**Report of the Committee on**

**Safety to Life**

**Technical Correlating Committee**

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Arup Fire [SE]

**Ron Coté,** *Nonvoting Secretary*
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**John L. Bryan,** Frederick, MD [SE]
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**Ronald K. Mengel,** System Sensor, IL [M]
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**Kirby W. Perry,** Kirby W. Perry Architects & Associates Inc., TX [SE]
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Staff Liaison: **Ron Coté**

**Committee Scope:** This Committee shall have primary responsibility for documents on the protection of human life from fire and other circumstances capable of producing similar consequences and for the nonemergency and emergency movement of people.

**Committee on Means of Egress**

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Staff Liaison: **Ron Coté**

**Committee Scope:** This Committee shall have primary responsibility for documents on the general requirements for safe egress for protection of human life from fire and other circumstances capable of producing similar consequences and on the nonemergency and emergency movement of people.

*These lists represent the membership at the time each Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the front of this book.*

The Report of the Committee on **Safety to Life** is presented for adoption.

This Report was prepared by the **Technical Committee on Means and Egress** and proposes for adoption, amendments to NFPA 101B, **Code for Means of Egress for Buildings and Structures** 1999 edition. NFPA 101B-1999 is published in Volume 5 of the 2001 National Fire Codes and in separate pamphlet form.

This Report has been submitted to letter ballot of the **Technical Committee on Means of Egress**, which consists of 28 voting members. The results of the balloting, after circulation of any negative votes, can be found in the report.

This Report has also been submitted to letter ballot of the **Technical Correlating Committee on Safety to Life**, which consists of 14 voting members; of whom 13 voted affirmatively, and 1 ballot was not returned (Longhitano).

Mr. Kalie, Jr. voted affirmative with the following comment: "Comment on 101B-5; Coordinate metrification plan with the TCC action September 26-27, 2000."

(Log #2)

101B- 1 - (Entire Document): Reject
**SUBMITTER:** Southern Regional Fire Code Dev. Committee
**RECOMMENDATION**: Disband the project and withdraw the document.
**SUBSTANTIATION:** NFPA 101B should be disbanded as it has not been used for its intended purpose. There is no need for redundant documents dealing with means of egress as NFPA 101 is the document used. The building code groups have not incorporated 101B into any of their documents, nor has any jurisdiction adopted it.
**COMMITTEE ACTION:** Reject.
**COMMITTEE STATEMENT:** Legitimate uses of NFPA 101B continue to develop. For example, the General Services Administration facility design standard will offer use of NFPA 101B, or Chapter 10 of the model building code used in the jurisdiction in question, in lieu of NFPA 101. Also, the State of Florida is considering using NFPA 101B in lieu of Chapter 10 of the 1999 edition of the Standard Building Code.

When the adoption of NFPA 101B was proposed at the International Code Council hearings as a substitute for Chapter 10 of the International Building Code, the vote was close.

It is premature to rescind NFPA 101B. It provides an option that might be especially useful to a jurisdictional authority that is enforcing an older edition of the UBC, NBC, or SBC.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP59)

101B- 2 - (Entire Document): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Reformat the chapter order as follows:
Chapter 1 Administration
Chapter 2 Mandatory References
Chapter 3 Definitions
Chapter 4 General
Chapter 5 New Construction
Chapter 6 Means of Escape
Chapter 7 Alterations, Repairs, of Change of Occupancy in Existing Structures
Annex A Explanatory Material
**SUBSTANTIATION:** Editorial. Compliance with the NFPA Manual of Style.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP60)

101B- 3 - (Entire Document): Accept in Principle
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Implement the Manual of Style directives with respect to reducing the use of exceptions.
**SUBSTANTIATION:** Compliance with the NFPA Manual of Style.
**COMMITTEE ACTION:** Accept in Principle.

The committee will work toward reducing the use of exceptions. The revised wording of NFPA 101B text will appear in the Report on Comments. In the meantime, staff will start the process by drafting materials for the committee's review. The task is huge if it is to be done so as to result in a document that is at least as usable as the current NFPA 101B which is formatted to use exceptions.
**COMMITTEE STATEMENT:** The above committee action recognizes that the reduction of use of exceptions required by the NFPA Manual of Style cannot be accomplished in time for the Report on Proposals. The committee will report its work product in the Report on Comments.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #28)

101B- 4 - (Entire Document): Reject
**SUBMITTER:** Jake Pauls, Jake Pauls Consulting Services
**RECOMMENDATION**: In all the Code's requirements for stairs, delete all requirements for minimum tread depth and maximum riser height. Add requirements for reduced egress capacity, for tread depths less than 11 inches and for riser dimensions exceeding 7 inches, based on adjustment formulas set out in NFPA 101A.
**SUBSTANTIATION:** It should be clear from the outset, and obvious given the proponent's advocacy efforts as well as the undeveloped nature of this proposal, that this is a "straw man" proposal intended to be rejected. It responds to the frequent public comments of at least one Means of Egress Technical Committee member (Mr. Brown) arguing that, in all of his examinations of the technical basis for riser-tread dimensions, he finds there is nothing there. For example, in Mr. Brown's testimony at the Fall 1999 NFPA Meeting, in relation to revision of stair riser-tread dimensions, he stated: "But basically, if you look at all the documentation there is, there is nothing there. There is no study. This is no nothing that shows that there is a real problem with the stair geometry that is there today. There is no numbers there. There just isn't." Mr. Brown's opinion is shared by some others. Given the weight being given by some to this opinion, it deserves a response by NFPA committees and members; this proposal provides an opportunity for this.
**COMMITTEE ACTION:** Reject.
**COMMITTEE STATEMENT:** The committee believes that riser and tread dimensions of stairs impact more than egress capacity; they affect the use of the stairs. Also, the adjustment factors of NFPA 101A referenced by the submitter are being deleted from NFPA 101A because they have not been kept up to date. As such, the material will not be available for reference purposes.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP67)

101B- 5 - (Entire Document): Accept in Principle
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Implement the Manual of Style directives with respect to changing the order in which units are expressed so that S.I./metric units are the standard and the British/customary units are shown in parentheses as approximate equivalents.
**SUBSTANTIATION:** Compliance with NFPA Manual of Style.
**COMMITTEE ACTION:** Accept in Principle.

The committee will make the change to metric units as primary and inch/pound units as the metric equivalent. The proposed changes will appear in the Report on Comments. The mertication process will follow the following steps:

1. Current inch/pound values shall be retained without modification but will be placed within parentheses so as to appear second.

2. The comparable metric value shall be calculated using the appropriate conversion factor and expressed in the units specified in the Manual of Style (e.g., multiply number of inches by 25.4 so as to express metric value in millimeters, not centimeters)

3. Adjust metric values for significant figures (i.e., rounding tolerance) using the following criteria:

| Foot-inch Dimension | Metric Value Rounded to |
|---|---|
| < 1/2 inch | Nearest tenth of a millimeter |
| 1/2 inch to < 3 inches | Nearest millimeter |
| 3 inches to < 10 feet | Nearest 5 millimeters |
| 10 feet to < approximately 33 feet | Nearest 10 millimeters |
| Approximately 33 feet and greater | Nearest meter |

4. Adjust metric value by rounding in opposite direction (i.e., not to "nearest" increment) if rounding to the nearest increment would make a currently complying existing element/feature non-complying upon precise application of the metric value.

**COMMITTEE STATEMENT:** The above committee action recognizes that the metrication required by the NFPA Manual of Style cannot be accomplished in time for the Report on Proposals. The steps that will be followed are provided above

as guidance to the reviewer of the ROP. The committee welcomes comments on the planned action.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP1)

101B- 6 - (Chapter 1 and Foreword): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise and reposition the Foreword so that it becomes Annex text tied to Chapter 1; Revise Chapter 1 and divide it into two chapters, Chapter 1 Administration and Chapter 4 General, as follows:

**Chapter 1 ~~General~~ Administration**

**1-1 Title.** NFPA 101B, *Code for Means of Egress for Buildings and Structures*, shall be known as the *Means of Egress Code*, is cited as such, and shall be referred to herein as "this *Code*" or "the *Code*."

**1-2* Scope.**

**1-2.1* Danger to Life from Fire.** The ~~This~~ *Code* addresses those egress features necessary to minimize danger to life from fire, including smoke or panic.

**1-2.2 Egress Facilities.** The ~~This~~ *Code* establishes ~~identifies the~~ minimum criteria for the design of egress facilities so as to permit prompt escape of occupants from buildings or, where desirable, ~~relocation~~ into safe areas within buildings.

**1.2.3 Areas Not Addressed.** The *Code* does not address the following:

(1) General fire prevention or building construction features that are normally a function of fire prevention codes and building codes

(2) Prevention of personal injuries incurred by an individual's own negligence

(3) Preservation of property from loss by fire

~~**1-2.3** This *Code* does not attempt to address all those general fire prevention or building construction features that are normally a function of fire prevention and building codes.~~

~~**1-2.4** The prevention of personal injuries incurred by an individual's own negligence, and the preservation of property from loss by fire have not been considered as the basis for any of the provisions of this Code.~~

**1-3* Application.**

**1-3.1 New Construction.**

**1-3.1.1** Means of egress for new construction shall comply with Chapter ~~3~~ 5 of this *Code* except as modified by 1-3.2 and 1-3.3.

**1-3.1.2** Large residential board and care occupancies with impractical evacuation capability shall meet the general requirements of Chapter ~~3~~ 5 and those requirements specifically applicable to health care occupancies.

**1-3.1.3** Where residential board and care occupancies are located within apartment buildings, the parts of the means of egress serving the apartment(s) used as a residential board and care occupancy shall meet the general requirements of Chapter ~~3~~ 5 and those requirements specifically applicable to apartment buildings.

**1-3.1.4** Ambulatory health care facilities shall be exempt from the means of egress requirements applicable to health care occupancies provided the facility meets the general requirements of Chapter ~~3~~ 5 and those requirements specifically applicable to business occupancies and ambulatory health care facilities.

**1-3.1.5*** Use Condition I detention and correctional occupancies shall meet the general requirements of Chapter 5 and those requirements specifically applicable to either residential occupancies or Use Condition II detention and correctional occupancies.

**1-3.2 Means of Escape.** The means of escape provisions of Chapter ~~4~~ 6 shall apply to the following:

(a) One- and two-family dwellings

(b) Dwelling units of apartment buildings

(c) Guest rooms or guest suites of hotels and dormitories

(d) Lodging and rooming houses

(e) Small residential board and care occupancies

Means of egress from dwelling units to the outside and from guest rooms or guest suites to the outside shall be in accordance with Chapter ~~3~~ 5.

**1-3.3 Alterations, Repairs, or Change of Occupancy in Existing Structures.** Alterations, repairs, or change of occupancy in existing structures shall comply with Chapter ~~3~~ 5 as modified by Chapter ~~5~~ 7.

**1-4 Equivalency.**

**1-4.1* Equivalency Option.** Nothing in this *Code* is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety as alternatives to those prescribed by this *Code*, provided technical documentation is submitted to the authority having jurisdiction to demonstrate equivalency and the system, method, or device is approved for the intended purpose by the authority having jurisdiction.

**1-4.2* Equivalent Compliance.** Alternative systems, methods, or devices approved as equivalent by the authority having jurisdiction shall be recognized as being in compliance with this *Code*.

**1-5 Units and Formulas.**

**1-5.1 SI Units.** Metric units of measurement in this *Code* are in accordance with the modernized metric system known as the International System of Units (SI).

**1-5.2 Primary and Equivalent Values.** If a value for measurement as given in this *Code* is followed by an equivalent value in other units, the first stated value shall be regarded as the requirement. A given equivalent value might be approximate.

**1-5.3 Conversion Procedure.** The conversion procedure used for the SI units was to multiply the quantity by the conversion factor and then round the result to the appropriate number of significant digits.

**1-6 Enforcement.**

**1-6.1 Administration and Enforcement.** This *Code* shall be administered and enforced by the authority having jurisdiction designated by the governing authority.

**Chapter 4 General**

**4-1 ~~1-6~~ Mixed Occupancies.**

**4-1.1 ~~1-6.1~~ Egress for Mixed Occupancies.** Where the means of egress of two or more classes of occupancy are intermingled in the same building or structure, ~~then~~ the means of egress shall comply with the most restrictive requirements of the occupancies involved.

**4-1.2 ~~1-6.2~~ Special Mixed Occupancy Provisions for Health Care Occupancies.**

**4-1.2.1 ~~1-6.2.1~~** All means of egress from health care occupancies that traverse non-health care spaces shall conform to the requirements of this *Code* for health care occupancies.

*Exception: Egress through a horizontal exit into other contiguous occupancies that do not conform with health care egress provisions but that do comply with the requirements set forth in the appropriate occupancy chapter of this Code shall be permitted, provided the occupancy does not contain high-hazard contents. The horizontal exit shall comply with the requirements of 5-2.4 ~~3-2.4~~.*

**4-1.2.2 ~~1-6.2.2~~** Egress provisions for areas of health care facilities that correspond to other occupancies shall meet the corresponding requirements of this *Code* for such occupancies. Where the clinical needs of the occupant necessitate locking the means of egress, staff shall be present for the supervised release of occupants during all times of use.

**4-1.2.3 ~~1-6.2.3~~** Non-health care related occupancies classified as containing high-hazard contents shall not be permitted in buildings housing health care occupancies.

**4-1.3 ~~1-6.3~~ Special Mixed Occupancy Provisions for Detention and Correctional Occupancies.**

**4-1.3.1 ~~1-6.3.1~~** Egress provisions for areas of detention and correctional facilities that correspond to other occupancies shall meet the corresponding requirements of this *Code* for such occupancies. Where security operations necessitate locking the required means of egress, staff shall be present for the supervised release of occupants during all times of use.

**4-1.3.2 ~~1-6.3.2~~** All means of egress from detention and correctional occupancies that traverse other use areas shall conform, as a minimum, to the requirements of this *Code* for detention and correctional occupancies.

*Exception: Egress through a horizontal exit into other contiguous occupancies that do not conform to detention and correctional occupancy egress provisions but that do comply with the requirements set forth in the appropriate occupancy chapter of this Code shall be permitted, provided the occupancy does not contain high-hazard contents. The horizontal exit shall comply with the requirements of 5-2.4 ~~3-2.4~~.*

**4-1.3.3 ~~1-6.3.3~~** Nondetention or noncorrectional related occupancies classified as containing high-hazard contents shall not be permitted in buildings housing detention or correctional occupancies.

**4-1.4* ~~1-6.4~~ Special Mixed Occupancy Provisions for Residential Occupancies.**

**4-1.4.1 ~~1-6.4.1~~**

No dwelling unit of a residential occupancy shall have its sole means of egress pass through any nonresidential ~~assembly, business, or mercantile~~ occupancy in the same building.

*Exception: Day-care homes within a dwelling unit.*

**4-1.4.2** No residential board and care occupancy shall have its sole means of egress pass through any nonresidential or non-health care occupancy in the same building.

**4-1.4.3 ~~1-6.4.2~~** No multiple dwelling unit of a residential occupancy shall be located above any nonresidential ~~an assembly, business, or mercantile~~ occupancy.

*Exception No. 1: Where the dwelling unit of the residential occupancy and exits therefrom are separated from the nonresidential ~~assembly, business, or mercantile~~ occupancy by construction having a fire resistance rating of not less than ~~at least~~ 1 hour.*

*Exception No. 2: Where the nonresidential ~~assembly, business, or mercantile~~ occupancy is protected throughout by an approved, supervised automatic sprinkler system.*

**4-1.4.4** No residential board and care occupancy shall be located above any nonresidential or non-health care occupancy.

*Exception: Where the residential board and care occupancy and exits therefrom are separated from the nonresidential or non-health care occupancy by construction having a fire resistance rating of not less than 2 hours.*

**4-2 ~~1-7~~ Hazard of Contents.**

**4-2.1 ~~1-7.1~~ General.**

**4-2.1.1 ~~1-7.1.1~~** The hazard of contents, for the purpose of this *Code*, shall be the relative danger of the start and spread of fire, the danger of smoke or gases generated, and the danger of explosion or other occurrence potentially endangering the lives and safety of the occupants of the building or structure.

**4-2.1.2 ~~1-7.1.2~~** Hazard of contents shall be determined by the authority having jurisdiction on the basis of the character of the contents and the processes or operations conducted in the building or structure.

**4-2.1.3 ~~1-7.1.3~~** ~~For the purpose of this *Code*, where~~ Where different degrees of hazard of contents exist in different parts of a building or structure, the most hazardous shall govern the classification for the purpose of this *Code* unless ~~Exception: Where~~ hazardous areas are separated or protected as required by the building code.

**4-2.2 ~~1-7.2~~ Classification of Hazard of Contents.**

**4-2.2.1 ~~1-7.2.1~~** The hazard of contents of any building or structure shall be classified as low, ordinary, or high in accordance with 4-2.2.2, 4-2.2.3, and 4-2.2.4 ~~1-7.2.2, 1-7.2.3, and 1-7.2.4~~.

**4-2.2.2 ~~1-7.2.2~~ Low Hazard.** Low-hazard contents shall be classified as those of such low combustibility that no self-propagating fire therein can occur.

**4-2.2.3* ~~1-7.2.3*~~ Ordinary Hazard.** Ordinary-hazard contents shall be classified as those that are likely to burn with moderate rapidity or to give off a considerable volume of smoke.

**4-2.2.4* ~~1-7.2.4*~~ High Hazard.** High-hazard contents shall be classified as those that are likely to burn with extreme rapidity or from which explosions are likely. *(For means of egress requirements, see Section 5-11 ~~3-11~~.)*

**A-1-2** The purpose of this *Code* is to provide minimum requirements, with due regard to function, for the design and installation of means of egress in buildings and structures for safety to life from fire. Its provisions will also aid life safety in similar emergencies.

The *Code* endeavors to avoid requirements that might involve unreasonable hardships or unnecessary inconvenience or interference with the normal use and occupancy of a building, but provides minimum requirements for means of egress that are consistent with the public interest. The protection methods assume a single fire source.

**A-1-2.1** The *Code* recognizes that panic in a burning building might be uncontrollable, but deals with the potential panic hazard through measures designed to prevent the development of panic. Experience indicates that panic seldom develops, even in the presence of potential danger, so long as occupants of buildings are moving toward exits that they can see within a reasonable distance with no obstructions or undue congestion in the path of travel. However, any uncertainty as to the location or adequacy of means of egress, the presence of smoke, or the stoppage of egress travel, such as might occur when one person stumbles and falls on the stairs, might be conducive to panic. Panic danger is greatest when there are large numbers of people in a confined area.

**A-1-3 Application.** ~~FOREWORD.~~ This document is intended to be used as part of a building code and not as a stand-alone document. This document was developed with the understanding that the building code with which it is used addresses fire protection and life safety features essential to safe egress. These features include: classification and separation of occupancies, protection of vertical openings, requirements for fire protection systems and equipment (fire alarms, extinguishers, automatic extinguishing systems, standpipes, and smoke control), interior finish, building construction and compartmentation, building service equipment, special hazard protection, and so on.

This document was written with the expectation that automatic sprinkler protection is provided throughout new health care occupancies and new detention and correctional occupancies. Thus, the provisions of this document are meant for application to sprinklered health care occupancies and sprinklered detention and correctional occupancies. If the building code with which NFPA 101B is to be used does not require automatic sprinkler protection throughout health care occupancies and detention and correctional occupancies, NFPA 101B will not provide the necessary level of life safety for those occupancies. In such cases, NFPA 101B should not be used.

Examples of how the occupancy classes addressed by this document might compare with the occupancy classes used in the International Building Code (IBC) are illustrated in Table A-1-3 ~~1~~.

This document also recognizes that the building code will scope the application of this document as it relates to new construction, additions, alterations, renovations, and change of use.

**Table A-1-3 ~~1~~ Occupancy Classification Comparison**

| General | IBC | NFPA 101B |
|---|---|---|
| Assembly | A1, A2, A3, A4, A5 | Assembly |
| Business | B | Business |
| Educational | E | Educational |
| Factory | F1, F2 | General and special purpose industrial |
| Industrial Hazardous | H1, H2, H3 | High-hazard industrial, other occupancies with high- hazard contents |
| | H4 | Business, general industrial, storage |
| | H5 | General or high-hazard industrial |
| Institutional | I1 | Large residential board and care |
| | I2 | Health care (hospital, nursing home, limited care) |
| | I3 (Condition 1-5) | Detention and correctional |
| | I4 (Adult Care, Child Care, Child Day Care, Child Day- Care Home) | Day care (day- care occupancy, group day- care home, family day- care home) |
| Mercantile | M | Mercantile (Class A, B, C) |
| Residential | R1 | Hotels |
| | R2 | Apartments, dormitories, lodging and rooming houses |
| | R3 | One- and two-family dwellings |
| | R4 | Small residential board and care |
| Storage | S1, S2 | Storage |
| Utility/Misc. | U | (not applicable) |

**A-1-3.1.5** If the Use Condition I facility conforms to the requirements of residential occupancies under this *Code*, there are no staffing requirements. If the Use Condition I facility conforms to the requirements of Use Condition II facilities, staffing is required.

**A-1-4.1** Before a particular mathematical fire model or evaluation system is used, its purpose and limitations need to be known. The technical documentation should clearly identify any assumptions included in the evaluation. Also, it is the intent of the Committee on Safety to Life to recognize that future editions of this *Code* are a further refinement of this edition and earlier editions. The changes in future editions will reflect the continuing input of the fire protection/life safety community in its attempt to meet the purpose stated in this *Code*.

This document does not offer a performance-based option because means of egress is only a portion of an overall life safety system. The NFPA 101 *Life Safety Code* presents a performance-based option because it addresses all aspects of life safety from fire.

**A-1-4.2** An equivalent method of protection is one that provides an equal or greater level of safety. It is not a waiver or deletion of a *Code* requirement.

**A-4.1.4** Although not considered as a residential occupancy in the Life Safety Code, residential board and care occupancies are addressed in this *Code* as residential occupancies along with dwellings, lodging/rooming houses, apartment buildings, and hotels/dormitories.

**A-4-2.2.3 ~~A-1-7.2.3~~** Ordinary-hazard classification represents the conditions found in most buildings and is the basis for the general requirements of this *Code*.

The fear of poisonous fumes or explosions is necessarily a relative matter to be determined on a judgment basis. All smoke contains some toxic fire gases but, under conditions of ordinary hazard, there should be no unduly dangerous exposure during the period necessary to escape from the fire area, assuming there are proper exits.

**A-4-2.2.4 ~~A-1-7.2.4~~** High-hazard contents might include occupancies where ~~gasoline and other~~ flammable liquids are handled or used or are stored under conditions involving possible release of flammable vapors; where grain dust, wood flour or plastic dust, aluminum or magnesium dust, or other explosive dusts might be produced; where hazardous chemicals or explosives are manufactured, stored, or handled; where cotton or other combustible fibers are processed or handled under conditions producing flammable flyings; and other situations of similar hazard.

**SUBSTANTIATION:** The changes are made for compliance with the NFPA Manual of Style and correlation with NFPA 101-2000. In 1-4.1 the committee believes that the wording proposed better explains the equivalency concept than does the NFPA boilerplate language which seems to infer that the AHJ must grant the equivalency regardless of the merits of the case.

In 4-1.4.1, the proposed new exception recognizes a common situation that probably wasn't contemplated when the similar language was prepared for NFPA 101-2000. Day-care homes occur within dwelling units. Means of escape and means of egress for the dwelling unit should be permitted to pass through the day-care home.

The word "residential" has been added before the words "board and care occupancy" in numerous places to correct the terminology.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #32)

101B- 7 - (1-2.1 and 1-2.4): Accept in Principle in Part

**SUBMITTER:** Jake Pauls, Jake Pauls Consulting Services

**RECOMMENDATION**: Revise text as follows:

1-2.1* This code addresses those egress features necessary to minimize danger to life from fire, including smoke ~~or~~ panic,

crowd pressures and mishaps in movement of individuals and of groups.

1-2.4 The ~~prevention of personal injuries incurred by an individual's own negligence, and the~~ preservation of property from loss by fire ~~have~~ has not been considered as the basis for any of the provisions of this Code.

**SUBSTANTIATION:** Chapters 3 and 4 include provisions that reduce the chance of mishaps to people moving on means of egress routes whether in emergency or normal occupancy conditions. Such mishaps include falls for example which are problematic under all use conditions but can lead to disasters under emergency conditions, as is already noted in the appendix. Crowd crush problems - which kill as many people in large assembly facilities as does fire are also dealt with in Chapter 3 in the context of assembly facilities. The related proposed change to 1-2.4 deletes some relatively useless language based on knowing when a personal injury is due solely, partly or not all to an individual's negligence. Often human error is due to the environment or is not reasonably mitigated by the environment. Note that in ergonomics, the science and technology of designing to human use, a central theme is: "To err is human. To forgive, design."

This proposal follows up on an unsuccessful proposal for the first edition of NFPA 101B. Much has changed since the development of that edition. Especially notable is the significant change in NFPA's mission statement to move well beyond fire and related hazards. NFPA's new mission statement, adopted in 1999, includes the following language which refers to "other hazards" rather than "related hazards.":

"To reduce the worldwide burden of fire and other hazards on the quality of life by advocating scientifically-based consensus codes and standards, research, training and education."

This fundamental shift in mission, along with NFPA's new effort in producing a building code, means that a fundamental restatement of the scope of NFPA 101B (as well as NFPA 101) is in order. Note that the Code already addresses many injury prevention topics beyond egress in case of fire and related hazards. The changes proposed here in Section 1-2 simply reflect what the Code already covers to a significant extent.

**COMMITTEE ACTION:** Accept in Principle in Part.

Do not revise 1-2.4.

Revise 1-2.1 as follows:

1-2.1* This code addresses those egress features necessary to minimize danger to life from fire ~~, including smoke or panic~~ and smoke, crowd pressures, and movement of individuals and groups.

**COMMITTEE STATEMENT:** See Proposal 101B-6 (Log #CP1) where the subject of current 1-2.4 is part of subitem (2) of the new 1.2.3. The thought that the Code does not address an individual's own negligence must be retained. The Code cannot reasonably protect against things such as careless smoking or igniting one's own clothing while washing items in gasoline in the kitchen sink.

The proposer's change to 1-2.1 with respect to the word "mishaps" is too encompassing. Much of the language in NFPA 101B was taken from NFPA 101 which has traditionally been limited in scope to protection from fire. Simply expanding the scope statement without expanding greatly the set of requirements would do the reader a disservice. The scope statement would claim that the document does one thing, but the actual code requirements would be lacking.

Some of the submitter's changes to 1-2.1 have been accepted. See the addition of the words "crowd pressures, and movement of individuals and groups." There are provisions in NFPA 101B, especially within those applicable to assembly occupancies, that do address crowd pressures and people movement.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP22)

101B- 8 - (1-6.1): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Per the action taken on Proposal 101B-6 (Log #CP1), paragraph 1-6.1 Mixed Occupancies is being moved into Chapter 4 General so as to become 4.1.1 Egress for Mixed Occupancies. Further revise the material to read:

4-1.1 Egress for Mixed Occupancies.

4-1.1.1 Where the means of egress of two or more classes of occupancy are intermingled in the same building or structure, the means of egress shall comply with the most restrictive requirements of the occupancies involved.

4-1.1.2 Where occupancies are separated by horizontal exits, egress through the horizontal exit shall not be the basis for designation as a mixed occupancy.

**SUBSTANTIATION:** Creation of the new 4-1.1.2 is a technical change that the committee believes is reasonable. If the egress from one occupancy passes through an adjacent occupancy and the transition from one to the other occurs at a horizontal exit, the two spaces should not be treated as a mixed occupancy. The horizontal exit affords the degree of safety needed to permit the protection to be that provided by the requirements applicable to the occupancy of the space.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP2)

101B- 9 - (Chapter 2 Definitions): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise and reposition Chapter 2 Definitions to become Chapter 3 as follows:

**Chapter 3 ~~2~~ Definitions**

**3.1 GENERAL ~~2-1 General.~~**

**3.1.1 ~~2-1.1~~** The following terms ~~defined in Section 2-2~~, for the purposes of this *Code*, shall have the meanings given in this chapter, if not otherwise modified for a specific occupancy.

**3.1.2 ~~2-1.2~~** Words used in the present tense shall include the future; words used in the masculine gender shall include the feminine and neuter; the singular number shall include the plural and the plural shall include the singular.

**3.1.3 ~~2-1.3~~** Where terms are not defined in this chapter, they shall be defined using ~~have~~ their ordinarily accepted meanings ~~or such as~~ within the context ~~implies~~ in which they are used. *Webster's Third New International Dictionary of the English Language, Unabridged*, shall be a source for ordinarily accepted meaning.

**3.2 OFFICIAL NFPA DEFINITIONS ~~2-2 Definitions.~~**

**3.2.1* Approved.** Acceptable to the authority having jurisdiction.

**3.2.2* Authority Having Jurisdiction.** The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure.

**3.2.3* Code.** A standard that is an extensive compilation of provisions covering broad subject matter or that is suitable for adoption into law independently of other codes and standards.

**3.2.4 Labeled.** Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

**3.2.5* Listed.** Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

**3.2.6 Shall.** Indicates a mandatory requirement.

**3.2.7 Should.** Indicates a recommendation or that which is advised but not required.

**3.3 GENERAL DEFINITIONS**

~~**Access Openings.** A window, panel, or similar opening that meets the following criteria:~~

~~(a) The opening has minimum dimensions of not less than 22 in. (55.9 cm) in width and 24 in. (61 cm) in height and is unobstructed to allow for ventilation and rescue operations from the exterior.~~

~~(b) The bottom of the opening is not more than 44 in. (112 cm) above the floor.~~

~~(c) The opening is readily identifiable from both the exterior and interior.~~

~~(d) * The opening is readily opened from both the exterior and interior.~~

**[renamed as "Emergency Access Opening" and relocated alphabetically]**

**3.3.1 Accessible Means of Egress.** See 3.3.70.1, *Means of Egress, Accessible*.

~~A path of travel, usable by a person with a severe mobility impairment, that leads to a public way or an area of refuge and that complies with the accessible route requirements of ICC/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities.*~~

**3.3.2* Aisle Accessway.** That initial portion of an exit access that leads to an aisle.

**3.3.3 Ambulatory Health Care Facilities.** See 3.3.74.1, *Occupancy, Ambulatory Health Care*.

~~A building or part of a building that is used to provide services or treatment to four or more patients at the same time and that meets the criteria of either (a) or (b):~~

~~(a) Facilities that provide, on an outpatient basis, treatment for patients incapable of taking action for self-preservation under emergency conditions without assistance from others.~~

~~(b) Facilities that provide, on an outpatient basis, surgical treatment that requires general anesthesia.~~

**3.3.4 Anchor Store.** A department store or major merchandising center that has direct access to the covered mall but ~~that has~~ in which all required means of egress is independent of the covered mall.

~~**Approved.*** Acceptable to the authority having jurisdiction.~~

**[moved to Section 3.2]**

~~**Area.** See *Floor Area, Gross*, and *Floor Area, Net.*~~

**3.3.5 Area.** See 3.3.45, *Floor Area, Gross* and 3.3.46, *Floor Area, Net*.

**3.3.5.1 Area, Gross Leasable.** The total floor area designated for tenant occupancy and exclusive use, expressed in square feet (square meters), measured from the centerlines of adjoining partitions and exteriors of outside walls.

**3.3.5.2 Area, Hazardous.** ~~Those areas of structures or buildings posing~~ An area of a structure or building that poses a degree of hazard greater than that normal to the general occupancy of the building or structure, such as those areas used for the storage or use of combustibles or flammables; toxic, noxious, or corrosive materials; or heat-producing appliances.

**3.3.5.3 Area, Living.** Any normally occupiable space in a residential occupancy, other than sleeping rooms or rooms that are intended for combination sleeping/living, bathrooms, toilet compartments, kitchens, closets, halls, storage or utility spaces, and similar areas.

~~**Area of Refuge.*** An area of refuge is defined by either (a) or (b):~~

~~(a) A story in a building where such building is protected throughout by an approved, supervised automatic sprinkler system and has at least two accessible rooms or spaces separated from each other by smoke-resisting partitions~~

~~(b) A space, in a path of travel leading to a public way, that is protected from the effects of fire, either by means of separation from other spaces in the same building or by virtue of location, thereby permitting a delay in egress travel from any level.~~

**3.3.6* Area of Refuge.** An area that is either (1) a story in a building where the building is protected throughout by an approved, supervised automatic sprinkler system and has not less than two accessible rooms or spaces separated from each other by smoke-resisting partitions; or (2) a space located in a path of travel leading to a public way that is protected from the effects of fire, either by means of separation from other spaces in the same building or by virtue of location, thereby permitting a delay in egress travel from any level.

**3.3.7 Atmosphere, Common.** The atmosphere that exists between rooms, spaces, or areas within a building that are not separated by an approved smoke barrier.

**3.3.8 Atmosphere, Separate.** The atmosphere that exists between rooms, spaces, or areas that are separated by an approved smoke barrier.

~~**Authority Having Jurisdiction.*** The organization, office, or individual responsible for approving equipment, an installation, or a procedure.~~

**[moved to Section 3.2]**

**3.3.9 Automatic.** ~~Providing~~ That which provides a function without the necessity of human intervention.

**3.3.10* Barrier, Smoke.** A continuous membrane, ~~either vertical or horizontal, such as a wall, floor, or ceiling assembly~~ or a membrane with discontinuities created by protected openings, ~~that is~~ where such membrane is designed and constructed to restrict the movement of smoke.

**3.3.11* Barrier, Thermal.** A material that limits the average temperature rise of an unexposed surface to not more than 250°F (120°C) for a specified fire exposure complying with the standard time-temperature curve of NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*.

**3.3.12* Birth Center.** A facility in which low-risk births are expected ~~planned to occur~~ following normal, uncomplicated pregnancies ~~pregnancy~~, and in which ~~provides~~ professional midwifery care is provided to women during pregnancy, birth, and postpartum.

**3.3.13 Bleachers.** A grandstand in which the seats are not provided with backrests.

**3.3.14* Building.** Any structure used or intended for supporting or sheltering any use or occupancy. ~~The term *building* is construed as if followed by the words "or portions thereof."~~

**3.3.14.1* Building, Apartment.** A building containing three or more dwelling units with independent cooking and bathroom facilities.

**3.3.14.2 Building, Bulk Merchandising Retail.** A building in which the sales area includes the storage of combustible materials on pallets, in solid piles, or in racks in excess of 12 ft (3.7 m) in storage height.

**3.3.14.3* Building, Covered Mall.** A building, including the covered mall, enclosing a number of tenants and occupancies, such as retail stores, drinking and dining establishments, entertainment and amusement facilities, offices, and other similar uses, wherein two or more tenants have a main entrance into the covered mall.

**3.3.14.4* Building, Existing.** A building erected or officially authorized prior to the effective date of the adoption of this edition of the *Code* by the agency or jurisdiction.

**3.3.14.5* Building, Flexible Plan and Open Plan Educational or Day-Care.** ~~These include~~ A building or portion of a building designed for multiple teaching stations.

~~Flexible plan buildings have movable corridor walls and movable partitions of full-height construction with doors leading from rooms to corridors.~~

~~Open plan buildings have rooms and corridors delineated by tables, chairs, desks, bookcases, counters, low-height [maximum 5-ft (1.5-m)] partitions, or similar furnishings.~~

**3.3.14.6* Building, High-Rise.** A building ~~more~~ greater than 75 ft (23 m) in height where the building height is measured from the lowest level of fire department vehicle access to the floor of the highest occupiable story ~~that is capable of being occupied~~.

**3.3.14.7* Building, Special Amusement.** ~~Any~~ A building that is temporary, permanent, or mobile ~~and~~ that contains a device or system that conveys passengers or provides a walkway along, around, or over a course in any direction as a form of amusement arranged so that the egress path is not readily apparent due to visual or audio distractions or an intentionally confounded egress path, or is not readily available due to the mode of conveyance through the building or structure.

**3.3.15 Bulk Merchandising Retail Building.** See 3.3.14.2, *Building, Bulk Merchandising Retail*.

~~A building in which the sales area includes the storage of combustible materials on pallets, in solid piles, or in racks in excess of 12 ft (3.7 m) in storage height.~~

**3.3.16 Class A ~~Store~~ Mercantile Occupancy.** All stores that have an aggregate gross area of more than 30,000 $ft^2$ (2800 $m^2$) or that use more than three levels, excluding mezzanines, for sales purposes.

**3.3.17* Class B ~~Store~~ Mercantile Occupancy.** All stores of more than 3000 $ft^2$ (280 $m^2$) but not more than 30,000 $ft^2$ (2800 $m^2$) aggregate gross area, or that use floors above or below the street floor level for sales purposes.

**3.3.18 Class C ~~Store~~ Mercantile Occupancy.** All stores of not more than 3000 $ft^2$ (280 $m^2$) gross area that use a maximum of one story or one story and mezzanines for sales purposes.

**3.3.19* Common Path of Travel.** The ~~That~~ portion of exit access that must be traversed before two separate and distinct paths of travel to two exits are available. ~~Paths that merge are common paths of travel.~~

~~**Conversion.**~~

~~A change of occupancy from an existing residential or health care occupancy to a residential board and care occupancy.~~

**[See NFPA 101-2000, 32.1.1.3/33.1.1.3 where the subject of conversions has been made a requirement rather than a definition]**

**3.3.20 Court.** An open, uncovered, unoccupied space, unobstructed to the sky, bounded on three or more sides by exterior building walls.

**3.3.20.1 Court, Enclosed.** A court bounded on all sides by the exterior walls of a building or by the exterior walls and lot lines on which walls are ~~allowable~~ permitted.

**3.3.21 Covered Mall.** A covered or roofed interior area used as a pedestrian way and connected to a building(s) or portions of a building housing single or multiple tenants.

**3.3.22 Covered Mall Building.** See 3.3.14.3, *Building, Covered Mall.*

~~A building, including the covered mall, enclosing a number of tenants and occupancies, such as retail stores, drinking and dining establishments, entertainment and amusement facilities, offices, and other similar uses, wherein two or more tenants have a main entrance into the covered mall.~~

**3.3.23 Day-Care Home.** A building or portion ~~part~~ of a building in which more than 3 but not more than 12 clients receive care, maintenance, and supervision, by ~~from~~ other than their relative(s) or legal guardian(s), for less than 24 hours per day.

~~**Direct Exit.** An exit that serves only one area; the direct exit has no openings to *other* areas.~~

**3.3.24 Dwelling Unit.** A single unit ~~in a residential occupancy that provides, providing~~ complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.

**3.3.25* Electroluminescent.** Refers to a light-emitting capacitor in which alternating current excites phosphor atoms placed between electrically conductive surfaces and produces light.

**3.3.26 Elevator Evacuation System.** A system, including a vertical series of elevator lobbies and associated elevator lobby doors, an elevator shaft(s), and a machine room(s), that provides protection from fire effects for elevator passengers, people waiting to use elevators, and elevator equipment so that elevators can be used safely for egress.

**3.3.27 Elevator Lobby.** A space from which people directly enter an elevator car(s) and to which people directly leave an elevator car(s).

**3.3.28 Elevator Lobby Door.** A door between an elevator lobby and another building space other than the elevator shaft.

**3.3.29 Emergency Access Opening.** A window, panel, or similar opening in which (1) the opening has dimensions of not less than 22 in. (55.9 cm) in width and 24 in. (61 cm) in height and is unobstructed to allow for ventilation and rescue operations from the exterior, (2) the bottom of the opening is not more than 44 in. (112 cm) above the floor, (3) the opening is readily identifiable from both the exterior and interior, and (4) the opening is readily openable from both the exterior and interior.

~~**Evacuation Capability.*** The ability of the occupants, residents, and staff of a residential board and care occupancy as a group either to evacuate a building or to relocate from the point of occupancy to a point of safety. If the occupants include family members of the owners or operators, it is intended that the needs of the family members be considered in determining evacuation capability.~~

~~The levels of evacuation capability are as follows:~~

~~(a) *Prompt.* The ability of a group to move reliably to a point of safety in a timely manner that is equivalent to the capacity of a household in the general population.~~

~~(b) *Slow.* The ability of a group to move reliably to a point of safety in a timely manner, but not as rapidly as members of a household in the general population.~~

~~(c) *Impractical*. The inability of a group to reliably move to a point of safety in a timely manner.~~

**3.3.30* Evacuation Capability.** The ability of occupants, residents, and staff as a group either to evacuate a building or to relocate from the point of occupancy to a point of safety.

**3.3.30.1 Evacuation Capability, Impractical.** The inability of a group to reliably move to a point of safety in a timely manner.

**3.3.30.2 Evacuation Capability, Prompt.** The ability of a group to move reliably to a point of safety in a timely manner that is equivalent to the capacity of a household in the general population.

**3.3.30.3 Evacuation Capability, Slow.** The ability of a group to move reliably to a point of safety in a timely manner, but not as rapidly as members of a household in the general population.

**3.3.31 Exhibit ~~Exhibits~~.** A space or portable structure used for the display of products or services.

**3.3.32* Existing.** That which is already in existence on the date when this edition of the *Code* goes into effect.

**3.3.33* Exit.** That portion of a means of egress that is separated from all other spaces of the building or structure by construction or equipment ~~that provides~~ as required to provide a protected ~~path~~ way of travel to the exit discharge.

**3.3.33.1* Exit, Horizontal.** A ~~path~~ way of passage from one building to an area of refuge in another building on approximately the same level, or a ~~path~~ way of passage through or around a fire barrier to an area of refuge on approximately the same level in the same building that affords safety from fire and smoke originating from the area of incidence and areas communicating therewith.

**3.3.34 Exit Access.** That portion of a means of egress that leads to an exit.

**3.3.35 Exit Discharge.** That portion of a means of egress between the termination of an exit and a public way.

**3.3.35.1 Exit Discharge, Level of.** (1) The lowest story from which not less than 50 percent of the required number of exits and not less than 50 percent of the required egress capacity from such a story discharge directly outside at grade; (2) the story with the smallest elevation change needed to reach grade where no story has 50 percent or more of the required number of exits and 50 percent or more of the required egress capacity from such a story discharge directly outside at grade.

**3.3.36 Exposition.** An event in ~~an assembly occupancy during~~ which the display of products or services is organized to bring together the provider and user of the products or services.

**3.3.37 Exposition Facility.** A convention center, hotel, or other building at ~~in~~ which exposition events are held.

~~**Exterior Stair.** See *Outside Stairs.*~~

**3.3.38 Externally Illuminated.** See 3.3.62, *Illuminated, Externally.*

**3.3.39 Family Day-Care Home.** A day-care home in which more than three but fewer than seven clients receive care, maintenance, and supervision, by other than their relative(s) or legal guardian(s), for less than 24 hours per day.

**3.3.40 Festival Seating.** See 3.3.90, *Seating, Festival.*

~~That form of audience/spectator accommodation in which no seating, other than a floor or ground surface, is provided for the audience/spectators gathered to observe some performance.~~

**3.3.41 Fire Exit Hardware.** A door-latching assembly incorporating a device that releases the latch upon the application of a force in the direction of egress travel and provides fire protection where used as part of a fire door assembly.

**3.3.42 Fire Protection Rating.** See 3.3.86, *Rating, Fire Protection*.

~~The designation indicating the duration of the fire test exposure to which a fire door assembly or fire window assembly was exposed and successfully met all the acceptance criteria as determined in accordance with NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, or NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*, respectively.~~

**3.3.43 Fire Resistance Rating.** See 3.3.87, *Rating, Fire Resistance*.

~~The time, in minutes or hours, that materials or assemblies have withstood a fire exposure as established in accordance with the test procedures of NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*.~~

**3.3.44 Flexible Plan and Open Plan Educational Occupancy or Day-Care Building ~~Buildings~~.** See 3.3.25.5, *Building, Flexible Plan and Open Plan Educational or Day-Care*.

~~These include a building or portion of a building designed for multiple teaching stations.~~

~~Flexible plan buildings have movable corridor walls and movable partitions of full-height construction with doors leading from rooms to corridors.~~

~~Open plan buildings have rooms and corridors delineated by tables, chairs, desks, bookcases, counters, low-height [maximum 5-ft (1.5-m)] partitions, or similar furnishings.~~

**3.3.45* Floor Area, Gross.** The floor area within the inside perimeter of the outside walls of the building under consideration with no deduction for hallways, stairs, closets, thickness of interior walls, columns, or other features.

**3.3.46 Floor Area, Net.** The floor area that ~~Net floor area~~ is the actual occupied area, not including accessory unoccupied areas or thickness of walls.

**3.3.47 General Industrial Occupancy.** See 3.3.74.8.1, *Occupancy, Industrial, General*.

~~Ordinary- and low-hazard industrial operations conducted in buildings of conventional design suitable for various types of industrial processes.~~

**3.3.48 Grandstand.** A structure that provides tiered or stepped seating.

**3.3.49 Gridiron.** The structural framing over a stage supporting equipment for hanging or flying scenery and other stage effects.

**3.3.50 Gross Leasable Area.** See 3.3.5.1, *Area, Gross Leasable*.

~~The total floor area designated for tenant occupancy and exclusive use, expressed in square feet (square meters), measured from centerlines of adjoining partitions and exteriors of outside walls.~~

**3.3.51 Group Day-Care Home.** A day-care home in which at least 7 but not more than 12 clients receive care, maintenance, and supervision, by ~~from~~ other than their relative(s) or legal guardian(s), for less than 24 hours per day.

**3.3.52 Guard.** A vertical protective barrier erected along exposed edges of stairways, balconies, and similar areas.

**3.3.53 Guest Room.** An accommodation combining living, sleeping, sanitary, and storage facilities within a compartment.

**3.3.54 Guest Suite.** An accommodation with two or more contiguous rooms comprising a compartment, with or without doors between such rooms, that provides living, sleeping, sanitary, and storage facilities.

**3.3.55 Handrail.** A bar, pipe, or similar member designed to furnish persons with a handhold.

**3.3.56 Hazardous Area.** ~~See 3.3.xx.2, *Area, Hazardous*.~~

Those areas of structures or buildings posing a degree of hazard greater than that normal to the general occupancy of a building or structure, such as those areas used for the storage or use of combustibles or flammables; toxic, noxious, or corrosive materials; or heat-producing appliances.

**3.3.57 High-Hazard Industrial Occupancy.** See 3.3.74.8.2, *Occupancy, Industrial, High Hazard.*

~~Buildings that have high-hazard materials, processes, or contents, excluding incidental high-hazard operations in low- or ordinary-hazard industrial occupancies that are protected in an approved manner.~~

**3.3.58 High-Rise Building.** See 3.3.14.6, *Building, High-Rise.*

~~A building more than 75 ft (23 m) in height where building height is measured from the lowest level of fire department vehicle access to the floor of the highest story that is capable of being occupied.~~

**3.3.59 Horizontal Exit.** See 3.3.33.1, *Exit, Horizontal*.

~~A path of passage from one building to an area of refuge in another building on approximately the same level, or a path of passage through or around a fire barrier to an area of refuge on approximately the same level in the same building that affords safety from fire and smoke originating from the area of incidence and areas communicating therewith.~~

**3.3.60 Hospital.** A building or portion ~~part~~ thereof used on a 24-hour basis for the medical, psychiatric, obstetrical, or surgical care of four or more inpatients.

**3.3.61* Hotel.** A building or groups of buildings under the same management in which there are sleeping accommodations for more than 16 persons and primarily used by transients for lodging with or without meals.

**3.3.62* Illuminated, Externally.** Refers to an illumination source that is contained outside of the device or sign legend area that is to be illuminated.

**3.3.63* Illuminated, Internally.** Refers to an illumination source that is contained inside the device or legend that is illuminated.

**3.3.64 Internally Illuminated.** See 3.3.63, *Illuminated, Internally*.

**3.3.65 Level of Exit Discharge.** See 3.3.35.1, *Exit Discharge, Level of*.

~~**Labeled.** Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.~~

**[Moved to Section 3.2]**

**3.3.66 Life Safety Evaluation.** A written review dealing with the adequacy of life safety features relative to fire, storm, collapse, crowd behavior, and other related safety considerations.

**3.3.67* Limited Care Facility.** A building or portion ~~part~~ of a building used on a 24-hour basis for the housing of four or more persons who are incapable of self-preservation because of age, physical limitations due to accident or illness, or ~~mental limitations~~ limitations such as mental retardation/developmental disability, mental illness, or chemical dependency.

~~**Listed.*** Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets identified standards or has been tested and found suitable for a specified purpose.~~

**[Moved to Section 3.2]**

**3.3.68 Living Area.** See 3.3.5.3, *Area, Living*.

~~Any normally occupiable space in a residential occupancy, other than sleeping rooms or rooms that are intended for combination sleeping/living, bathrooms, toilet compartments, kitchens, closets, halls, storage or utility spaces, and similar areas.~~

**3.3.69 Lodging or Rooming House.** A building or portion thereof that does not qualify as a one- or two-family dwelling, that provides sleeping accommodations for a total of 16 or fewer people on a transient or permanent basis, without personal care services, with or without meals, but without separate cooking facilities for individual occupants.

**3.3.70* Means of Egress.** A continuous and unobstructed way of travel from any point in a building or structure to a public way consisting of three separate and distinct parts: (1) the exit access, (2) the exit, and (3) the exit discharge.

~~A continuous and unobstructed path of travel from any point in a building or structure to a public way that consists of the following separate and distinct parts:~~

~~(a) Exit access~~

~~(b) Exit~~

~~(c) Exit discharge~~

**3.3.70.1 Means of Egress, Accessible.** A path of travel, usable by a person with a severe mobility impairment, that leads to a public way or an area of refuge.

**3.3.71 Means of Escape.** A way ~~path~~ out of a ~~residential occupancy~~ building or structure that does not conform to the strict definition of *means of egress* but does provide an alternate way ~~path~~ out.

**3.3.72 Multilevel Play Structure.** See 3.3.106.1, *Structure, Multilevel Play*.

~~A structure that consists of tubes, slides, crawling areas, and jumping areas that is located within a building and is used for climbing and entertainment, generally by children.~~

**3.3.73 Nursing Home.** A building or portion ~~part~~ of a building used on a 24-hour basis for the housing and nursing care of four or more persons who, because of mental or physical incapacity, might be unable to provide for their own needs and safety without the assistance of another person.

**3.3.74 Occupancy.** The purpose for which a building or portion thereof is used or intended to be used.

**3.3.74.1 Occupancy, Ambulatory Health Care.** A building or portion thereof used to provide services or treatment simultaneously to four or more patients that (1) provides, on an outpatient basis, treatment for patients that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others; or (2) provides, on an outpatient basis, anesthesia that renders the patients incapable of taking action for self-presevation under emergency conditions without the assistance of others.

**3.3.74.2* Occupancy, Assembly.** An occupancy (1) used for a gathering of 50 or more persons for deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar uses; or (2) used as a special amusement building, regardless of occupant load.

**3.3.74.3* Occupancy, Business.** An occupancy used for account and record keeping or the transaction of business other than mercantile.

**3.3.74.4* Occupancy, Day-Care.** An occupancy in which four or more clients receive care, maintenance, and supervision, by other than their relatives or legal guardians, for less than 24 hours per day.

**3.3.74.5* Occupancy, Detention and Correctional.** An occupancy used to house four or more persons under varied degrees of restraint or security where such occupants are mostly incapable of self-preservation because of security measures not under the occupants' control.

**3.3.74.6* Occupancy, Educational.** An occupancy used for educational purposes through the twelfth grade by six or more persons for four or more hours per day or more than 12 hours per week.

**3.3.74.7* Occupancy, Health Care.** An occupancy used for purposes of medical or other treatment or care of four or more persons where such occupants are mostly incapable of self-preservation due to age, physical or mental disability, or because of security measures not under the occupants' control.

**3.3.74.8* Occupancy, Industrial.** An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted.

**3.3.74.8.1* Occupancy, Industrial, General.** An industrial occupancy in which ordinary and low hazard industrial operations are conducted in buildings of conventional design suitable for various types of industrial processes.

**3.3.74.8.2* Occupancy, Industrial, High Hazard.** An industrial occupancy in which industrial operations that include high hazard materials, processes, or contents are conducted.

**3.3.74.8.3 Occupancy, Industrial, Special Purpose.** An industrial occupancy in which ordinary and low hazard industrial operations are conducted in buildings designed for and suitable only for particular types of operations, characterized by a relatively low density of employee population, with much of the area occupied by machinery or equipment.

**3.3.74.9* Occupancy, Mercantile.** An occupancy used for the display and sale of merchandise.

**3.3.74.10 Occupancy, Mixed.** An occupancy in which two or more classes of occupancy exist in the same building or structure and where such classes are intermingled so that separate safeguards are impracticable.

**3.3.74.11* Occupancy, Residential.** An occupancy that provides sleeping accommodations for purposes other than health care or detention and correctional.

**3.3.74.12* Occupancy, Residential Board and Care.** A building or portion thereof that is used for lodging and boarding of four or more residents, not related by blood or marriage to the owners or operators, for the purpose of providing personal care services.

**3.3.74.12.1 Occupancy, Residential Board and Care ~~Occupancy~~, Large.** A board and care occupancy that provides sleeping accommodations for more than 16 residents who receive personal care.

**3.3.74.12.1 Occupancy, Residential Board and Care ~~Occupancy~~, Small.** A board and care occupancy that provides sleeping accommodations for not more than 16 residents who receive personal care.

**3.3.74.13* Occupancy, Storage.** An occupancy used primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals.

**3.3.75 Occupant Load.** The total number of persons that might occupy a building or portion thereof at any one time.

**3.3.76 Occupiable Story.** See 3.3.104.1, *Story, Occupiable*.

~~A story occupied by people on a regular basis. Stories used exclusively for mechanical equipment rooms, elevator penthouses, and similar spaces are not occupiable stories.~~

**3.3.77 Open-Air Parking Structure.** See 3.3.106.3, *Structure, Open-Air Parking*.

~~A parking structure that has wall openings at each parking level, open to the atmosphere, for an area of not less than 1.4 ft$^2$ (0.13 m$^2$) for each lineal foot (0.3 m) of its exterior perimeter. Such openings are distributed over 40 percent of the building perimeter or are distributed uniformly over two opposing sides at each parking level of the building. Interior wall lines and column lines are at least 20 percent open with openings distributed to provide ventilation.~~

**3.3.78 Open Structure.** See 3.3.106.2, *Structure, Open*.

~~Structures supporting equipment and operations not enclosed within building walls.~~

**3.3.79 Outside Stair ~~Stairs~~.** A stair with not less than ~~Stairs for which at least~~ one side ~~is~~ open to the outside air.

**3.3.80 Panic Hardware.** A door-latching assembly incorporating a device that releases the latch upon the application of a force in the direction of egress travel.

**3.3.81* Personal Care.** The care of residents ~~in a residential board and care occupancy~~ who do not require chronic or convalescent medical or nursing care ~~where such care involves responsibility for the safety of the resident while inside the building~~.

**3.3.82* Photoluminescent.** Having the property of emitting light that continues for a length of time after excitation by visible or invisible light has been removed.

**3.3.83 Point of Safety.** A location that (a) is exterior to and away from a building; or (b) is within a building of any type construction protected throughout by an approved automatic sprinkler system and that is either (1) within an exit enclosure meeting the requirements of this *Code*, or (2) within another portion of the building that is separated by smoke barriers, with not less than a $^1/_2$-hour fire resistance rating, and that portion of the building has access to a means of escape or exit that conforms to the requirements of this *Code* and does not necessitate return to the area of fire involvement; or (c) is within a building of Type I, Type II(222), Type II(111), Type III(211), Type IV, or Type V(111) construction and is either (1) within an exit enclosure meeting the requirements of this *Code*, or (2) within another portion of the building that is separated by smoke barriers, with not less than a $^1/_2$-hour fire resistance rating, and that portion of the building has access to a means of escape or exit that conforms to the requirements of this *Code* and does not necessitate return to the area of fire involvement.

~~A location in a residential board and care occupancy that meets one of the following criteria:~~

~~(a) It is exterior to and away from the building~~

~~(b) It is within a building of any type construction that is protected throughout by an approved, automatic sprinkler system and is either~~

~~1. Within an exit enclosure, or~~

~~2. Within another portion of the building that is separated by smoke barriers having at least a $^1/_2$-hour fire resistance rating, and that portion of the building has access to a means of escape or exit and that does not require return to the area of fire involvement.~~

~~(c) It is within a building that has a minimum 1-hour fire resistance-rated construction and is either~~

~~1. Within an exit enclosure, or~~

~~2. Within another portion of the building that is separated by smoke barriers having at least a $^1/_2$-hour fire resistance rating, and that portion of the building has access to a means of escape or exit that does not require return to the area of fire involvement.~~

**3.3.84 Public Way.** A ~~Any~~ street, alley, or other similar parcel of land ~~that is~~ essentially open to the outside air deeded, dedicated, or otherwise permanently appropriated to the public for public use and having ~~that has~~ a clear width and height of not less than 10 ft (3 m).

**3.3.85 Ramp.** A walking surface that has a slope steeper than 1 in 20.

**3.3.86 Rating, Fire Protection.** The designation indicating the duration of the fire test exposure to which a fire door assembly or fire window assembly was exposed and successfully for which it met all the acceptance criteria as determined in accordance with NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, or NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*, respectively.

**3.3.87 Rating, Fire Resistance.** The time, in minutes or hours, that materials or assemblies have withstood a fire exposure as established in accordance with the test procedures of NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*.

~~**Residential Board and Care Occupancy, Small.** A board and care occupancy that provides sleeping accommodations for not more than 16 residents who receive personal care.~~

~~**Residential Board and Care Occupancy, Large.** A board and care occupancy that provides sleeping accommodations for more than 16 residents who receive personal care.~~

**3.3.88 Residential Housing Area, Detention and Correctional.** Sleeping areas and any contiguous day room, group activity space, or other common spaces for customary access of residents ~~of detention and correctional occupancies~~.

**3.3.89 Sally Port (Security Vestibule).** A compartment ~~that is~~ provided with two or more doors where the intended purpose is to prevent continuous and unobstructed passage by allowing the release of only one door at a time.

**3.3.90* Seating, Festival.** A form of audience/spectator accommodation in which no seating, other than a floor or ground surface, is provided for the audience/spectators gathered to observe a ~~some~~ performance.

**3.3.91 Seating, Smoke-Protected Assembly.** Seating served by means of egress that is not subject to smoke accumulation within or under the structure.

**3.3.92 Self-Closing.** Equipped with an approved device that ~~will ensure~~ ensures closing after opening ~~having been opened~~.

**3.3.93* Self-Luminous.** Illuminated by a self-contained power source and operated independently of external power sources.

**3.3.94* Self-Preservation (Day-Care Occupancy).** ~~A day-care occupancy~~ The ability of a client ~~who is capable of self-preservation is one who can~~ to evacuate a day-care occupancy ~~the building~~ without direct intervention by a staff member.

**3.3.95 Separate Atmosphere ~~(Educational Occupancy and Day-Care Occupancy)~~.** See 3.3.8, *Atmosphere, Separate.*

~~The atmosphere that exists between rooms, spaces, or areas that are separated by an approved smoke barrier.~~

**3.3.96 Severe Mobility Impairment.** The ability to move to stairs but without the ability to use the stairs.

~~**Shall.** Indicates a mandatory requirement.~~

**[Moved to Section 3.2.]**

~~**Should.** Indicates a recommendation or that which is advised but not required.~~

**[Moved to Section 3.2.]**

**3.3.97 Smoke Barrier.** See 3.3.10, *Barrier, Smoke*.

~~A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly, that is designed and constructed to restrict the movement of smoke.~~

**3.3.98* Smoke Compartment.** A space within a building ~~that is~~ enclosed by smoke barriers on all sides, including the top and bottom.

**3.3.99* Smoke Partition.** A continuous membrane that is designed to form a barrier to limit the transfer of smoke.

**3.3.100* Smokeproof Enclosure.** A stair enclosure designed to limit the movement of products of combustion produced by a fire.

**3.3.101 Smoke-Protected Assembly Seating.** See 3.3.91, *Seating, Smoke-Protected Assembly.*

**3.3.102 Special Amusement Building.** See 3.3.14.7, *Building, Special Amusement.*

~~Any building that is temporary, permanent, or mobile and that contains a device or system that conveys passengers or provides a walkway along, around, or over a course in any direction as a form of amusement arranged so that the egress path is not readily apparent due to visual or audio distractions or an intentionally confounded egress path, or is not readily available due to the mode of conveyance through the building or structure.~~

**3.3.103 Special-Purpose Industrial Occupancy.** See 3.3.74.8.3, *Occupancy, Industrial, Special Purpose.*

~~Ordinary- and low-hazard industrial operations in buildings designed for and suitable only for particular types of operations, characterized by a relatively low density of employee population, with much of the area occupied by machinery or equipment.~~

**3.3.104 Story.** The ~~That~~ portion of a building located ~~included~~ between the upper surface of a floor and the upper surface of the floor or roof next above.

**3.3.104.1* Story, Occupiable.** A story occupied by people on a regular basis. Stories used exclusively for mechanical equipment rooms, elevator penthouses, and similar spaces are not occupiable stories.

**3.3.105* Street Floor.** A ~~Any~~ story or floor level accessible from the street or from outside the building at ground level, with the floor level at the main entrance not more than three risers above or below ground level ~~at these points~~, and arranged and utilized ~~used~~ to qualify as the main floor. ~~If, due to differences in street levels, there are two or more stories accessible from the street, then each is a street floor. If there is no floor level within the specified limits for a street floor above or below ground level, then the building is considered as having no street floor.~~

**3.3.106* Structure.** That which is built or constructed. ~~The term *structure* is construed as if followed by the words "or portion thereof."~~

**3.3.106.1 Structure, Multilevel Play.** A structure that consists of tubes, slides, crawling areas, and jumping areas that is located within a building and is used for climbing and entertainment, generally by children.

**3.3.106.2* Structure, Open.** A structure that supports ~~Structures supporting~~ equipment and operations not enclosed within building walls.

**3.3.106.3 Structure, Open-Air Parking. A structure used for the parking or storage of motor vehicles that have (1) uniformly distributed openings in exterior walls on not less than two sides totaling not less than 40 percent of the building perimeter, (2) aggregate areas of such openings in exterior walls in each level not less than 20 percent of the total perimeter wall area of each level, and (3) interior wall lines and columns not less than 20 percent open with openings distributed to allow ventilation.**

~~A parking structure that has wall openings at each parking level, open to the atmosphere, for an area of not less than 1.4 $ft^2$ (0.13 $m^2$) for each lineal foot (0.3 m) of its exterior perimeter. Such openings are distributed over 40 percent of the building perimeter or are distributed uniformly over two opposing sides at each parking level of the building. Interior wall lines and column lines are at least 20 percent open with openings distributed to provide ventilation.~~

**3.3.106.4* Structure, Underground.** A structure or portions of a structure in which the floor level is below the level of exit discharge.

**3.3.106.5 Structure, Water-Surrounded.** A structure fully surrounded by water.

**3.3.106.6 Structure, Windowless.** A structure or portions of a structure lacking emergency access openings.

~~A structure or portions of a structure that lack access openings detailed as follows:~~

~~(a) A one-story structure or portion thereof is not considered a windowless structure if the story is provided with grade level doors or access openings on two sides of the building spaced not more than 125 ft (38 m) apart in the exterior walls.~~

~~(b) A structure or portion thereof that is more than one story in height is not considered a windowless structure under the following conditions:~~

~~1. Access openings are provided on the first story as required by (a).~~

~~2. Every story above the first floor is provided with access openings on two sides of the building, spaced not more than 30 ft (9.1 m) apart.~~

**3.3.107 Thermal Barrier.** See 3.3.11, *Barrier, Thermal*.

~~A material that limits the average temperature rise of the unexposed surface to not more than 250°F (120°C) for a specified fire exposure complying with the standard time-temperature curve.~~

**3.3.108 Tower.** An enclosed independent structure or portion of a building with elevated levels for support of equipment or occupied for observation, control, operation, signaling, or similar limited use where (1) the elevated levels are provided to allow adequate observation or line-of-sight for personnel or equipment, and (2) the levels within the tower below the observation level and equipment room for that level are not occupied.

~~An enclosed independent structure or portion of a building with elevated levels for support of equipment or that is occupied for observation, control, operation, signaling, or similar limited use under the following conditions:~~

~~(a) The elevated levels are provided to allow adequate observation or line-of-sight for personnel or equipment.~~

~~(b) Levels within the tower below the observation level and equipment room for that level are not occupied.~~

**3.3.109 Underground Structure.** See 3.3.106.4, *Structure, Underground*.

~~A structure or portions of a structure in which the floor level is below the level of exit discharge.~~

**3.3.110 Use Condition I — Free Egress — Detention and Correctional Occupancy.** Free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via means of egress that meet the necessary requirements.

**3.3.111 Use Condition II — Zoned Egress — Detention and Correctional Occupancy.** Free movement is allowed from sleeping areas and any other occupied smoke compartment to one or more other smoke compartments.

**3.3.112 Use Condition III — Zoned Impeded Egress — Detention and Correctional Occupancy.** Free movement is allowed within individual smoke compartments with egress impeded by remote-controlled release of means of egress from such smoke compartment to another smoke compartment.

**3.3.113 Use Condition IV — Impeded Egress — Detention and Correctional Occupancy.** Free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.

**3.3.114 Use Condition V — Contained — Detention and Correctional Occupancy.** Free movement is restricted from an occupied space. Staff-controlled manual release at each door is provided to permit movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.

**3.3.115 Wall, Fire Barrier.** A wall, other than a fire wall, that has a fire resistance rating.

**3.3.116 Water-Surrounded Structure.** See 3.3.106.5, *Structure, Water-Surrounded*.

~~A structure fully surrounded by water.~~

**3.3.117 Windowless Structure.** See 3.3.106.6, *Structure, Windowless*.

~~A structure or portions of a structure that lack access openings detailed as follows:~~

~~(a) A one-story structure or portion thereof is not considered a windowless structure if the story is provided with grade level doors or access openings on two sides of the building spaced not more than 125 ft (38 m) apart in the exterior walls.~~

~~(b) A structure or portion thereof that is more than one story in height is not considered a windowless structure under the following conditions:~~

~~1. Access openings are provided on the first story as required by (a).~~

~~2. Every story above the first floor is provided with access openings on two sides of the building, spaced not more than 30 ft (9.1 m) apart.~~

**3.3.118 Yard.** An open, unoccupied space other than a court, unobstructed from the ground to the sky~~,~~ on the lot on which a building is situated.

## CHAPTER 3 ANNEX A ITEMS

**A.3.2.1 Approved.** The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

**A.3.2.2 Authority Having Jurisdiction.** The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

**A.3.2.3 Code.** The decision to designate a standard as a "code" is based on such factors as the size and scope of the document, its intended use and form of adoption, and whether it contains substantial enforcement and administrative provisions.

**A.3.2.5 Listed.** The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

**A.3.3.2 Aisle Accessway.** *Aisle accessway* is the term used for the previously unnamed means of egress component leading to an aisle or other means of egress. For example, circulation space between parallel rows of seats having a width of 1 ft to 2 ft (0.3 m to 0.6 m) and a length not exceeding 100 ft (30 m) is an aisle accessway. Some of the circulation space between tables or seats in restaurants might be considered aisle accessway.

Depending on the width of aisle accessway, which is influenced by its length and expected utilization, the movement of a person through the aisle accessway might require others to change their individual speed of movement, alter their postures, move their chairs out of the way, or proceed ahead of the person.

**A.3.3.6 Area of Refuge.** An area of refuge has a temporary use during egress. It generally serves as a staging area that provides relative safety to its occupants while potential emergencies are assessed, decisions are made, and mitigating activities are begun. Taking refuge within such an area is, thus, a stage of the total egress process; a stage between egress from the immediately threatened area and egress to a public way.

An area of refuge might be another building connected by a bridge or balcony, a compartment of a subdivided story, an elevator lobby, or an enlarged story-level exit stair landing. An area of refuge is accessible by means of horizontal travel or, as a minimum, via an accessible route meeting the requirements of CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*.

This *Code* recognizes any floor in a building protected throughout by an approved, supervised automatic sprinkler system as an area of refuge. This recognition acknowledges the ability of a properly designed and functioning automatic sprinkler system to control a fire at its point of origin and to limit the production of toxic products to a level that is not life threatening.

The requirement for separated rooms or spaces can be met on an otherwise undivided floor by enclosing the elevator lobby with ordinary glass or other simple enclosing partitions that are smoke resisting.

For some occupancies, one accessible room or space is permitted.

**A.3.3.10 Barrier, Smoke.** A smoke barrier might be vertically- or horizontally-aligned, such as a wall, floor, or ceiling assembly. A smoke barrier might or might not have a fire resistance rating.

**A.3.3.11 Barrier, Thermal.** Finish ratings, as published in the UL *Fire Resistance Directory*, are one way of determining thermal barrier.

**A.3.3.12 Birth Center.** A birth center is a low-volume service for healthy, childbearing women, and their families, who are capable of ambulation in the event of fire or fire-threatening events. Birth center mothers and babies have minimal analgesia, no general or regional anesthesia, and are capable of ambulation, even in second-stage labor.

**A.3.3.14 Building.** The term *building* is to be understood as if followed by the words *or portions thereof. (See also Structure, A.3.3.106).*

**A.3.3.14.1 Building, Apartment.** The *Code* specifies, that wherever there are three or more living units in a building, the building is considered an apartment building. Townhouse units are considered to be apartment buildings if there are three or more units in the building. The type of wall required between units in order to consider them to be separate buildings is normally established by the authority having jurisdiction. If the units are separated by a wall of sufficient fire resistance and structural integrity to be considered as separate buildings, then the provisions for dwellings apply to each townhouse. Condominium status is a form of ownership, not occupancy; for example, there are condominium warehouses, condominium apartments, and condominium offices.

**A.3.3.14.3 Building, Covered Mall.** Covered mall buildings are occupied primarily by mercantile occupancies. However, they can include other occupancies such as drinking and dining establishments, entertainment and amusement facilities, offices, and similar uses that are incidental to the primary use of the building.

**A.3.3.14.4 Building, Existing.** With respect to judging whether a building should be considered existing, the deciding factor is not when the building was designed or when construction started but, rather, the date plans were approved for construction by the appropriate authority having jurisdiction.

**A.3.3.14.5 Building, Flexible Plan and Open Plan Educational or Day-Care.**

Flexible plan buildings have movable corridor walls and movable partitions of full-height construction with doors leading from rooms to corridors. Open plan buildings have rooms and corridors delineated by tables, chairs, desks, bookcases, counters, low-height partitions, or similar furnishings. It is the intent that low-height partitions not exceed 5 ft (1.5 m).

**A.3.3.14.6 Building, High-Rise.** It is the intent of this definition that, in determining the level from which the highest occupiable floor is to be measured, the enforcing agency should exercise reasonable judgment, including consideration of overall accessibility to the building by fire department personnel and vehicular equipment. Where a building is situated on a sloping terrain and there is building access on more than one level, the enforcing agency might select the level that provides the most logical and adequate fire department access.

**A.3.3.14.7 Building, Special Amusement.** Such structures include amusements such as a haunted house, a roller coaster-type ride within a building, a multilevel play structure within a building, a submarine ride, and similar amusements where the occupants are not in the open air.

**A.3.3.17 Class B ~~Store~~ Mercantile Occupancy.** Mezzanines are permitted in Class B mercantile occupancies. If more than three floors, excluding mezzanines, are used, the mercantile occupancy is Class A, regardless of area.

**A.3.3.19 Common Path of Travel.** Common path of travel is measured in the same manner as travel distance but terminates at that point where two separate and distinct routes become available. Paths that merge are common paths of travel.

**A.3.3.25 Electroluminescent.** This light source is typically contained inside the device.

**A.3.3.30 Evacuation Capability.** The evacuation capability of the residents and staff is a function of both the ability of the residents to evacuate and the assistance provided by the staff. It is intended that the evacuation capability be determined by the procedure acceptable to the authority having jurisdiction. It is also intended that the timing of drills, the rating of residents, and similar actions related to determining the evacuation capability be performed by persons approved by or acceptable to the authority having jurisdiction. The evacuation capability can be determined by the use of the definitions in Section 3.3, the application of NFPA 101A, *Guide on Alternative Approaches to Life Safety*, or a program of drills (timed).

Where drills are used in determining evacuation capability, it is suggested that the facility conduct and record fire drills six times per year on a bimonthly basis, with a minimum of two drills conducted during the night when residents are sleeping, and that the facility conduct the drills in consultation with the authority having jurisdiction. Records should indicate the time taken to reach a point of safety, date and time of day, location of simulated fire origin, escape paths used, and comments relating to residents who resisted or failed to participate in the drills.

Translation of drill times to evacuation capability is determined as follows:

(1) 3 minutes or less — prompt

(2) Over 3 minutes, but not in excess of 13 minutes — slow

(3) More than 13 minutes — impractical

Evacuation capability, in all cases, is based on the time of day or night when evacuation of the facility would be most difficult, such as, when residents are sleeping or fewer staff are present.

Evacuation capability determination is considered slow if the following conditions are met:

(1) All residents are able to travel to centralized dining facilities without continuous staff assistance.

(2) There is continuous staffing whenever there are residents in the facility.

**A.3.3.32 Existing.** See *Building, Existing,* A.3.3.14.4.

**A.3.3.33 Exit.** Exits include exterior exit doors, exit passageways, horizontal exits, exit stairs, and exit ramps. In the case of a stairway, the exit incudes the stair enclosure, the door to the stair enclosure, stairs and landings inside the enclosure, the door from the stair enclosure to the outside or to the level of exit discharge, and any exit passageway and its associated doors if such are provided so as to discharge the stair directly to the outside. In the case of a door leading directly from the street floor to the street or open air, the exit comprises only the door.

Doors of small individual rooms, as in hotels, while constituting exit access from the room, are not referred to as exits except where they lead directly to the outside of the building from the street floor.

**A.3.3.33.1 Exit, Horizontal.** Horizontal exits should not be confused with egress through doors in smoke barriers. Doors in smoke barriers are designed only for temporary protection against smoke, whereas horizontal exits provide protection against serious fire for a relatively long period of time in addition to providing immediate protection from smoke.

**A.3.3.45 Floor Area, Gross.** Where the term *floor area* is used, it should be understood to be gross floor area unless otherwise specified.

**A.3.3.61 Hotel.** So-called apartment hotels should be classified as hotels because they are potentially subject to the same transient occupancy as hotels. Transients are those who occupy accommodations for less than 30 days.

**A.3.3.62 Illuminated, Externally.** The light source is typically a dedicated incandescent or fluorescent source.

**A.3.3.63 Illuminated, Internally.** The light source is typically incandescent, fluorescent, electroluminescent, photo-luminescent, light-emitting diodes, or self-luminous.

**A.3.3.67 Limited Care Facility.** Limited care facilities and residential board and care occupancies both provide care to people with physical and mental limitations. However, the goals and programs of the two types of occupancies differ greatly. The requirements in this *Code* for limited care facilities are based on the assumption that these are medical facilities, that they provide medical care and treatment, and that the patients are not trained to respond to the fire alarm; that is, the patients do not participate in fire drills but, rather, they await rescue.

The requirements for residential board and care occupancies are based on the assumption that the residents are provided with personal care and activities that foster continued independence, that the residents are encouraged and taught to overcome their limitations, and that most residents, including all residents in prompt and slow homes, are trained to respond to fire drills, to the extent they are able.

**A.3.3.70 Means of Egress.** A means of egress comprises the vertical and horizontal travel and incudes interventing room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stairs, elevators, enclosures, lobbies, escalators, horizontal exits, courts, and yards.

**A.3.3.74.2 Occupancy, Assembly.** Assembly occupancies might include the following:

(1) Armories

(2) Assembly halls

(3) Auditoriums

(4) Bowling lanes

(5) Club rooms

(6) College and university classrooms, 50 persons and over

(7) Conference rooms

(8) Courtrooms

(9) Dance halls

(10) Drinking establishments

(11) Exhibition halls

(12) Gymnasiums

(13) Libraries

(14) Mortuary chapels

(15) Motion picture theaters

(16) Museums

(17) Passenger stations and terminals of air, surface, underground, and marine public transportation facilities

(18) Places of religious worship

(19) Pool rooms

(20) Recreation piers

(21) Restaurants

(22) Skating rinks

(23) Special amusement buildings regardless of occupant load

(24) Theaters

Assembly occupancies are characterized by the presence or potential presence of crowds with attendant panic hazard in case of fire or other emergency. They are generally open or occasionally open to the public, and the occupants, who are present voluntarily, are not ordinarily subject to discipline or control. Such buildings are ordinarily occupied by able-bodied persons and are not used for sleeping purposes. Special conference rooms, snack areas, and other areas incidental to, and under the control of, the management of other occupancies, such as offices, fall under the 50-person limitation.

Restaurants and drinking establishments with an occupant load of fewer than 50 persons should be classified as mercantile occupancies.

**A.3.3.74.3 Occupancy, Business.** Business occupancies include the following:

(1) Air traffic control towers (ATCTs)

(2) City halls

(3) College and university instructional buildings, classrooms under 50 persons, and instructional laboratories

(4) Courthouses

(5) Dentists' offices

(6) Doctors' offices

(7) General offices

(8) Outpatient clinics, ambulatory

(9) Town halls

Doctors' and dentists' offices are included, unless of such character as to be classified as ambulatory health care occupancies.

Birth centers occupied by fewer than four patients, not including infants, at any one time; not providing sleeping facilities for four or more occupants; and not providing

treatment procedures that render four or more patients, not including infants, incapable of self-preservation at any one time should be classified as business occupancies. For birth centers occupied by patients not meeting these parameters, see the requirements applicable to health care occupancies.

Service facilities common to city office buildings such as newsstands, lunch counters serving fewer than 50 persons, barber shops, and beauty parlors are included in the business occupancy group.

City halls, town halls, and court houses are included in this occupancy group insofar as their principal function is the transaction of public business and the keeping of books and records. Insofar as they are used for assembly purposes, they are classified as assembly occupancies.

**A.3.3.74.4 Occupancy, Day-Care.** Day-care occupancies include the following:

(1) Adult day-care occupancies, except where part of a health care occupancy

(2) Child day-care occupancies

(3) Day-care homes

(4) Kindergarten classes that are incidental to a child day-care occupancy

(5) Nursery schools

In areas where public schools offer only half-day kindergarten programs, many child day-care occupancies offer state-approved kindergarten classes for children who need full-day care. As these classes are normally incidental to the day-care occupancy, the requirements of the day-care occupancy should be followed.

**A.3.3.74.5 Occupancy, Detention and Correctional.** Detention and correctional occupancies include the following:

(1) Adult and juvenile substance abuse centers

(2) Adult and juvenile work camps

(3) Adult community residential centers

(4) Adult correctional institutions

(5) Adult local detention facilities

(6) Juvenile community residential centers

(7) Juvenile detention facilities

(8) Juvenile training schools

**A.3.3.74.6 Occupancy, Educational.** Educational occupancies include the following:

(1) Academies

(2) Kindergartens

(3) Schools

An educational occupancy is distinguished from an assembly occupancy in that the same occupants are regularly present.

**A.3.3.74.7 Occupancy, Health Care.** Health care occupancies include the following:

(1) Ambulatory health care facilities

(2) Hospitals

(3) Limited care facilities

(4) Nursing homes

Occupants of health care occupancies typically have physical or mental illness, disease, or infirmity. They also include infants, convalescents, or infirm aged persons.

**A.3.3.74.8 Occupancy, Industrial.** Industrial occupancies include the following:

(1) Dry cleaning plants

(2) Factories of all kinds

(3) Food processing plants

(4) Gas plants

(5) Hangars (for servicing/maintenance)

(6) Laundries

(7) Power plants

(8) Pumping stations

(9) Refineries

(10) Sawmills

(11) Telephone exchanges

In evaluating the appropriate classification of laboratories, the authority having jurisdiction should treat each case individually based on the extent and nature of the associated hazards. Some laboratories are classified as occupancies other than industrial; for example, a physical therapy laboratory or a computer laboratory.

**A.3.3.74.8.1 Occupancy, Industrial, General.** General industrial occupancies include multistory buildings where floors are occupied by different tenants or buildings suitable for such occupancy and, therefore, are subject to possible use for types of industrial processes with a high density of employee population.

**A.3.3.74.8.2 Occupancy, Industrial, High Hazard.** A high hazard occupancy includes occupancies where gasoline and other flammable liquids are handled, used, or stored under such conditions that involve possible release of flammable vapors; where grain dust, wood flour or plastic dusts, aluminum or magnesium dust, or other explosive dusts are produced; where hazardous chemicals or explosives are manufactured, stored, or handled; where cotton or other combustible fibers are processed or handled under conditions that might produce flammable flyings; and where other situations of similar hazard exist.

**A.3.3.74.9 Occupancy, Mercantile.** Mercantile occupancies include the following:

(1) Auction rooms

(2) Department stores

(3) Drugstores

(4) Restaurants with fewer than 50 persons

(5) Shopping centers

(6) Supermarkets

Office, storage, and service facilities incidental to the sale of merchandise and located in the same building should be considered part of the mercantile occupancy classification.

**A.3.3.74.11 Occupancy, Residential.**

Residential occupancies are treated as separate occupancies as follows:

(1) One- and two-family dwellings

(2) Lodging or rooming houses

(3) Hotels, motels, and dormitories

(4) Apartment buildings

**A.3.3.74.12 Occupancy, Residential Board and Care.** The following are examples of facilities that are classified as residential board and care occupancies:

(1) A group housing arrangement for physically or mentally handicapped persons who normally attend school in the community, attend worship in the community, or otherwise use community facilities

(2) A group housing arrangement for physically or mentally

handicapped persons who are undergoing training in preparation for independent living, for paid employment, or for other normal community activities

(3) A group housing arrangement for the elderly that provides personal care services but that does not provide nursing care

(4) Facilities for social rehabilitation, alcoholism, drug abuse, or mental health problems that contain a group housing arrangement and that provide personal care services but do not provide acute care

(5) Assisted living facilities

(6) Other group housing arrangements that provide personal care services but not nursing care

**A.3.3.74.13 Occupancy, Storage.** Storage occupancies include the following:

(1) Barns

(2) Bulk oil storage

(3) Cold storage

(4) Freight terminals

(5) Grain elevators

(6) Hangars (for storage only)

(7) Parking structures

(8) Stables

(9) Truck and marine terminals

(10) Warehouses

Storage occupancies are characterized by the presence of relatively small numbers of persons in proportion to the area.

**A.3.3.81 Personal Care.** Personal care involves responsibility for the safety of the resident while inside the building. Personal care might include daily awareness by the management of the resident's functioning and whereabouts, making and reminding a resident of appointments, the ability and readiness for intervention in the event of a resident experiencing a crisis, supervision in the areas of nutrition and medication, and actual provision of transient medical care.

**A.3.3.82 Photoluminescent.** The light source is considered internally illuminated.

**A.3.3.90 Seating, Festival.** Festival seating describes situations in assembly occupancies where live entertainment events are held that are expected to result in overcrowding and high audience density that can compromise public safety. It is not the intent to apply the term *festival seating* to exhibitions; sports events; dances; conventions; and bona fide political, religious, and educational events. Assembly occupancies with 15 $ft^2$ (1.4 $m^2$) or more per person should not be considered festival seating.

**A.3.3.93 Self-Luminous.** An example of a self-contained power source is tritium gas. Batteries do not qualify as a self-contained power source. The light source is typically contained inside the device.

**A.3.3.94 Self-Preservation (Day-Care Occupancy).** Examples of clients who are incapable of self-preservation include infants, clients who are unable to use stairs because of confinement to a wheelchair or other physical disability, and clients who cannot follow directions or a group to the outside of a facility due to mental or behavioral disorders. It is the intent of this *Code* to classify children under the age of 24 months as incapable of self-preservation. Examples of direct intervention by staff members include carrying a client, pushing a client outside in a wheelchair, and guiding a client by direct hand-holding or continued bodily contact. If clients cannot exit the building by themselves with minimal intervention from staff members, such as verbal orders, classification as incapable of self-preservation should be considered.

**A.3.3.98 Smoke Compartment.** In the provision of smoke compartments using the outside walls or the roof of a building, it is not intended that outside walls or roofs or any openings therein be capable of resisting the passage of smoke.

**A.3.3.99 Smoke Partition.** A smoke partition is not required to have a fire resistance rating.

**A.3.3.100 Smokeproof Enclosure.** For further guidance, see the following publications:

(1) ASHRAE *Handbook and Product Directory — Fundamentals*

(2) *Design of Smoke Management Systems*, by Klote and Milke

(3) NFPA 105, *Recommended Practice for the Installation of Smoke-Control Door Assemblies*

**A.3.3.104.1 Story, Occupiable.** Stories used exclusively for mechanical equipment rooms, elevator penthouses, and similar spaces are not occupiable stories.

**A.3.3.105 Street Floor.** Where, due to differences in street levels, there are two or more stories accessible from the street, each is a street floor. Where there is no floor level within the specified limits for a street floor above or below ground level, the building has no street floor.

**A.3.3.106 Structure.** The term *structure* is to be understood as if followed by the words *or portion thereof. (See also Building*, A.3.3.14.)

**A.3.3.106.2 Structure, Open.** Open structures are often found in oil refining, chemical processing, or power plants. Roofs or canopies without enclosing walls are not considered an enclosure.

**A.3.3.106.4 Structure, Underground.** In determining openings in exterior walls, doors or access panels are permitted to be included. Windows are also permitted to be included if they are openable or provide a breakable glazed area.

**SUBSTANTIATION:** The changes are made for compliance with the NFPA Manual of Style and correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP3)

101B- 10 - (3-1.1.1): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: In the 3-1.1.1 Exit Access Corridor subsection, make the following changes:

3-1.1.1.2.3.1 Doors protecting corridor openings shall be constructed to resist the passage of smoke. Compliance with NFPA 80, Standard for Fire Doors and Fire Windows, shall not be required. Clearance between the bottom of the door and the floor covering not exceeding 1 in. (2.5 cm) shall be permitted for corridor doors.

Exception: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials.

3-1.1.1.2.4 Health Care Occupancy Corridor Transfer Grilles. Transfer grilles, regardless of whether they are ~~whether or not~~ protected by fusible link-operated dampers, shall not be used in health care occupancy corridor walls or doors.

Exception: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials shall be permitted to have ventilating louvers or to be undercut.

3-1.1.1.3.3 Walls required by 3-1.1.1.3.1 or 3-1.1.1.3.2 shall have a fire resistance rating of not less than 1/2 hour. Exception: In conversions from an existing residential or health care occupancy to a residential board and care occupancy no fire resistance rating shall be required, but the wall shall resist the passage of smoke. ~~(See definition of Conversion in Section 2-2.)~~

3-1.1.1.3.5 Walls and doors required by 3-1.1.1.3.1 and 3-1.1.1.3.2 shall be constructed to ~~resist the passage of smoke~~ as smoke partitions in accordance with 3-13. The provisions of 3-13.3.5 shall not apply. There shall be no louvers, transfer grilles, operable transoms, or other air passages penetrating such walls or doors, except ~~Exception: Properly~~ properly installed heating and utility installations.

3-1.1.1.3.6 Doors to hazardous areas, vertical openings, exits, and exit passageways shall be self-closing or automatic-closing. ~~in walls required by 3-1.1.1.3.1 and 3-1.1.1.3.2 shall be self-closing or automatic-closing in accordance with 3-2.1.8. Doors in walls separating sleeping rooms from corridors shall be automatic-closing in accordance with 3-2.1.8.~~

~~Exception No. 1: Doors to sleeping rooms that have occupant control locks such that access is normally restricted to the occupants or staff personnel shall be permitted to be self-closing.~~

~~Exception No. 2: In buildings protected throughout by an approved, automatic sprinkler system, doors, other than doors to hazardous areas, vertical openings, and exit enclosures shall not be required to be self-closing or automatic-closing.~~

Insert a new 3-1.1.1.2.3.3 as follows and renumber existing paragraphs as needed:

3-1.1.1.2.3.3 Hold-open devices that release when the door is pushed or pulled shall be permitted.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #6)

101B- 11 - (3-1.1.1.1): Accept in Principle
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Delete the existing 3-1.1.1.1.

Add a new 3-1.1.1.1 as follows:

3-1.1.1.1 Corridors used as exit access and that serve an area having an occupant load of more than 30 shall be separated from other parts of the building by walls having a minimum 1-hour fire resistance rating and doors having a minimum 20-minute fire protection rating unless otherwise specified by this section.

3-1.1.1.1.1 Assembly Occupancies.

3-1.1.1.1.1.1 Corridor and lobby protection shall not be required where assembly rooms served by the corridor or lobby have at least 50 percent of their exit capacity discharging directly to the outside, independent of corridors and lobbies.

3-1.1.1.1.1.2 Corridor and lobby protection shall not be required in buildings protected throughout by an approved, supervised automatic sprinkler system.

3-1.1.1.1.1.3 Lobbies that serve only one assembly area and that meet the requirements for intervening rooms shall not be required to have a fire resistance rating. (See 3-5.1.7.)

3-1.1.1.1.2 Educational Occupancies.

3-1.1.1.1.2.1 Corridor protection shall not be required if all spaces normally subject to student occupancy have at least one door opening directly to the outside or to an exterior exit access balcony or corridor.

3-1.1.1.1.2.2 In buildings protected throughout by an approved, supervised automatic sprinkler system, corridor walls shall not be required to be rated, provided such walls, in conjunction with the openings therein and ceilings at which they terminate, resist the passage of smoke.

3-1.1.1.1.2.3 Toilet rooms shall not be required to be separated from corridors, provided they are separated from all other spaces by walls having not less than a 1-hour fire resistance rating.

Renumber the existing 3-1.1.1.2 and associated subsections to a new 3-1.1.1.1.3, Health Care Occupancies.

3-1.1.1.1.4 Detention and Correctional Occupancies. (See 3-5.1.28.)

3-1.1.1.1.5 Residential Occupancies.

3-1.1.1.1.5.1 In hotels, dormitories, or apartment buildings, in buildings protected throughout by an approved, supervised automatic sprinkler system, corridor walls shall have a minimum 1/2-hour fire resistance rating.

3-1.1.1.1.5.2 In hotels, dormitories, or apartment buildings, spaces shall be permitted to be unlimited in area and open to the corridor under the following conditions:

(a) The spaces are not used for guest rooms or guest suites, dwelling units, or hazardous areas.

(b) The building is protected throughout by an approved, supervised automatic sprinkler system.

(c) The space does not obstruct access to required exits.

3-1.1.1.1.5.3 In lodging and rooming houses, all sleeping rooms shall be separated from escape route corridors by walls and doors that are smoke resistant. There shall be no louvers or operable transoms or other passages penetrating the wall except properly installed heating and utility installations other than transfer grilles. Transfer grilles shall be prohibited. Doors shall be provided with latches or other mechanisms suitable for keeping the doors closed. No doors shall be arranged to prevent the occupant from closing the door. In nonsprinklered buildings, doors shall be self-closing or automatic-closing upon detection of smoke.

Renumber the existing 3-1.1.1.3 and associated subsections to a new 3-1.1.1.1.6, Large Residential Board and Care Occupancies.

3-1.1.1.1.6 Mercantile and Business Occupancies.

3-1.1.1.1.6.1 There are no requirements for corridor wall construction where exits are available from an open floor area.

3-1.1.1.1.6.2 Corridors shall not be required to have a fire resistance rating within a space occupied by a single tenant.

3-1.1.1.1.6.3 Corridors shall not be required to have a fire resistance rating within buildings protected throughout by an approved, automatic sprinkler system.

3-1.1.1.1.7 Industrial and Storage Occupancies.

3-1.1.1.1.7.1 There are no requirements for corridor wall construction.

3-1.1.1.1.8 Ambulatory Health Care Facilities.

3-1.1.1.1.8.1 Pass-through windows and other miscellaneous openings shall be permitted to be installed in corridor vision panels or doors without special protection if the aggregate area of openings per room does not exceed 20 in. $^2$ (135 cm $^2$) and the openings are installed at or below half the distance from the floor to the room ceiling. For rooms protected throughout by an approved, supervised automatic sprinkler system, the aggregate area of openings per room shall not exceed 80 in. $^2$ (520 cm $^2$).

**SUBSTANTIATION:** The purpose of this proposal is to eliminate the lengthy list of exceptions to this paragraph by stating all of the current requirements, including exceptions, in paragraph form. There is no intent to delete, add, or modify any of the existing requirements of this existing section.
**COMMITTEE ACTION:** Accept in Principle.

Do as the submitter suggested, but in 3-1.1.1.1 delete wording and revise editorially as follows:

3-1.1.1.1 Corridors used as exit access ~~and that serve an area having an occupant load of more than 30~~ shall be separated from other parts of the building by walls having a minimum 1-hour fire resistance rating and doors having a minimum 20-minute fire protection rating unless otherwise specified by ~~this section~~ 3-1.1.1.1.1 through 3-1.1.1.1.8 .

**COMMITTEE STATEMENT:** The submitter's language does accomplish the elimination of numerous exceptions. The reference to 30 persons was deleted because the occupancy chapters have traditionally required rated corridor walls regardless of number of occupants served.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #17)

101B- 12 - (3-1.1.1.1): Accept in Principle
**SUBMITTER:** Catherine L. Stashak, Des Plaines Fire Dept., IL
**RECOMMENDATION**: Revise text as follows:

3-1.1.1 Exit Access Corridors.

3-1.1.1.1 Corridors used as exit access and that serve an area having an occupant load of more than 30 shall have a minimum 1-hour fire resistance rating and doors with a minimum 20-minute fire protection rating, except as indicated in Table 3-1.1.1.1.

**Table 3-1.1.1.1 Exit Access Corridors**

| Occupancy | Sprinklers* | Other criteria that fully or partially eliminates fire protection per 3-1.1.1.1 |
|---|---|---|
| **Assembly** | No minimum rating required | 1. When assembly rooms served by the corridor or lobby have at least 50% of their exit capacity discharging directly to the outside, independent of corridors and lobbies.<br><br>2. Lobbies that serve only one assembly area and meet the requirements for intervening rooms.<br>*(See 3-5.1.7)* |
| **Educational** | Corridor walls in conjunction with openings therein and ceilings at which they terminate shall resist the passage of smoke. | 1. Spaces subject to student occupancy that have at least one door opening directly to the outside or to an exterior access balcony or corridor.<br><br>2. Toilet rooms, provided they are separated from all other spaces as per 3-1.1.1.1. |
| **Hotels & Dormitories** | 1/2-hour fire resistance rating<br><br>Spaces can be unlimited in area and open to corridors when not used for guest rooms, or hazardous areas and do not obstruct access to required exits. | |
| **Apartments** | 1/2-hour fire resistance rating<br><br>Spaces can be unlimited in area and open to corridors when not used for guest rooms, or hazardous areas and do not obstruct access to required exits. | |
| **Ambulatory Health Care** | Unprotected pass-through windows and other miscellaneous openings in corridor vision panels or doors shall be permitted as long as the aggregate area of openings per room does not exceed 80 $in.^2$. Openings shall be installed at or below 1/2 the distance from the floor to the room ceiling. | Same as sprinklered buildings except area of openings per room cannot exceed 20 $in.^2$. |
| **Lodging or Rooming Houses** | Self-closing doors not required | Sleeping rooms with corridor walls and doors that are smoke resistant. No louvers, operable transoms, transfer grilles, or other air passages penetrating the wall except properly installed heating and utility installations. Doors shall have approved latches or other mechanisms suitable for keeping door closed. Doors shall be self-closing or automatic closing upon detection of smoke. Doors shall not be arranged to prevent the occupant from closing the door. |
| **Mercantile** | No minimum rating required | 1. Where exits are available from an open floor area.<br><br>2. Within a space occupied by a single tenant. |
| **Business** | No minimum rating required | 1. Where exits are available from an open floor area.<br><br>2. Within a space occupied by a single tenant. |
| **Industrial** | No minimum rating required | No minimum rating required |
| **Storage** | No minimum rating required | No minimum rating required |
| **Health Care** *(See 3-1.1.1.2 & 3-1.1.1.2.3)* | | |
| **Detention & Correctional** *(See 3-5.1.28)* | | |
| **Residential Board & Care (Large Facilities)** *(See 3-1.1.1.3)* | | |

*Sprinkler system shall be an approved, supervised automatic sprinkler system.

**SUBSTANTIATION:** I represent myself for this proposal. But as information only, I served on the TCC Task Group to prepare proposals for 101B. So many exceptions to a requirement make the Code difficult to use. Placing the criteria for this section in table format should make 3-1.1.1 easier to use. Another proposal has been submitted by a different proponent providing a paragraph format for this section. This way the Committee can review two options for dealing with a section that has too many exceptions. Only very minor technical changes were made with this submittal.
**COMMITTEE ACTION:** Accept in Principle.
See Committee Action on Proposal 101B-11 (Log #6).
**COMMITTEE STATEMENT:** The actiion taken on the referenced proposal should meet the submitter's intent. The committee attempted to make the tabular format work, but it appeared that numerous technical changes would be required to make it accurate. However, the committee notes that it would prefer to present the information in table form if the table could be revised to reflect the current requirements of NFPA 101 Life Safety Code.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #18)
101B- 13 - (3-1.1.1.1 Exception No. 14): Accept in Principle
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Revise the wording of this exception as follows:
In mercantile and business occupancies, ~~corridors shall not be required to have a fire resistance rating~~ within a space occupied by a single tenant.
**SUBSTANTIATION:** The proposed change to this paragraph reflects the change made to this requirement by the Technical Committee on Mercantile and Business Occupancies for the 2000 edition of NFPA 101. This change is submitted by the writer, a member of that Technical Committee, in order to maintain consistency between corresponding editions of NFPA 101 and NFPA 101B in the construction of corridor walls required for this egress arrangement.
**COMMITTEE ACTION:** Accept in Principle.
See Committee Action on Proposal 101B-15 (Log #CP64).
**COMMITTEE STATEMENT:** The action taken on the referenced proposal should meet the submitter's intent.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #19)
101B- 14 - (3-1.1.1.1 Exception No. 15): Accept in Principle
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Revise the wording of this exception as follows:
In mercantile and business occupancies, ~~corridors shall not be required to have a fire resistance rating~~ within buildings protected throughout by an approved, supervised automatic sprinkler system.
**SUBSTANTIATION:** The proposed change to this paragraph reflects the change made to this requirement by the Technical Committee on Mercantile and Business Occupancies for the 2000 edition of NFPA 101. This change is submitted by the writer, a member of that Technical Committee, in order to maintain consistency between corresponding editions of NFPA 101 and NFPA 101B in the construction of corridor walls required for this level of protection.
**COMMITTEE ACTION:** Accept in Principle.
See Committee Action on Proposal 101B-15 (Log #CP64).
**COMMITTEE STATEMENT:** The action taken on the referenced proposal should meet the submitter's intent.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP64)
101B- 15 - (3-1.1.1.1 Exception No. 14 and Exception No. 15): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-1.1.1.1 Exception No. 14 and Exception No. 15 as follows:
Exception No. 14: In mercantile and business occupancies, corridors shall not be required ~~to have a fire resistance rating~~ within a space occupied by a single tenant.
Exception No. 15: In mercantile and business occupancies, corridors shall not be required ~~to have a fire resistance rating~~ within buildings protected throughout by an approved, supervised automatic sprinkler system.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #20)
101B- 16 - (3-1.1.2.1(d) Exception (2)): Accept
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Revise the wording of the first sentence of this part of this exception as follows:
Such rooms or areas shall be protected by an approved, supervised automatic sprinkler system.
**SUBSTANTIATION:** The proposed change to this paragraph reflects the change made to this requirement by the Technical Committee on Mercantile and Business Occupancies for the 2000 edition of NFPA 101. This change is submitted by the writer, a member of that Technical Committee, in order to maintain consistency between corresponding editions of NFPA 101 and NFPA 101B in the levels of protection required for this exception.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP5)
101B- 17 - (3-1.2): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-1.2 as follows:
3-1.2* Headroom. Means of egress shall be designed and maintained to provide headroom as provided in other sections of this Code and shall be not less than ~~at least~~ 7 ft 6 in. (2.3 m) with projections from the ceiling not less than ~~at least~~ 6 ft 8 in. (2 m) nominal height above the finished floor. The minimum ceiling height shall be maintained for not less than two-thirds of the ceiling area of any room or space, provided the ceiling height of remaining ceiling area is not less than 6 ft 8 in. (2 m). Headroom on stairs shall be a minimum of 6 ft 8 in. (2 m) and shall be measured vertically above a plane parallel to and tangent with the most forward projection of the stair tread.
Exception: Industrial equipment access walkways, platforms, ramps, and stairs that serve as a component of the means of egress from the involved equipment and do not serve more than 20 people shall be permitted a minimum headroom of 6 ft 8 in. (2 m).
A-3-1.2 For the purpose of this requirement, projections include devices such as lighting equipment, emergency signaling equipment, environmental controls and equipment, security devices, signs, and decorations that are typically limited in area.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP6)

101B- 18 - (3-1.2, 3-2.5.3.3, and 5-3-1.3.1 (New) ): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Insert a new 3-1.3 Walking Surfaces; renumber existing 3-1.3 through 3-1.5 to become 3-1.4 through 3-1.6; delete 3-2.5.3.3; and add a new 5-3-1.3.1 as follows:

3-1.3 Walking Surfaces in the Means of Egress.

3-1.3.1 †General. Walking surfaces in the means of egress shall comply with 3-1.3..2 through 3-1.3.4.

3-1.3.2 Changes in Elevation. Abrupt changes in elevation of walking surfaces shall not exceed 1/4 in. (0.6 cm). Changes in elevation exceeding 1/4 in. (0.6 cm), but not exceeding 1/2 in. (1.3 cm), shall be beveled 1 to 2. Changes in elevation exceeding 1/2 in. (1.3 cm) shall be considered a change in level and shall be subject to the requirements of 3-1.4.

3-1.3.3 Level. Walking surfaces shall be nominally level. The slope of a walking surface in the direction of travel shall not exceed 1 in 20 unless the ramp requirements of 3-2.5 are met. The slope perpendicular to the direction of travel shall not exceed 1 in 48.

3-1.3.4* Slip Resistance. Walking surfaces shall be slip resistant under foreseeable conditions. The walking surface of each element in the means of egress shall be uniformly slip resistant along the natural path of travel.

A-3-1.3.4 The foreseeable conditions are the conditions that are likely to be present at the location of the walking surface during the use of the building or area. A foreseeable condition of a swimming pool deck is that it is likely to be wet.

Regarding the slip resistance of treads, it should be recognized that, when walking up or down stairs, a person's foot exerts a smaller horizontal force against treads than is exerted when walking on level floors. Therefore, materials used for floors that are acceptable as slip resistant (as described by ASTM F 1637, Standard Practice for Safe Walking Surfaces) provide adequate slip resistance where used for stair treads. Such slip resistance includes the important leading edges of treads, the part of the tread that the foot first contacts during descent, which is the most critical direction of travel. If stair treads are wet, there is an increased danger of slipping, just as there is an increased danger of slipping on wet floors of similar materials. A small wash or drainage slope on exterior stair treads is, therefore, recommended to shed water. (See Templer, J. A., The Staircase: Studies of Hazards, Falls, and Safer Design, Cambridge, MA: MIT Press, 1992.)

~~3-2.5.3.3 Slip Resistance. Ramps and landings shall have slip-resistant surfaces.~~

5-3-1.3.1 Walking Surfaces in the Means of Egress. Existing walking surfaces shall be exempt from the provisions of 3-1.3.2, 3-1.3.3 and 3-1.3.4 where approved by the authority having jurisdiction.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP7)

101B- 19 - (3-1.3.2 Exception (New) ): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Add an exception to 3-1.3.2 so as to read:

3-1.3.2*Changes in level in means of egress not in excess of ~~more than~~ 12 in. (30.5 cm) shall be achieved either by a ramp or by a stair that complies with the requirements of 3-2.2. The presence and location of ramped portions of walkways shall be readily apparent. The ~~minimum~~ tread depth of such stair shall be not less than 13 in. (33 cm), and the presence and location of each step shall be readily apparent.

Exception: Industrial equipment access stairs that serve as a component of the means of egress from the involved equipment and do not serve more than 20 people shall be permitted a tread depth of not less than 10 in. (25.4 cm).

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 27

NEGATIVE: 1

**EXPLANATION OF NEGATIVE:**

PAULS: My negative ballot is triggered for two reasons. First, if the substantiation is to be applied consistently, the 12 inch dimension should have been revised in this committee proposal to 21 inch for consistency with NFPA 101-2000. Secondly, and more importantly, there is an error (in my opinion) with the location of the exception. The exception should not have been applied to the limited-rise stairs addressed in 3-1.3.2; it should only be applied to 3-2.2.2.1 where there is already such an exception. There is a greater need for the larger tread depth on limited-rise stairs than there is for stairs generally; this principle has been established in NFPA 101 for several years and is also in the IBC.

Admittedly the proposed changes to 3-1.3 reflect changes made in the 2000 edition of NFPA 101. At least one of the changes to NFPA 101-2000 (the repetition of the exception in 3-1.3) should not have happened. I will address that with the next round of proposals for NFPA 101. In the mean time, we should not repeat an error in NFPA 101B. (Incidentally, as many in NFPA know, I was deeply involved with other aspects of NFPA 101 during the last cycle and thus some things, like the new exception to NFPA101 7.1.7.2 escaped my notice.)

Finally, there was an effort to match some features of the IBC in NFPA 101B; this led for example to use of the 12-inch dimension rather than 21 inch as in NFPA 101. But the IBC has no industrial stair exception in its requirements for limited-rise stairs. Thus the requirements of NFPA 101B are inconsistent with both the IBC and NFPA 101.

The shortest and easiest fix, based on my negative ballot, is to not include the exception in 3-1.3.2.

**COMMENT ON AFFIRMATIVE:**

ELVOVE: The proposed editorial changes to 101B will correlate 101B with the 2000 edition of NFPA 101 with one exception: the 12-inch change in level dimension as currently written in the 1999 edition of 101B and again proposed to be retained in the 2002 edition of 101B is not consistent with the 2000 edition of NFPA 101 (which specifies 21-inches). Therefore, the committee's substantiation ("correlation with NFPA 101-2000") is not truly correct. In order to truly correlate, 101B needs to change from 12 to 21-inches. (The same would hold for 3-1.3.1). Otherwise, the committee's substantiation should change to reflect why 101B specifies 12-inches while the 2000 edition 101 specifies 21-inches.

I also concur with Mr. Paul's comment that the proposed new exception for industrial stairs is not needed in 3-1.3.2 as it is best suited where currently found in 3-2.2.2.1.

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(Log #CP8)

101B- 20 - (3-2.1.2 and 3-3.2): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise 3-2.1.2 and 3-3.2 to read as follows:

3-2.1.2 ~~Egress~~ Width.

~~3-2.1.2.1* In determining the egress width for a doorway for purposes of calculating capacity, only the clear width of the doorway when the door is in the full open position shall be measured. Clear width shall be the net, unobstructed width of the door opening without projections into such width.~~

3-2.1.2.1* †Egress Capacity Width. In determining the egress width for swinging doors for purposes of calculating capacity, only the clear width of the doorway when the door is open 90 degrees shall be measured. In determining the egress width for other types of doors for purposes of calculating capacity, only the clear width of the doorway when the door is in the full open position shall be measured. Clear width of doorways shall be measured between the face of the door and the stop in accordance with 7.3.2.

3-2.1.2.2* Minimum Width Measurement. For purposes of determining minimum door width, the door leaf width shall be used unless clear width is specified. Where clear width is specified, there shall be no projections into the required clear door opening width, measured in accordance with 3-2.1.2.1, lower than 34 in. (86 cm) above the floor or ground.

Projections into the required clear door opening width that are not less than 34 in. (86 cm) but that do not exceed 80 in. (203 cm) above the floor or ground shall be limited to the hinge side of each door opening and shall not exceed 4 in. (10.1 cm).

Projections exceeding 80 in. (203 cm) above the floor or ground shall not be limited.

3-2.1.2.3 ~~3-2.1.2.2~~ Minimum Width. Door openings in means of egress shall be not less than ~~at least~~ 32 in. (81 cm) in clear width. Where a pair of doors is provided, at least one of the doors shall provide not less than ~~at least~~ a 32 in. (81 cm) clear width opening.

*Exception No. 1: Exit access doors serving a room not larger than 70 $ft^2$ (6.5 $m^2$) and not required to be accessible to persons in wheelchairs shall be at least 24 in. (61 cm) in door width.*

*Exception No. 2: Doors serving a building or portion thereof not required to be accessible to persons with severe mobility impairments shall be permitted to be 28 in. (71 cm) in door leaf width.*

*Exception No. 3 ~~2~~: In detention and correctional occupancies, door openings to resident sleeping rooms shall be a minimum of 28 in. (71 cm) in clear width.*

*Exception No. 4 ~~3~~: Doors within dwelling units shall be a minimum 28 in. (71 cm) wide, except bathroom doors shall be a minimum 24 in. (61 cm) wide.*

*Exception No. 5 ~~4~~: A power-operated door leaf located within a two-leaf opening shall be exempt from the minimum 32-in. (81-cm) single-leaf requirement in accordance with Exception No. 2 to 3-2.1.9.*

*Exception No. 6: This requirement shall not apply to revolving doors as provided in 3-2.1.10.*

3-2.1.2.4 ~~3-2.1.2.3~~ In health care occupancies, the minimum clear width for doors in the means of egress from sleeping rooms; diagnostic and treatment areas such as X-ray, surgery, or physical therapy; and nursery rooms shall be as follows:

(a) Hospitals and nursing homes — 41.5 in. (105 cm)

(b) Psychiatric hospitals and limited care facilities — 32 in. (81 cm)

*Exception No. 1: Doors that are located so as not to be subject to use by any health care occupant shall be not less than 32 in. (81 cm) in clear width.*

*Exception No. 2: Doors in exit stair enclosures shall be not less than 32 in. (81 cm) in clear width.*

*Exception No. 3: Doors serving newborn nurseries shall be not less than 32 in. (81 cm) in clear width.*

*Exception No. 4: Where a pair of doors is provided, at least one of the doors shall provide a minimum 32 in. (81 cm) clear width opening and a rabbet, bevel, or astragal shall be provided at the meeting edge. The inactive leaf shall have an automatic flush bolt to provide positive latching.*

A-3-2.1.2.1 Figures A-3-2.1.2.1(a) and A-3-2.1.2.1(b) illustrate the method of measuring door width for purposes of calculating egress capacity.

**Figure A-3-2.1.2.1(a) Door width - egress capacity.** (Existing NFPA 101-2000 Figure A.7.2.1.2.1(a))

**Figure A-3-2.1.2.1(b) Door width - egress capacity with permitted obstructions.** (Existing NFPA 101-2000 Figure A.7.2.1.2.1(b))

A-3-2.1.2.2 Figures A-3-2.1.2.2(a) and A-3-2.1.2.2(b) illustrate the method of measuring clear width for doors.

In cases where a chapter requires a door width, for example, of not less than 36 in. (91 cm), this requirement can be met by a door leaf of the minimum specified width if the term *clear width* does not appear as part of the minimum width requirement. A pair of cross-corridor doors subject to such a requirement would be judged under the following criteria:

(1) Each door leaf is required to be not less than 36 in. (91 cm) in width.

(2) The pair of doors is required to provide sufficient, clear, unobstructed width (which will be less than the door leaf width measurement) to handle its assigned occupant load, based on a calculation using the appropriate egress capacity factor in Table 3-3.3.1.

Where swinging doors do not open at least 90 degrees, the clear width of the doorway should be measured between the face of the door and the stop.

It is not the intent to regulate projections above the 80-in. (203-cm) height.

**Figure A-3-2.1.2.2(a) Minimum clear width.** (Existing NFPA 101-2000 Figure A.7.2.1.2.2(a))

**Figure A-3-2.1.2.2(b) Minimum clear width with permitted obstructions.** (Exisitng NFPA 101-2000 Figure A.7.2.1.2.2(b))

3-3.2* Measurement of Means of Egress. Width of means of egress shall be measured in the clear at the narrowest point of the exit component under consideration ~~within 80 in. (203 cm) maximum above the floor~~.

*Exception: For egress components, projections not more than $3\,^1/_2$ in. (8.9 cm) on each side shall be permitted at and below a height of 38 in. (96 cm).*

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #26)

101B- 21 - (3-2.1.3 Exception No. 1and 2): Reject
**SUBMITTER:** Jake Pauls, Jake Pauls Consulting Services
**RECOMMENDATION**: Revise text as follows:
Exception No. 1: Provided that it does not serve as the primary means of escape in one- and two-family dwellings where ~~where~~ a door discharges to the outside ... [remainder unchanged]
Exception No. 2: Provided that it does not serve as the primary means of escape in one- and two-family dwellings, ... [remainder unchanged]
**SUBSTANTIATION:** This introduces a part of what is called Visitability, a concept incorporated in some local requirements in the U.S. and in national requirements for new housing in the U.K. We need to recognize that this is a small but crucial aspect of the whole visitability package, the part dealing with the "zero-step entrance" (as advocated by the group, Concrete Change, for example.) There will be tougher proposals in the future to get the rest of the Visitability package including the elimination of steps on the remainder of the access/egress route for the home and the provision of a wheelchair accessible route at least to one ground-floor toilet. The part proposed here has the greatest impact on safety as well as usability.

In addition to facilitating accessibility for occupants and visitors using wheelchairs, the elimination of the single step has a huge benefit for everyone having difficulty with steps, especially steps at doors. I learned this first hand in investigating a serious fall by an elderly woman attempting to enter a residential-type building being used for an office. Until I did the detailed ergonomic evaluation of the unusual stepping pattern required to step over a riser and a threshold, I did not fully appreciate just how difficult this is, even relative to traversing a single step on an ordinary walkway. Thus, in addition to its accessibility benefits, there is a safety and usability benefit that applies to many more people than only those using wheelchairs. Some of these people have disabilities affecting their ambulation due to injury, disease or effects of aging.

The change to Exception No. 2 is justified because, as stated, it allows an even worse safety and usability situation in some respects than was permitted by Exception No. 1. An inferior alternative is to limit the use of Exception No. 2 to interior stairways, however, I am not making this my proposal.

**COMMITTEE ACTION:** Reject.

**COMMITTEE STATEMENT:** The submitter has not provided adequate justification that the current allowance for a 7-in. stepdown adversely affects means of escape. However, if the stepdown were not permitted, things such as snow accumulation could adversely affect means of escape. It is more important to serve escape needs than it is to address visitability in a piecemeal fashion. The proposed change would require the floor at both sides of the door to be at the same level, yet this does not guarantee that a wheelchair user can get to the vicinity of the door. The submitter's change would be a partial fix toward visitability. It would be better to address the subject comprehensively at a later date.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 26

NEGATIVE: 2

**EXPLANATION OF NEGATIVE:**

ELVOVE: In the proponent's substantiation and in later discussions held by the Means of Egress Committee during the NFPA 5000 ROP meeting in Tampa, the proponent indicated a concern that falls can occur due to "the unusual stepping pattern required to step over a riser and a threshold." (if the step is too close to a door containing a threshold). This hazard could be reduced if (new) one and two family dwellings are required to meet the floor level requirements of the base paragraph (i.e., revise exception 1, so they are not exempted from the base paragraph requirements). In deleting this exception, home builders will have to provide a means to sufficiently protect landings from the accumulation of snow and ice in areas subject to these conditions. (Note: the proponent's discussion of "Visibility", though a noble concept, is not in itself, substantiation for this requirement).

PAULS: My negative ballot is triggered by concerns about the double standard for dwelling unit safety and usability, especially in relation to stairs. Thus this particular issue will be pursued most vigorously throughout the comment, membership action and appeal process provided under NFPA's system.

Responding to the Committee's statement supporting rejection of my Proposal 101B -21, the Committee is in error when referring to the "7-in. stepdown". In actuality, the permitted step height is 8 in., not 7 in. (as the limit was changed in 101B-22 (Log #CP9)). Thus this step at doors is permitted to be significantly higher than permitted generally for stairs (7 In.) as well as permitted for other stairs in dwellings (7 3/4 in.).

Secondly, the Committee is inconsistent in referring to the proposed problem of snow accumulation, if it were a problem for dwellings, why is snow not a problem for all of the other situations where no step down is permitted by NFPA 101B, NFPA 101 as well as the IBC and other model codes? This strikes me as yet another example of an unjustified double standard applied only to the most vulnerable of users in dwellings. Furthermore, no evidence was provided by the Committee of any actual injuries or deaths due to snow accumulation at a door. Moreover, the in-swinging doors of dwellings today are of better construction than were many traditional doors; this obviates the outswinging storm door which one or tow Committee members felt might have difficulty with snow accumulation. On this issue, there was extensive testimony at the recent hearings on the IRC in Rochester where several advocates for improved usability of homes testified specifically on this matter in the IRC. If there is any place in the country where snow accumulation is extensive, it is in the lake-effect snowfall areas of up-state New York where these testifiers live. Incidentally, the deletion of the step down at primary means of escape doors covered by the IRC was voted for by the industry-dominated IRC committee and was upheld by the voting membership of the three model code groups. We thus face the prospect of NFPA publishing codes that are deficient relative even to the ICC codes. As a committee member, I find that prospect unacceptable.

A similar rebuttal applies to the commonly made argument that the step is needed to prevent entry of water. How does water know the difference between a door to a dwelling and a door to any other building? Water control is a solvable problem. It has been solved in many existing homes with the step-free or zero-step entry. I saw many examples of this in the course of a tour of visible homes (also very affordable homes) in Atlanta in conjunction with a three-day meeting of national experts and advocates on visibility. Atlanta is one of those regions where wind-driven rain is a challenge. Yet nobody reported this as an unsolvable problem for homes without a step at the entry door.

Thirdly, the Committee gave as a reason for rejection that visibility should be addressed in a comprehensive fashion rather than in a piecemeal fashion. What a bizarre reason for rejecting a modest proposal; in effect arguing that I should come back with a larger proposal that would almost certainly be rejected for even more reasons than the Committee came up with on my Proposal 101B-21. The deletion of the step down at doors stands well on its own in terms of improved safety and usability. The larger matter of wheelchair accessibility to, and around critical areas of, homes will need a lot of work. In the meantime, the matter of the single step at doors will help all users.

I will be submitting comments on this proposal later in the NFPA 101B process as well as in the NFPA 101 process. Those comments will gen into more detail on this matter and will, I suspect be even more scathing of Committee rejection of this modest proposal which has little or no cost impact while providing significant safety and usability benefits. For now, let me note there has been an important social development related to how at least one major international organization views NFPA. Specifically, on November 15, 2000, the American Public Health Association (APHA) adopted a public policy on NFPA that included the following recommendations:

4. (APHA) Encourages NFPA and other organizations to develop codes and standards requiring home stairways to be designed and constructed so that steps and railings provide at least the same level of usability and safety from falls as do stairs and railings in other buildings.
5. (APHA) Encourages NFPA, in its development of codes and standards, generally to utilize a "Universal Design" or inclusive design philosophy, which maximizes safety and usability for the largest range of people, including elderly persons or those of any age with disabilities.

What a slap in the face we have now from the NFPA Means of Egress Committee in rejecting a relatively simple move toward home stair standards consistent with what is required for other buildings and rejecting this modest contribution to "Universal Design".

Let me go a bit further with the argument that the Committee and NFPA members will get from me and others on this matter over the next year or so. There was some testimony recently within the Means of Egress Committee in relation to the absence of a handrail at the step associated with doors. Someone said that people could hold onto the door frame in lieu of having a proper handrail. What nonsense! Door frames and, indeed, door hardware are not substitutes for a proper handrail. Furthermore, the step is quite different than NFPA 101B or NFPA 101 permits elsewhere, even for dwellings. This is because the common provision of a raised threshold further raises the effective height of as much as 8 1/2 in. with a code-complying 1/2-in. high threshold. Moreover, and this was one of the points raised in my ergonomic evaluation in the case of a woman falling at an entrance, one has to step horizontally significantly further to get footing on the floor beyond the raised threshold. Especially for older persons, this poses significant problems of usability and safety. This increases the effective stride length by several inches. How can the Means of Egress Technical Committee be so insensitive to the growing needs of our aging population by insisting on the double, lower standard applicable only to dwellings? Injury from falls is a much larger problem than is fire, by about two orders of

magnitude and this problem especially impacts older persons. Here is a relatively simple fall problem with a relatively simple, inexpensive fix. What credibility does the Committee hope to gain by appearing so insensitive to this problem and so resistant to the modest solution proposed by 101B-21?

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(Log #CP9)

101B- 22 - (3-2.1.3 Exception No. 1 and 5-3-2.1.3): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise Exception No. 1 to 3-2.1.3 and make editorial changes so as to read:

3-2.1.3 †Floor Level. The elevation of the floor surfaces on both sides of a door shall not vary by more than 1/2 in. (13 mm). The elevation shall be maintained on both sides of the doorway for a distance not less than ~~at least equal to~~ the width of the widest leaf. Thresholds at doorways shall not exceed ~~be more than~~ 1/2 in. (13 mm) in height. Raised thresholds and floor level changes in excess of ~~more than~~ 1/4 in. (6.4 mm) at doorways shall be beveled with a slope not steeper than 1 in 2.

Exception No. 1: In one- and two-family dwellings where the door discharges to the outside or to an exterior balcony or exterior exit access, the floor level outside the door shall be permitted to be one step lower than the inside, but shall not be in excess of ~~not more than~~ 8 in. (20.3 cm) ~~7 in. (17.8 cm)~~ lower.

Exception No. 2: In one- and two-family dwellings, a door at the top of a stair shall be permitted to open directly at a stair, provided that ~~if~~ the door does not swing over the stair and the door serves an area with an occupant load of fewer than 50 persons.

Add a second sentence to 5-3-2.1.3 to read:

In existing buildings, a door at the top of a stair shall be permitted to open directly at a stair, provided that the door does not swing over the stair and the door serves an area with an occupant load of fewer than 50 persons.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 27

NEGATIVE: 1

**EXPLANATION OF NEGATIVE:**

PAULS: My accompanying negative ballot for 101B-21 addresses much of the problem I have with this committee proposal. It is so contrary to move toward mainstreamed stair geometry requirements (under the control of the Means of Egress Technical Committee) for the 7 inches to be raised to 8 inches. If 8 inches is in NFPA 101, let's not repeat the mistake in NFPA 101B. At some point, we have to move to a consistent standard. Furthermore, as discussed in greater length in my negative ballot on 101B-21, the effective step height in this situation is often a half inch higher due to the threshold. Moreover, as noted in that other negative ballot, we now have the prospect of NFPA 101B being worse than even the ICC codes on this matter. There is no justification for an 8-inch step height here. Revise the committee proposal so the 8 inches stays at 7 inches (assuming that the exception is not modified as proposed in 101B-21).

If it is not already clear to my fellow committee members, this is one of those issues I intend to pursue as thoroughly as permitted in NFPA's process and I will be enlisting the assistance of others who have a particular concern for reasonable safety and usability of homes.

**COMMENT ON AFFIRMATIVE:**

ELVOVE: I agree with the committee's action as the changes proposed will correlate 101B with the 2000 edition of NFPA 101 as indicated by the committee's substantiation. However, per my comments on Log 26 (101B-21), I do not feel that exception 1 is warranted for new one and two family dwellings and therefore should be deleted in its entirety.

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(Log #CP10)

101B- 23 - (3-2.1.4.5, 3-2.1.4.6, and 5-3.2.1.4.5): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise 3-2.1.4.5 and 3-2.1.4.6, and add a new 5-3-2.1.4.5 as follows:

3-2.1.4.5* †During its swing, any door in a means of egress shall leave not less ~~not obstruct more~~ than one-half of the required width of an aisle, corridor, passageway, or landing unobstructed and shall not ~~nor~~ project more than 7 in. (17.8 cm) into the required width of an aisle, corridor, passageway, or landing when fully open. Doors shall not open directly onto a stair without a landing. The landing shall have a width not less than the width of the door. (See 3-2.1.3.)

3-2.1.4.6 In educational occupancies, doors that swing into an exit access corridor shall be arranged ~~recessed~~ to prevent interference with corridor traffic. (See also 3-2.1.4.5.) ; ~~any doors that are not recessed shall open 180 degrees to stop against the wall. Doors in any position shall not reduce the required corridor width by more than one-half.~~

5-3-2.1.4.5 † In existing buildings, a door providing access to a stair shall not be required to maintain any minimum unobstructed width during its swing, provided that it meets the requirement that limits projection to not more than 7 in. (17.8 cm) into the required width of a stair or landing when the door is fully open. Existing landings shall be permitted to have a width less than the width of the door where approved by the authority having jurisdiction.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #3)

101B- 24 - (3-2.1.4.7): Reject

**SUBMITTER:** Stephen E. Duffin, Zurich

**RECOMMENDATION**: Revise text to read as follows:

"The forces required to fully open any door manually in a means of egress shall not be more than 15 lbf (67 N) to release the latch, 30 lbf (133 N) to set the door in motion, and 15 lbf (67 N) to open the door to the minimum required width. Opening forces for interior side-hinged or pivoted-swinging doors without closers shall not be more than 5 lbf (22 N). These forces shall be applied at the latch stile.

Exception No. 1: Doors in accessible means of egress shall be power operated. Power shall be adequate and reliable and be provided from both a primary and secondary supply.

Exception No. 2 : Horizontal sliding doors in detention and correctional occupancies as specified in Exception No. 1 to 3-2.1.4.1.

Exception No. 3 : Power-operated doors as specified in 3-2.1.9.

**SUBSTANTIATION:** A major deficiency exists in the 1999 edition of NFPA 101B, "Means of Egress for Buildings and Structures," accessible means of egress design. This needs to be promptly addressed and corrected.

Various sections of Chapter 3 of this standard pertain to accessible means of egress design concepts. A basic premise of accessible means of egress design is defined in Section 3-5.4.1 of the 1999 edition of NFPA 101B. Section 3-2.12 provides additional details. This standard bases its design concepts on the principle that a person with a severe mobility impairment shall be able to travel unassisted to a minimum of one accessible area of refuge or one accessible exit discharge within the allowable travel distance. This performance objective is not being achieved. Substantial documentation exists to support this fact. There is currently a design component allowed in an accessible means of egress that actually provides a road block to a person with a severe mobility impairment attempting to reach an accessible area of refuge or an accessible exit discharge. By allowing this design component in the accessible means of egress design, it is actually defeating its purpose.

The design component providing the roadblock is allowed by Section 3-2.1.4.7 of the 1999 edition of NFPA 101B. Substantial documentation exists to support the fact that a person with a severe mobility impairment cannot overcome the forces currently allowed in Section 3-2.1.4.7 to fully open the egress doors in an accessible means of egress, especially doors equipped with closures. What good is the currently allowable accessible means of egress design if a person with a severe mobility impairment is stopped at an egress door - because that person can't open the door - and can't reach an area of refuge or an accessible exit discharge? This deficiency is extremely serious. What difference is there between a door that can't be opened and one that is locked? A person with a severe mobility

impairment must be able to travel unassisted through these egress doors - therefore this deficiency must be addressed. If this deficiency is not corrected and these doors are allowed to remain with the existing allowable opening forces - it is subjectively synonymous with viewing the egress doors in an accessible means of egress as being locked closed for a person with a severe mobility impairment.

Doors in accessible means of egress need to be required to be power operated. Power should be adequate and reliable and be provided from both a primary and secondary supply. Power could be supplied from power sources currently defined in Section 3-9 (Emergency Lighting and Standby Power). These power sources are not uncommon and have been the design standard for years for emergency lighting. Therefore, this appears to be both a technically and economically feasible proposal to correct a very serious deficiency.

**COMMITTEE ACTION:** Reject.

**COMMITTEE STATEMENT:** The submitter has not substantiated why such a strict provision for a power-operated door is warranted. The recommendation is not consistent with the accessibility requirements of ANSI A117.1 or the building codes that scope its use.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP11)

101B- 25 - (3-2.1.5.4 (New) and 3-2.1.5.4): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Insert a new 3-2.1.5.4 as follows, revise current 3-2.1.5.4 as follows, and renumber 3-2.1.5.4 through 3-2.1.5.6 to become 3-2.1.5.5 through 3-2.1.5.7.

3-2.1.5.4 If a stair enclosure allows access to the roof of the building, the door to the roof either shall be kept locked or shall allow re-entry from the roof.

3-2.1.5.5 ~~3-2.1.5.4~~ A latch or other fastening device on a door shall be provided with a releasing device having ~~that is readily operable and has~~ an obvious method of operation and that is readily operated under all ~~required~~ lighting conditions. The releasing mechanism for any latch shall be located not less than ~~at least~~ 34 in. (86 cm), and not more than 48 in. (122 cm), above the finished floor. Doors shall be openable with not more than one releasing operation.

Exception: *Egress doors from individual living units and guest rooms of residential occupancies shall be permitted to be provided with devices that require not more than one additional releasing operation if such device is operable from the inside without the use of a key or tool and is mounted at a height not exceeding ~~more than~~ 48 in. (122 cm) above the finished floor. Automatic latching devices shall not be located more than 48 in. (122 cm) above the finished floor.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP12)

101B- 26 - (3-2.1.6.1): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Delete subpart (c) of 3-2.1.6.1 and make editorial changes as follows:

3-2.1.6.1 Delayed Egress Locks. In occupancies shown in Table 3-2.1.6.1, approved, listed, delayed egress locks shall be permitted to be installed on doors serving low- and ordinary-hazard contents in buildings protected throughout by an approved, supervised automatic fire detection system or an approved, supervised automatic sprinkler system, provided the following criteria are met ~~under the following conditions:~~

(a) The doors shall unlock upon actuation of an approved, supervised automatic sprinkler system, or upon the actuation of any heat detector or activation of not more than two smoke detectors of an approved, supervised automatic fire detection system.

(b) The doors shall unlock upon loss of power controlling the lock or locking mechanism.

~~(c) The doors unlock upon disablement of the automatic fire detection system, sprinkler system, or the means of sprinkler system supervision protecting the building area served by the door(s).~~

(c) ~~(d)~~ * An irreversible process shall release ~~releases~~ the lock within 15 seconds upon application of ~~when~~ a force ~~is applied~~ to the release device required in 3-2.1.5.5 ~~3-2.1.5.4.~~ The force to initiate the lock-releasing process shall not have to be applied continuously for more than 3 seconds. The force applied to initiate the lock-releasing process shall not have to exceed 15 lbf (67 N). The initiation of the release process shall activate an audible signal in the vicinity of the door. Once the door lock has been released by the application of force to the releasing device, relocking shall be by manual means only.

Exception to (c) ~~(d)~~ Where approved by the authority having jurisdiction, a delay of not more than 30 seconds shall be permitted.

(d) ~~(e)~~ * On the door adjacent to the release device, there shall be ~~is~~ a readily visible, durable sign in letters not less than ~~at least~~ 1 in. (2.5 cm) high and not less than ~~at least~~ 1/8 in. (0.3 cm) in stroke width on a contrasting background that reads as follows:

PUSH UNTIL ALARM SOUNDS
DOOR CAN BE OPENED IN 15 SECONDS

**Table 3-2.1.6.1 Occupancies Permitting Delayed Egress Locks**

| Occupancy | Condition |
|---|---|
| Assembly | Doors other than main entrance/exit |
| Educational | — |
| Day care | — |
| Health care | Not more than one such device is located in any egress path |
| Ambulatory health care | Limited to exterior doors |
| Hotels and dormitories | Not more than one such device is located in any egress path |
| Apartment buildings | Not more than one such device is located in any egress path |
| Residential board and care, large | Not more than one such device is located in any egress path |
| Mercantile | — |
| Business | — |
| Industrial | — |
| Storage | — |

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP13)

101B- 27 - (3-2.1.6.2): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise 3-2.1.6.2 by inserting the words "in the direction of egress" in five places and making editorial changes as follow:

3-2.1.6.2 Access-Controlled Egress Doors. In occupancies shown in Table 3-2.1.6.2, doors in the means of egress shall be permitted to be equipped with an approved entrance and egress access control system, provided that the following criteria are met ~~under the following conditions:~~

(a) A sensor shall be ~~is~~ provided on the egress side arranged to detect an occupant approaching the doors, and the doors shall be ~~are~~ arranged to unlock in the direction of egress upon detection of an approaching occupant or loss of power to the sensor.

(b) Loss of power to that part of the access control system that locks the doors shall automatically unlock ~~unlocks~~ the doors in the direction of egress.

(c) The doors shall be ~~are~~ arranged to unlock in the direction of egress from a manual release device located 40 in. (102 cm) to 48 in. (122 cm) vertically above the floor and

within 5 ft (1.5 m) of the secured doors. The manual release device shall be readily accessible and clearly identified by a sign that reads as follows:

PUSH TO EXIT

When operated, the manual release device shall result in direct interruption of power to the lock — independent of the access control system electronics — and the doors shall remain unlocked for at least 30 seconds.

(d) Activation of the building fire-protective signaling system, if provided, shall automatically unlock ~~unlocks~~ the doors in the direction of egress, and the doors shall remain unlocked until the fire-protective signaling system has been manually reset.

(e) Activation of the building automatic sprinkler or fire detection system, if provided, shall automatically unlock ~~unlocks~~ the doors in the direction of egress, and the doors shall remain unlocked until the fire-protective signaling system has been manually reset.

**Table 3-2.1.6.2 Occupancies Permitting Access-Controlled Egress Doors**

| Occupancy | Condition |
|---|---|
| Assembly | Doors not locked from egress side when assembly occupancy is occupied |
| Educational | — |
| Day care | — |
| Health care | — |
| Ambulatory health care | Limited to exterior doors |
| Hotels and dormitories | — |
| Apartment buildings | — |
| Residential board and care, large | — |
| Mercantile | In buildings protected throughout by an approved, supervised fire detection system or an approved, automatic sprinkler system |
| Business | — |
| Industrial | — |
| Storage | — |

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP15)

101B- 28 - (3-2.1.7.1): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-2.1.7.1 as follows:

3-2.1.7.1 In the occupancies shown in Table 3-2.1.7.1, doors shall be equipped with panic or fire exit hardware. Such a releasing device shall meet the following criteria:

(1) ~~(a)~~ †It shall consist ~~Consist~~ of cross bars or push pads ~~panels~~ , the actuating portion of which extends across not less than ~~at least~~ one-half of the width of the door leaf and not less than , ~~at least~~ 34 in. (86 cm),nor ~~and not~~ more than 48 in. (122 cm), above the floor.

(2) ~~(b)~~ It shall be constructed so that a horizontal ~~Cause the door latch to release when a~~ force ~~that shall~~ not ~~be required~~ to exceed 15 lbf (67 N) ~~is applied~~ actuates the cross bar or push pad and latches.

**Table 3-2.1.7.1 Occupancies Requiring Panic Hardware or Fire Exit Hardware**

| Occupancy | Condition |
|---|---|
| Assembly | Any latching or locking door in means of egress from area having an occupant load of 100 or more persons |
| Educational | Any latching or locking door in means of egress from area having an occupant load of 100 or more persons |
| Day care | Any latching or locking door in means of egress from area having an occupant load of 100 or more persons |
| Any occupancy | Any door serving high-hazard contents area with an occupant load of 5 or more persons |

**SUBSTANTIATION:** Correlation with NFPA101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP16)

101B- 29 - (3-2.1.8 and 5-3-2.1.8.1(c) ): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-2.1.8 and add a new 5-3-2.1.8.2(c) as follows:

3-2.1.8 Self-Closing Devices.

3-2.1.8.1* A door ~~that is designed to~~ normally required to be kept closed ~~in a means of egress shall be self-closing and~~ shall not be secured in the open position ~~by any means~~ at any time and shall be self-closing or automatic-closing in accordance with 3-2.1.8.2.

~~Exception: Automatic-closing doors in accordance with 3-2.1.8.2 shall be permitted.~~

3-2.1.8.2 In any building of low- or ordinary-hazard contents, as defined in Section 4-2 ~~1-7~~ , or where approved by the authority having jurisdiction, doors shall be permitted to be automatic-closing, provided that the following criteria are met ~~under the following conditions:~~

(a) Upon release of the hold-open mechanism, the door becomes self-closing.

(b) The release device is designed so that the door instantly releases manually and upon release becomes self-closing, or the door readily closes.

(c) †The automatic releasing mechanism or medium is activated by the operation of approved smoke detectors installed in accordance with the requirements for smoke detectors for door release service in NFPA 72, National Fire Alarm Code®.

~~(1) the operation of an approved, automatic smoke detection system installed to protect the entire building, designed and installed to provide for actuation of the system promptly so as to preclude the generation of heat or smoke sufficient to interfere with egress before the system operates, or (2) the operation of approved smoke detectors installed in such a way as to detect smoke on either side of the door opening. The above systems shall be permitted to be zoned where approved by the authority having jurisdiction.~~

(d) Upon loss of power to the hold-open device, the hold-open mechanism is released and the door becomes self-closing.

(e) The release by means of smoke detection of one door in a stair enclosure results in the closing of all doors serving that stair.

(f) In health care occupancies, the automatic sprinkler system, the fire alarm system, and the systems listed in (c) shall be arranged to initiate the closing action of all such doors by zone or throughout the entire facility.

(g) In ambulatory health care facilities, the systems listed in (c) shall be arranged to initiate the closing action of all such doors by zone or throughout the entire facility.

5-3-2.1.8.2(c) Self-Closing Devices. Existing smoke detectors installed in such a way as to detect smoke on either side of the door opening shall be permitted in lieu of smoke detectors installed in accordance with the requirements for smoke detectors for door release service in NFPA 72, National Fire Alarm Code® where approved by the authority having jurisdiction.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP62)

101B- 30 - (3-2.1.8.2(f)): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-2.1.8.2(f) as follows:
3-2.1.8.2 (f) In health care occupancies, the automatic sprinkler system, the fire alarm system, and the systems listed in (c) shall be arranged to initiate the closing action of all such doors ~~by zone~~ throughout the smoke compartment or throughout the entire facility.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP17)

101B- 31 - (3-2.1.9): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-2.1.9 as follows:
3-2.1.9* Powered ~~Power-Operated~~ Doors.

3-2.1.9.1 General. Where means of egress doors are operated by power upon the approach of a person or doors with power-assisted manual operation, the design shall be such that in the event of power failure, the door opens manually to allow ~~permit~~ egress travel or closes where necessary to safeguard the means of egress. The forces required to open these doors manually shall not exceed those ~~be more than~~ required in 3-2.1.4.7 except that the force required to set the door in motion shall not be more than 50 lbf (222 N). The door shall be designed and installed so that when a force is applied to the door on the side from which egress is made, it shall be capable of swinging from any position to the full use of required width of the opening in which it is installed. (See 3-2.1.4.) On the egress side of each door, there shall be a readily visible, durable sign that reads as follows:

IN EMERGENCY, PUSH TO OPEN

The sign shall be in letters not less than 1 in. (2.5 cm) high on a contrasting background.

Exception No. 1: Sliding, power-operated doors in an exit access that serves an occupant load of fewer than 50 ~~and~~ that manually opens in the direction of door travel with forces not exceeding those ~~more than~~ required in 3-2.1.4.7 shall not be required to have a swing-out feature. The required sign shall read as follows: ~~state "In Emergency, Slide to Open."~~

IN EMERGENCY, SLIDE TO OPEN

Exception No. 2: *In the emergency break-out mode, a door leaf located within a two-leaf opening shall be exempt from the minimum 32-in. (81-cm) single-leaf requirement of 3-2.1.2.2 if the clear width of the single leaf is at least 30 in. (76 cm).
Exception No. 3: For a biparting sliding door in the emergency break-out mode, a door leaf located within a multiple-leaf opening shall be exempt from the minimum 32-in. (81-cm) single-leaf requirement of 3-2.1.2.2 if a ~~minimum~~ clear opening of not less than 32 in. (81 cm) ~~clear opening~~ is provided by all leafs broken out.

Exception No. 4: ~~Horizontal sliding doors that comply with 3-2.1.14.~~ Doors complying with 3-2.1.14 shall be permitted to be used.

Exception No. 5: Power-operated doors as permitted in detention and correctional occupancies.

3-2.1.9.2 Doors Required to Be Self-Closing. Where doors are required to be self-closing and (1) are operated by power upon the approach of a person or (2) are provided with power-assisted manual operation, they shall be permitted in the means of egress under the following conditions:

(1) Doors can be opened manually in accordance with 3-2.1.9.1 to allow egress travel in the event of power failure.

(2) New doors remain in the closed position unless actuated or opened manually.

(3) When actuated, new doors remain open for not more than 30 seconds.

(4) Doors held open for any period of time close — and the power-assist mechanism ceases to function — upon operation of approved smoke detectors installed in such a way as to detect smoke on either side of the door opening in accordance with the provisions of NFPA 72, National Fire Alarm Code.

(5) Doors required to be self-latching are either self-latching or become self-latching upon operation of approved smoke detectors per 3-2.1.9.2(4).

(6) New power-assisted swinging doors comply with BHMA/ANSI A156.19, American National Standard for Power Assist and Low Energy Power Operated Doors.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP18)

101B- 32 - (3-2.2.1 Exception No. 3 (New) ): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Add a new exception to read as follows:
3-2.2.2.1 †Standard Stairs. Stairs shall be in accordance with Table 3-2.2.2.1.

**Table 3-2.2.2.1 Stair Criteria**

| Element | Dimension |
|---|---|
| Minimum width clear of all obstructions, except projections not more than $3\frac{1}{2}$ in. (8.9 cm) at or below handrail height on each side | 44 in. (112 cm); 36 in. (91 cm) if total occupant load of all stories served by stairways is fewer than 50 |
| Maximum height of risers | 7 in. (17.8 cm) |
| Minimum height of risers | 4 in. (10.2 cm) |
| Minimum tread depth | 11 in. (27.9 cm) |
| Minimum headroom | 6 ft 8 in. (203 cm) |
| Maximum height between landings | 12 ft (3.7 m) |
| Landing | *(See 3-2.1.3 and 3-2.2.3.2.)* |

Exception No. 1: Industrial equipment access stairs and landings that serve as a component of the means of egress from the involved equipment and do not serve more than 20 people shall be permitted to have a minimum clear width of 22 in. (55.9 cm), minimum tread depth of 10 in. (25.4 cm), maximum riser height of 9 in. (22.9 cm), minimum headroom of 6 ft 8 in. (203 cm), and a maximum height between landings of 12 ft (3.7 m).
Exception No. 2: Maximum riser height of 7 3/4in. (19.7 cm) and minimum tread depth of 10 in. (25.4 cm) shall be permitted for one- and two-family dwellings and within dwelling units.
Exception No. 3: In assembly occupancies, the limitation on height between landings in Table 3-2.2.2.1 shall not apply to aisle stairs.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #27)

101B- 33 - (3-2.2.2.1 Exception No. 2): Accept
**SUBMITTER:** Jake Pauls, Jake Pauls Consulting Services
**RECOMMENDATION**: Delete Exception No. 2 without replacement.
**SUBSTANTIATION:** The double lower standard for stairs in dwelling units is not justified by philosophical considerations or the injury toll. Moreover, usability considerations under all considerations under all conditions of use, including emergency escape/egress, dictate riser-tread geometry similar to that commonly found in other buildings where most usage conditions are much less demanding.

See extensive justification provided with this proposal. Also provided is a detailed rebuttal to arguments presented when this issue was last debated in relation to the Life Safety Code.

**Detailed Justification for "7-11" Step Geometry for Homes: Introductory Background**

In addition to being widely used as a minimum requirement in model codes and standards, use of the "7-11" requirement has also been repeatedly recommended *for dwelling unit stairs* by the CABO Board for the Coordination of the Model Codes, BCMC (one quarter of which was composed of NFPA representatives). That BCMC recommendation went through the CABO Board of Directors and was never rescinded before BCMC was replaced by BDMC when the International Code Council (ICC) was formed. Within ICC the International Building Code™ Means of Egress Committee, in 2000, recommended (again) that the "7-11" step geometry requirement be applied to dwellings as it was to other buildings. Within NFPA, in 1999, the Means of Egress Technical Committee and the NFPA membership voting at the Fall 1999 Meeting voted strongly in favor of the "7-11" step geometry requirement for dwellings covered by the Life Safety Code. Committees not agreeing to the use of the "7-11" step geometry requirement were the NFPA 101 Residential Technical Committee, the NFPA 101 Technical Correlating Committee, the NFPA 501 (Manufactured Housing) committees and industry-dominated ICC International Residential Code™ committees. Twice, in 2000, the NFPA Standards Council has dealt with appeals on the step geometry issue for dwellings. In both cases, the Council directed committees responsible for stairway requirements for dwellings to justify, better than they had, why there should be a lower standard of requirement for step geometry for dwellings. Here follows an excerpt from the Standard Council's Long Decision on Agenda Item SC#00-3(b), dated 13 January 2000, on Comment 101-397.

> ". . . . the Council believes that further review of this issue should be undertaken to establish, with greater clarity than has been presented before the Council, whether and why retaining a different stair geometry for this [One- and Two-Family Dwelling] occupancy is justified. The Council is, therefore, directing the TC during the next revision cycle to reconsider, either through a TC or a Public Proposal, the 7/11 stair geometry for new construction in one and two-family dwellings. Both sides should fully address the technical and cost-benefit questions raised by this issue. Should the TC again decide to reject the 7/11 stair geometry for this occupancy, it should provide clear substantiation why a different stair geometry for one and two family dwellings is justified."

The Standards Council made a somewhat similar decision (on Agenda Item 00-58 (a/b/c/d/e/f/g), dated 20 July 2000, in the more-complex set of issues raised by the TC-proposed inclusion of stair geometry plus other stair and railing requirements in NFPA 501, Standard for Manufactured Housing. After I submitted comments, and pursued their approval through the TC, TCC, Annual Meeting and Standards Council appeal levels, the Council returned the package back to the NFPA 501 committee. This had the effect of not including, for the 2000 edition of NFPA 501, any requirements on stairs and railings.

Thus far, as of September 2000 (because no committee meetings have yet been held), the responsible committees have not responded to the Standards Council directives. The first NFPA Technical Committee to deal with this issue, subsequent to the Standards Council directives, is the Means of Egress Technical Committee which is responsible for NFPA 101B. In essence, it is up to this Technical Committee to respond first to the Standards Council. This responsibility applies especially to the matter of technical soundness of the "7-11" step geometry requirement as well as the need to apply it generally.

**Injury Epidemiology**

**Stair-related Injuries.** As shown in Table 1, injury statistics from the U.S. Consumer Product Safety Commission (CPSC) clearly demonstrate that estimated number of injuries related to stairs has been increasing over the last 25 years. Note that contrary to some industry claims (noted in proposal E37-00 before ICC), there has not been a recent trend downward in the estimated number of stair-related injuries reported by the CPSC. Such industry claims were apparently based on unadjusted data which did not take into account important changes in CPSC's data gathering for the National Electronic Injury Surveillance System (NEISS), especially in 1997 when the number of hospital emergency rooms reporting data was increased from 91 to 101. This meant that unadjusted data were incorrect, particularly in suggesting possible time trends. The data shown in the right column are adjusted in accordance with correction factors, for 1986 to 1996, obtained from CPSC staff. Notably, NEISS data do not include injuries in some settings and, furthermore, only about 40 percent of medically-treated injuries are treated in emergency departments. Using the available, adjusted NEISS data, Figure 1 consists of a graph depicting the 95 percent confidence intervals and central trend line based on a linear growth of injuries over time (at a rate of about two percent per year), Notably, during approximately the same time period, as the estimated number of stair-related injuries doubled, fire-related injuries to civilians (as reported by NFPA) fell fairly steadily averaging about 3 percent decrease per year reaching 21,875 (20,775 to 22,975 at the 95 percent confidence intervals) in 1999. Like the stair-related injuries, there is some under reporting in the fire injury data. (Note that fire-related deaths in the home fell from about 6,000 to about 3,000 over the last 25 years.)

As shown by Table 1, the majority (about 63 percent) of stair-related injuries occur in residential settings; in fact, according to CPSC/NEISS statistics, about 85 percent of stairway-related injuries—*where the location is known*—occur with residential stairs. Clearly, residential stairs are high-priority candidates for careful attention to, and regulation, of features such as riser-tread geometry.

Table 1 and Figure 1 clearly suggest that stairway-related injuries have not been effectively controlled. Indeed, as noted above, the trend line for stair-related injuries is upward while that for fire-related injuries to civilians is downward. Similarly, in the USA, motor-vehicle related fatalities in terms of vehicle miles driven have been dropping (by about one-half). During the 25-year period shown in Figure 1, population growth in the U.S. has been only about 1 percent a year. Thus growth in stair-related injuries is not explained by population growth nor, in my professional opinion, by increased home stair usage.

Table 2 is taken from Lawrence, B.A. et al. 1999 ("Estimating the costs of nonfatal consumer product injuries in the United States." *Proceedings of 7th International Conference on Product Safety Research*, September 30 - October 1, 1999, Washington, DC, pp. 48-68.) Notably, as ranked by injury cost, stairways pose a greater injury problem than floors even though we use floors somewhere on the order of one hundred times more than we use stairways. See additional discussion of costs below.

**Table 1: Estimated Number of Injuries Treated in U.S. Hospital Emergency Departments and Associated with Stairs or Steps, 1974-1998 Unadjusted Data Tabulated by Locale and Adjusted Totals**
***Tabulation by Jake Pauls Using CPSC/NEISS Data for Product Code 1842***

| Year | Home | Other | Unknown | Total Unadjusted | Total Adjusted |
|---|---|---|---|---|---|
| 1974 | 151,434 | 21,449 | 80,077 | 252,960 | |
| 1975 | 329,723 | 57,100 | 199,943 | 586,766 | |
| 1976 | 332,962 | 62,581 | 207,008 | 602,551 | |
| 1977 | 371,168 | 66,046 | 206,514 | 643,728 | |
| 1978 | 391,184 | 69,659 | 176,900 | 637,743 | |
| 1979 | 417,606 | 84,303 | 140,623 | 642,532 | |
| 1980 | 462,855 | 87,381 | 145,732 | 695,968 | |
| 1981 | 535,643 | 100,649 | 148,122 | 784,414 | |
| 1982 | 545,161 | 103,143 | 139,430 | 787,734 | |
| 1983 | 584,472 | 108,663 | 106,300 | 799,435 | |
| 1984 | 586,776 | 102,740 | 81,702 | 771,218 | |
| 1985 | 544,301 | 114,914 | 109,946 | 769,161 | |
| 1986 | 563,150 | 117,775 | 113,951 | 794,876 | 787,881 |
| 1987 | 561,229 | 100,485 | 139,816 | 801,530 | 787,423 |
| 1988 | 533,895 | 89,500 | 195,686 | 819,081 | 797,457 |
| 1989 | 530,275 | 80,393 | 226,353 | 837,021 | 807,474 |
| 1990 | 577,259 | 99,520 | 322,093 | 998,872 | 954,822 |
| 1991 | 584,760 | 92,309 | 329,128 | 1,006,197 | 952,969 |
| 1992 | 604,197 | 104,855 | 351,749 | 1,060,801 | 995,350 |
| 1993 | 635,919 | 94, 911 | 321,385 | 1,052,215 | 978,034 |
| 1994 | 640,207 | 88,660 | 291,753 | 1,020,620 | 939,685 |
| 1995 | 567,689 | 97,781 | 313,441 | 978,911 | 892,571 |
| 1996 | 548,972 | 86,413 | 348,880 | 984,265 | 897,453 |
| 1997 | 490,455 | 70,421 | 354,011 | 914,887 | 914,887 |
| 1998 | 563,501 | 81,761 | 344,564 | 989,826 | 989,826 |
| **25-Year Total** | **12,654,793** | **2,183,412** | **5,395,107** | **20,333,312** | **19,670,042** |
| **Percent of Total** | **63** | **11** | **27** | **100** | **----** |
| **Percent of Known Locales** | **85** | **15** | **----** | **----** | **----** |

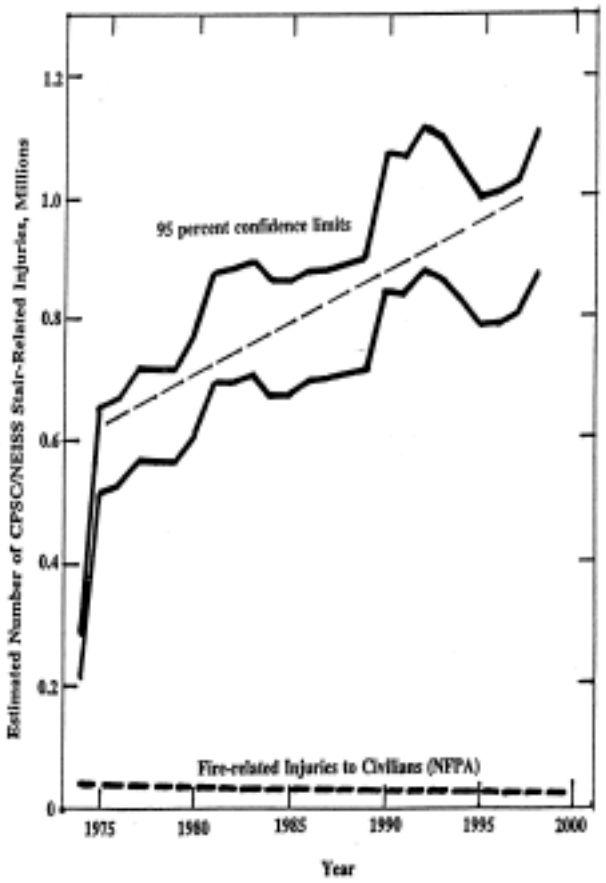


**Figure 1**
**Estimated Number of CPSC/NEISS Stair-Related Injuries Treated in U.S. Hospital Emergency Departments Using Data Adjusted for Changes in CPSC/NEISS Sampling***

* In 1997, CPSC/NEISS changed from a sample of 91 hospitals to a sample of 101 hospitals.

There is a 95 percent confidence that the actual number of CPSC/NEISS stair-related injuries treated in hospital emergency departments lies between the two heavy lines shown on the graph. The dashed line indicates the central, linear-trend line rising at a rate of 2 percent per year.
Note that CPSC/NEISS data do not include stair-related injuries occurring in some settings (such as occupational). Also, only about 40 percent of medically-treated injuries generally are treated in hospital emergency departments.

**Table 2**
**Ten Leading products by age group, ranked by percent of nonfatal injury cost, United States, 1995-1996**

| Rank | Age <1 | A 1-4 | Age 5-9 | Age 10-14 | Age 15-19 | Age 20-29 | Age 30-39 | Age 40-49 | Age 50-59 | Age 60-69 | Age 70-79 | Age .=80 | All ages |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Stairs or steps 15% | Stairs or Steps 8% | Bicycles 14% | Bicycles 13% | Basketball 15% | Basketball 9% | Stairs or steps 10% | Stairs or steps 13% | Stairs or steps 14% | Floors 15% | Floors 24% | Floors 40% | Stairs or steps 9% |
| 2 | Beds (not cribs) 11% | Beds 7% | Monkey bars 6% | Basketball 11% | Football 11% | Stairs or steps 9% | Bicycles 5% | Floors 6% | Floors 9% | Stairs or steps 15% | Stairs or steps 15% | Beds 10% | Floors 8% |
| 3 | Floors 9% | Floors 6% | Swings 4% | Football 9% | Bicycles (inc. mountain) 6% | Bicycles (inc. mountain) 5% | Basketball 5% | Ladders 5% | Snow Skiing 6% | Ladders 6% | beds 7% | Stairs or steps 9% | Bicycles (inc. mountain) 6% |
| 4 | Baby walkers 6% | Tables 6% | Beds 4% | Baseball & Softball 6% | Baseball & Softball 5% | Baseball & Softball 5% | Baseball & Softball 4% | Bicycles (inc. mountain )5% | Ladders 6% | Chairs 4% | Chairs 5% | Chairs & recliners 6% | Basketball 5% |
| 5 | Tables 5% | Doors 5% | Doors 4% | In-line/ rollerskating 5% | Stairs or steps 4% | Floors 3% | Floors 4% | Snow Skiing 4% | Bicycles (inc. mountain) 4% | Beds 4% | Ladders 4% | Crutches, canes or walkers 4% | Beds 3% |
| 6 | Baby strollers 4% | High chairs & chairs 4% | Stairs or steps 4% | Soccer 3% | Soccer 4% | Football 3% | Ladders 3% | Knives 2% | Chairs 3% | Snow Skiing 3% | Bathtubs or showers 3% | Wheelchairs 4% | Baseball & Softball 3% |
| 7 | Sofas 4% | Poisoning 3% | In-line/rollerskating 4% | Stairs or steps 3% | Floors 2% | Knives 3% | Knives 3% | Baseball & Softball 2% | Bathtubs or showers 2% | Bathtubs or showers 3% | Rugs, carpets, or doormats 3% | Bathtubs or showers 3% | Football 3% |
| 8 | Car seats 3% | Bicycles 3% | Floors 4% | Trampolines 2% | In-Line/ rollerskating 2% | Doors 2% | Snow Skiing 2% | Basketball 2% | Beds 2% | Doors 2% | Crutches, canes or walkers 2% | Rugs, carpets, or doormats 3% | Doors 2% |
| 9 | Chairs 3% | Sofas 3% | Baseball & Softball 3% | Floors 2% | Wrestling 2% | Snow Skiing 2% | Doors 2% | Horseback riding 2% | Knives 2% | Bicycles 2% | Wheelchairs 2% | Toilets 2% | Chairs 2% |
| 10 | Doors 2% | Ceilings and walls 2% | Trampolines 2% | Doors 2% | Knives 2% | Soccer 2% | Home Structures or repair 2% | Chairs 2% | Horseback riding 2% | Knives 2% | Doors 2% | Tables 1% | Ladders 2% |
| % of Total Cost | 62% | 47% | 49% | 56% | 53% | 43% | 40% | 43% | 50% | 56% | 67% | 82% | 43% |

Source: Computed by Puclic Services Research Institute, Landover, Maryland, from NEISS Data and the US Consumer Product Safety Commission Injury Cost model (excluding guns, food, and motorized vehicles - including cars and boats).

**Table 3**
**Five Leading Causes of Nonfatal Injuries Treated in U.S. Hospital Eds by Age Group**
**All Injury Study, 1997**
**Estimated Annual Number of Injuries in Thousands**

| Rank | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Fall 854 | Fall 600 | Struck by/ Against 592 | Struck by/ Against 556 | Struck by/ Against 457 | Over-Exertion 820 | Fall 760 | Fall 609 | Fall 413 | Fall 1,797 | Fall 7007 |
| 2 | Struck by/ Against 393 | Struck by/ Against 486 | Fall 454 | MV, traffic 514 | MV, traffic 450 | Struck by/ Against 814 | Over-Exertion 639 | Struck by/ Against 327 | MV, traffic 196 | Struck by/ Against 242 | Struck by/ Against 4575 |
| 3 | Cut/Pierce 205 | Cut/Pierce 288 | Cut/Pierce 276 | Fall 379 | Over-exertion 420 | Fall 761 | Struck by/ Against 622 | MV, traffic 314 | Struck by/ Against 186 | MV, traffic 189 | Cut/Pierce 3,401 |
| 4 | Natural/ Environment 166 | Pedal cyclist 216 | Over-Exertion 230 | Over-Exertion 372 | Cut/Pierce 396 | MV, traffic 697 | Cut/Pierce 555 | Cut/Pierce 299 | Cut/Pierce 184 | Cut/Pierce 185 | MV, traffic 3,256 |
| 5 | Poisoning 109 | MV, traffic 118 | Pedal cyclist 220 | Cut/Pierce 328 | Fall 371 | Cut/Pierce 684 | MV, traffic 527 | Over-Exertion 284 | Over-Exertion 123 | Over-Exertion 139 | Over-Exertion 3,156 |

Source: Quinlan KP et al. Expanding the National Electronic Injury Surveillance System to Monitor All Nonfatal Injuries Treated in US Hospital Emergency Departments, *Annals of Emergency Medicine*, November 1999, Table 4, p. 641.

Note: "Fire/burn" only appears three times in the original, full table of the top ten causes. It is ranked tenth for age group 0-4, with 61,000 injuries; seventh for age group 20-24 with 72,000 injuries; and tenth for age group 45-54 with 46,000 injuries.

Table 3 shows the relative dangers of falls generally for nonfatal injuries reported to hospital emergency rooms. It is based on a pilot study of more injuries than have been included previously in the CPSC/NEISS data. CPSC/NEISS is now being expanded to better reflect all injuries and first detailed data are due out in 2001. Again, fire is a relatively small cause of nonfatal injuries.

Tables 2 and 3 give us some indication of where we are heading with our rapidly aging population. Indeed, over the last 25 years stair-related (nonfatal, emergency room treated) injuries to people over 65 have grown from about 11 percent to about 14 percent of the total stair-related injuries and from about 16 percent to about 23 percent for serious stair-related injuries. Most stair-related fatalities occur among people over 65 years of age.

Obviously, in the USA we are doing some things better than others. Stairs we do badly. Indeed, over recent decades, dwelling unit stair have gotten worse in terms of design and construction as well as carpeting practices which have tended to reduce even further the already reduced effective tread depth. Table 4 shows the stair geometry requirements of NFPA 101 over recent decades.

**History and Prospects.** During this same time period, many code requirements and construction practices for dwelling unit stairs have actually gotten worse. For example, at one time the BOCA and CABO codes specified a maximum rise of 8 inches but builders succeeded in raising the limit to 8 1/4 inches. Even after CABO and BOCA, in 1995 and 1996 respectively, went to the 7 3/4 by 10 requirement (based on the compromise recommendation of a BOCA Ad Hoc Committee composed of a large proportion of home builders), home builders have been very successful in preventing local and state jurisdictions from adopting even this compromise; builders proudly boast that they have kept actually enforced codes for dwellings down to the low standard permitting a rise of 8 or 8 1/4 inches and requiring only a 9-inch tread depth *with absolutely no compensation for thick carpeting which reduces the effective tread depth to about 8 inches while slightly increasing the effective rise height*. Apparently, this is also the current situation with the International Code Council's International Building Code™ (IBC) and International Residential Code™ (IRC) although, in spring 2000 the IBC Means of Egress Committee voted to recommend that dwelling unit stairs be designed to the "7-11" standard. Notably, according to industry and regulatory sources, NFPA 101 is rarely used for dwellings; thus with the political compromises in model code development/adoption/enforcement being propelled by the home building industry, there is little prospect of seeing any reduction, or even a levelling off, of stair-related injuries in the near future. (See the end of this proposal justification for comments regarding possible litigation—against industry and regulatory organizations—that might improve this rather bleak picture.)

**Ranking on the Basis of Injury Cost.** Table 2 is based on the CPSC/NEISS injury data system but analyzed more systematically and taking into account cost of injuries. Table 2 shows the leading products (ranked by percent of injury cost) for various age groups for 1995-1996. "Stairs or steps" is an especially prominent product category within this ranking; it is the top or second category for seven of twelve age groups. This category also accounts for about ten percent of total consumer product injury costs (for those products coded by CPSC/NEISS). Notably, in relation to the slightly higher ranking of floors for the three oldest age groups, we need to recall that such people severely limit stair use. Even for the population generally, we typically use floors about ten to a hundred times more than we use stairs.

**Injury Costs Related to Stairs.** The National Public Services Research Institute, Landover, MD, (the source of Table 2) has provided the following estimates of injury costs related to stairs. These figures are for the year 1995 in the U.S. and are stated in 1997 dollars.

**Table 4**
**NFPA 101 Stair Step Geometry Rules: 1963 to 2000**

| | | |
|---|---|---|
| **1963 Edition (last *Building Exits Code*):** | | |
| Most buildings, including dwellings (Class B): | Max. rise: | 7 3/4 in. |
| | Min. tread: | 9 in. |
| Few buildings (Class A): | Max. rise: | 7 in. |
| | Min. tread: | 10 in. |
| Few buildings, existing stairs (Class C): | Max. rise: | 8 in. |
| | Min. tread: | 8 in. |
| Recommendation for sum of two risers and a tread not less than 24 in. nor more than 25 in. | | |
| **1967 to 1976 Editions:** | | |
| Most buildings, including dwellings (Class B): | Max. rise: | 8 in. |
| | Min. tread: | 9 in. |
| Few buildings (Class A): | Max. rise: | 7 1/2 in. |
| | Min. tread: | 10 in. |
| Requirement for sum of two risers and a tread not less than 24 in. nor more than 25 in. | | |
| **1981 Edition:** | | |
| New stairs: all buildings, including dwellings: | Max. rise: | 7 in. |
| | Min. tread: | 11 in. |
| Existing stairs: Class A and B as for 1976 edition. | | |
| **1985 to 1994 Editions:**** | | |
| New stairs except those in dwellings: | Max. rise: | 7 in. |
| | Min. tread: | 11 in. |
| New stairs in dwellings (Class B): | Max. rise: | 8 in. |
| (which Ch. 5 only permitted for existing stairs) | Min. tread: | 9 in. |
| **1997 and 2000 Editions:** | | |
| New stairs except those in dwellings: | Max. rise: | 7 in. |
| | Min. tread: | 11 in. |
| New stairs in dwellings: | Max. rise: | 7 3/4 in. |
| | Min. tread: | 10 in. |

***** Beginning in 1988, effective tread depth was specified.***

**Table 5**
**Comprehensive Costs of Stair-related, Nonfatal Injuries for the Year 1995 in the United States**

| | |
|---|---|
| Medical costs | $4.7 billion |
| Productivity losses | $7.1 billion |
| Quality of Life losses | $38.1 billion |
| **Total Costs** | **$49.9 billion** |

These costs are what are termed "Comprehensive Costs." They are based on the CPSC Injury Cost Model taking a societal viewpoint and using data from the 1990s (including CPSC/NEISS and 17 other large data sets) considering 11 cost components: inpatient, ambulance, ancillary and post-discharge costs; health insurance claims processing costs; short-term and long-term work losses plus employer losses; quality of life, and pain and suffering cost (subjected to a sensitivity analysis considering Quality Adjusted Life Years or QALYs); and product liability costs consisting of insurance administration costs and litigation costs. A conservative 2.5 percent discount rate is used in the Model. These estimates share, with earlier more-crude estimates, the characteristic of being about an order of magnitude greater (a factor of ten) than stair construction costs annually in the USA. Such a huge mismatch of injury costs and construction costs underlines that there is a huge unsolved stair safety problem; therefore improved requirements for design and construction—including riser-tread requirements similar to those required in less-demanding, nonresidential settings—are clearly warranted.

**Hypocrisy about a Double Standard for Stairs.** Now, relative to these data and much additional information provided below, we have the widely-held position among building code authorities that stair-related injuries—*the majority of which occur in residential settings*—do not warrant the same attention to riser-tread requirements for dwellings as for other buildings. Of course the position is preposterous and without good foundation! However, building code authorities who participate in code-change hearings—and who have apparently failed to resist the pressures from home builders in the adoption and enforcement of appropriate stair step geometry requirements for dwellings—continue to take the ridiculous stand that there should be a double standard in step geometry requirements for dwellings. Many of them have defended their positions by arguing that there is not enough technical justification for specific riser-tread geometry minimum requirements. If this position is correct it applies to all step geometry requirements, i.e., those for all buildings, not only for dwellings! If the "7-11" step geometry is important enough and sufficiently justified for public buildings where a small minority of stair-related injuries occur, then it surely must be important enough and at least as well justified for dwellings where the vast majority of stair-related injuries occur and where the use conditions are far more demanding. Regulatory authorities must come to see the hypocrisy and ethical bankruptcy of the currently favored position with the dual standard in the model codes.

**History of Debate on Improved Step Geometry Requirements in Codes and Standards**

Despite the frequent claims by homebuilder detractors that I am the only person advocating the "7-11" requirement for stair design, history shows otherwise. Improved step geometry, including the mainstreaming of the "7-11" requirement, has been widely supported and the lead on this has often been taken by others. For example:

**ANSI A117.1 (1961):** "Steps should, wherever possible, and in conformation with existing step formulas, have risers that do not exceed 7 inches." (At that time, common "existing step formulas" suggested tread dimensions of 10 to 11 inches as appropriate with this riser height.) I had nothing to do with the development of this standard.

**BOCA Basic Building Code (1975):** For Assembly and Institutional occupancies the requirement was for a 7.5-inch maximum riser and a 10-inch minimum tread plus 1-inch nosing. For other occupancies there was a 8-in maximum riser and a 9-in minimum tread plus 1-inch nosing. I was not a proponent.

**BOCA (1977 !!), (1980) and (1984):** "7-11" requirement proposed. I was not the proponent in any of these cases.

**NFPA (1978):** "7-11" proposed for Life Safety Code, NFPA 101, by three stair safety researchers. Dr. John Templer, Dr. John Archea, and I made the recommendation to a committee. This led subsequently to adoption (by the Means of Egress Committee on which I was a member) of the "7-11" requirement for all stairs in the 1981 edition of NFPA 101.

**ANSI A117.1 (1980):** This introduced the requirement for stair treads measured from riser to riser to be no less than 11 inches." I had nothing to do with the development of this standard.

**BOCA (1985):** My proposal for mainstreaming the "7-11" stair requirement was accepted by the Code Change Committee but BOCA membership did not apply it to dwellings.

**CABO/BCMC (1985):** I was actively involved as a member of the public working on the Means of Egress Report (1985) which recommended the "7-11" requirement for all but dwelling stairs.

**ANSI A117.1 (1986):** The step geometry rule was clearly restated to require risers no higher than 7 inches and treads not less than 11 inches, measured riser to riser. I had nothing to do with the development of this requirement in the standard.

**CABO/BCMC (1990):** Motion made for "7-11" to be mainstreamed for all stairs. I did not initiate that motion; I seconded it. (Paul Heilstedt can confirm this.)

**BOCA (1991):** Proposal accepted by Code Change Committee and BOCA membership to mainstream the "7-11" requirement. That proposal came from CABO/BCMC (Luther Colliver and David Wismer); not from me.

**National Building Code of Canada (1993):** Committee responsible for dwellings refuses to consider change. Committee responsible for other buildings adopts "7-11" geometry. I was the proponent.

**BOCA Ad Hoc Committee on Stairway Safety (1993):** Improvement to dwelling unit stair geometry requirements (to 7 3/4 by 10) recommended by this committee which included a disproportionate number of builders; there was considerable support for the "7-11" by others on the committee. I was not a member of this Committee.

**BOCA (1994):** BOCA membership adopts intermediate (7 3/4 by 10) requirement for dwelling unit stair geometry requirements. Proponent was BOCA Ad Hoc Committee on Stairway Safety.

**CABO (1994):** CABO One and Two Family Dwelling Code Committee accepts proposal (from representative of BOCA Ad Hoc Committee on Stairway Safety) and CABO Code incorporated same improved step geometry requirement as BOCA National Building Code.

**NFPA (1996):** Life Safety Code,® NFPA 101, adopts same requirement for dwelling unit step geometry as used in BOCA and CABO Codes. I was the proponent of this; the NFPA committee vote on this was unanimous, including NAHB's representative; and no public comments were received on the proposal. NAHB's complaint to Standards Council was rejected.

**ICC (1997):** International Building Code™ Means of Egress Committee twice vote unanimously to recommend the "7-11" step geometry as the minimum for dwellings as well as for other buildings. I originated the recommendation.

**ICC (1998/9):** International Building Code™ Means of Egress Committee and the International Residential Code™ Drafting Committee (which has disproportionate representation from builder spokesmen) votes for the intermediate step geometry requirement, 7 3/4 by 10, for dwellings. Code authorities backed this intermediate rule, despite industry opposition. (I was not the proponent.)

**NFPA (1999/2000):** NFPA 101 Technical Committees disagree on mainstreaming of the "7-11" rule to dwellings; the Residential TC rejected my comment on this (101-397); the Means of Egress TC resoundingly accepted my comment (101-398); the TCC rejected the comments. Taken to NFPA members at the Fall 1999 Meeting of NFPA, members voted for my comment 101-397. The Standards Council subsequently rejected my Appeal and the Board of Directors rejected my Petition. However, the Standards Council directed the Residential TC to carefully reconsider, and fully justify, having a lower standard of step geometry for dwellings.

**NFPA (1999/2000):** NFPA 501 Administration TC and the NFPA 501 TCC reject my comments seeking improvement in the step geometry proposed for manufactured housing; the TC had proposed the old 8 1/4 by 9 rule based on the 1989 edition of the CABO One and Two-Family Dwelling Code. After an appeal to the NFPA Standards Council, I prevailed in having all of the stair and railing proposals returned to the Committee for additional work.

**ICC (2000):** International Building Code™ Means of Egress Committee votes to recommend the "7-11" step geometry as the minimum for dwellings as well as for other buildings. The Committee's inability to recommend requirements on step carpeting was noted as a reason for mainstreaming vote on step geometry. I submitted the proposal (E33-00).

**Other History Behind Step Geometry Requirements**

Clearly, from the foregoing chronologies, there is a long history of recommendations for lower riser heights and larger tread depths than (1) currently accepted by homebuilders and their supporters testifying on this matter or (2) found in the current model building code requirements for dwellings.

**Some Opposing Arguments Presented Recently Against Improved Stair Step Geometry.** Much weight was given, and frequent mention was made subsequently by NAHB representatives, to a listing of 30 factors identified in 1999 by NFPA 101 Residential Technical Committee member, Mr. Peter Christie in his ballot statement on my comment 101-397 (on proposal 101-613) which recommended the "7-11" step geometry for dwellings covered by NFPA 101 (page 207 of the F99 ROC published by NFPA). There was not an opportunity during the 1999 deliberations to challenge fully the listing. Here follows a short form of such a challenge.

1. "7-11 stair geometry" is noted by Mr. Christie.

2-3. Four traditional riser-tread relation rules are noted (not always accurately) by Mr. Christie. All of Mr. Christie's rules have flaws that have led to their disappearance from most model codes and standards. They all share the characteristic of disallowing relatively good stair geometries (e.g. 6-inch rise and 12-inch tread) while allowing relatively bad step geometries (e.g. approximately 8 1/2 inch rise and 8 1/2 inch tread).

4. One or two steps. Yes, this is an important factor in falls and it is dealt with by NFPA 101 (7.1.7) and NFPA 101B (3-1.2).

5-8. Four items that are all, in essence, dealing with dimensional uniformity that is important and dealt with by NFPA 101 and NFPA 101B.

9. The matter of slippery treads is of minor importance but is dealt with by NFPA 101 and NFPA 101B.

10. Carpeting of treads is important and is dealt with by NFPA 101 and NFPA 101B although the requirements could be strengthened.

11-14. Functional handrail provision is important and is dealt with by NFPA 101 and NFPA 101B.

15. Lighting is important but is not adequately dealt with by NFPA 101 and NFPA 101B; it should be.

16. Undefined start of stair. This is mostly a problem with stairs with one or two risers, the same issue noted in item 4 although it also interacts with item 15, lighting.

17. Failure of user to look for stair. This is mostly a problem with stairs with one or two risers, the same issue noted in item 4 although it also interacts with item 15, lighting.

18. Improper headroom is a relatively rare factor and is dealt with by NFPA 101 and NFPA 101B.

19-30. This largest group of items noted by Mr. Christie really identify use factors which are an inherent part of the residential environment in which the stairway is used for many activities, by a wide range of people, with a wide variety of footwear,

| | | |
|---|---|---|
| c.1 B.C. | Vitruvius | Riser:tread:stringer ratio should be 3:4:5 (based on Pythagoras), e.g., 7.5-in rise, 10-in tread geometry. |
| 1570 | Palladio | 4.5-in to 6.8-in risers, 13.6-in to 20.4-in treads recommended. |
| 1686 | Wotton | 6-in max risers, 12-in to 18-in treads recommended. |
| 19th century | Common home stairs | Often 7-in to 7.5-in risers, 10-inch treads plus 1-in nosing. |
| 1927 | Uniform Building Code, 1st edition | 8-in max. risers, 9-inch min. treads for stairs in dwellings; 7.5-in max. risers, 10-inch min. treads for most other stairs. |
| 1932 | Architectural Graphic Standards | 7.25-in risers, 10-in treads recommended for "ample stairs" in dwellings; 7.75-in risers, 9.5-inch treads recommended for "minimum stairs." |
| 1933 | Lehmann & Engelmann | 6.7-in risers, 11.4-in treads preferred; alternatively tread minus riser equals 4.7 in. (Based on energy expenditure.) |
| 1941 | Architectural Graphic Standards | 6-in to 7.75-in risers, 11-in min (including nosing) treads recommended. 30 to 35-degree pitch preferred. |
| 1942 | Fireman's Fund Fidelity | 6.75-in risers, 10.5-in treads recommended as adequately safe. |
| 1972 | Teledyne Brown | 7.5-in max risers, 10-in min treads recommended within dwellings; 6-in max risers, 11-in min treads for exterior stairs. This became part of HUD training handbook, *Designing for Home Safety*, in 1975. |
| 1974 | John Templer | 7-in max risers, 11-in min treads recommended. |
| 1978 | Carson, et al. | Survey of homes (up to 75 years old) in Milwaukee indicated mean geometry of 7.7-in risers, 10.3-in treads. 30 percent were carpeted. |
| 1989 | Liberty Mutual Research Center | 6-in to 8-in risers, 10-in to 13-in treads recommended based on preference/psychophysical studies with 19 different step geometries. Lower risers, deeper treads favored for descent. |
| 1992 | John Templer | Book, *The Staircase*, published; recommends nominal "7-11" with 7.2-in max risers, 11-in min treads. |

under conditions of medication/alcohol use and with visual distractions. Here Mr. Christie and those who thoughtlessly parrot his list make the biggest error. One must design for the anticipated users and usage rather than blame users for shortcomings in the design that make human error so damaging. As the ergonomics principle puts it: "To err is human. To forgive, design."

Thus, to sum up Mr. Christie's list, some of his items (i.e. items 2 and 3) are erroneous. About a dozen, which he states somewhat repetitively, are already dealt with in NFPA 101 and 101B *as complementary features of stairways, not features that can be used in place of appropriate step geometry!* In other words, we shouldn't cherry pick some requirements out of a system of features that work together to achieve a reasonable level of safety and usability. The largest group of items (a dozen or so) actually underlines the need for improved design in homes; such items do not lessen the need for step geometry of at least the same quality provided on other stairways. Should we simplistically blame the victims or prohibit the common behaviors that increase people's risk of falls? We do use such an approach in motor vehicle and roadway design, for example. Rather we design cars and roads to be reasonably forgiving of human error and inadequacies. We need to the same in buildings including homes.

**Space and Cost Implications of Improved Step Geometry.** On this matter Mr. Christie made even more serious errors, in some cases built upon errors in his list (discussed above). At the NFPA 101 Residential Technical Committee Report on Comments meeting (May 1999) he handed out a set of calculations which he claimed supported his contention that the cost impact was much greater than the approximate $400 cost impact that I had estimated in my comment. However, he made serious errors including:

(a) Misusing the rule about twice the riser plus the tread depth. He applied his misstatement of the rule to my geometry of 6.75-inch riser with an 11-inch tread depth.

(b) Not applying his rule about twice the riser plus the tread depth to his 7.714-inch riser with a 10-inch tread. By his rule, the riser should have been lower and thus an additional step would be required for his stair.

(c) Correcting for his errors, the difference in run length between his stair and mine is only 25 inches, not the 42.5 inches he calculates.

(d) Correcting for his errors, the difference in area required between his stair and mine is only 6.25 sq. ft., not 10.625 sq. ft.

(e) Correcting for his doubling of this area, the difference in area is 6.25 sq. ft., not 21.25 sq. ft. The area for a single, story-to-story stair should not be doubled; space above and below the stair is not entirely lost.

(f) Finally, applying the $70 per sq. ft. cost figure, the difference between his stair based on the 7.75 by 10 rule and my recommendation based on the 7 by 11 rule is only $437.50, not $1,487.50 as he claims. My $400.00 estimate was reasonable when the calculation was performed without Mr. Christie's errors.

The actual step geometries of the two stairs is 15 risers of 7.2-inch height with 10-inch tread depths compared with 16 risers of 6.75-inch height with 11-inch tread depths. Here it should be noted that, according to NAHB-published cost estimates, the stairs in a typical 2,150-sq. ft. house constructed in 1998 (at a total purchase cost of $226,680.00) was $558.00 or 0.4 percent of the house cost. Note that the NAHB reported the builder's profit on this house at $20,837.00 or 9.2 percent of the total cost. ("The Truth about Regulatory Barriers to Housing Affordability." National Association of Home Builders, Washington, DC, c.1999, p. 4.)

Table 6 provides more general information relating, as a function of ceiling heights, various step geometry rules and the actual area differences required (above or below 50.5 sq. ft.) for a story-to-story flight of stairs plus top and bottom landings. Notably, home builders' decisions to increase ceiling heights beyond the minimum permitted (7 ft.) or the former standard (8 ft.) to 9, 10 and even 11 feet, plus the decision to use truss-based floor structural systems which are deeper than joists, increases stair area as much as or more than needed to provide the better step geometry.

**Benefits and Costs**

Against these additional areas and related increased construction costs we need to consider benefits which take at least two forms (in addition to the beneficial aesthetic superiority of stairs with a more-gradual pitch and a grander appearance); these benefits are improved safety and improved usability.

**Burden of Injury.** Regarding safety or injury prevention, the typical home stairway today is associated, on average, with injury burden exceeding cost of construction by a factor of at least ten (an injury burden of about $50 billion annually in the USA versus a stairway construction cost of only about $5 billion annually for the USA). Even a ten percent reduction in fall occurrence would provide an injury prevention benefit equal to the entire cost of the stair and some two or three times more than the added cost required to provide the "7-11" step geometry. Early estimates of efficacy of improved step geometry (to the "7-11" standard) are for improvement on the order of 25 percent (Alessi, D., Brill, M. and associates. Home safety guidelines for architects and builders. NBS-GCR 78-156, National Bureau of Standards, Gaithersburg, MD, 1978.)

**Table 6**
**Relative Area, in square feet, Required with Various Code Requirements**
**for Riser-Tread Geometry and Five Ceiling Heights**
**With a Floor System 11.25 inches Thick**
***The reference stairway occupies 50.5 square feet***
***(with a 14-riser straight flight plus top and bottom landings)***

| Ceiling Height | Home Builders 8.25 - 9 | UBC 8 - 9 | SBC 7.75 - 9 | BOCA, NFPA, ICC OTFDC, IBC & IRC 7.75 - 10 | BCMC, many codes & standards 7 - 11 |
|---|---|---|---|---|---|
| **10 ft.** | **1.25** | 3.50 | 3.50 | **7.50** | **17.00** |
| **9 ft.** | **-1.00** | -1.00 | 1.25 | **5.00** | **11.50** |
| **8 ft.** | **-5.50** | -3.25 | -3.25 | **Reference** | **8.75** |
| **7 ft. 6 in.** | **-5.50** | -5.50 | -3.25 | **Reference** | **6.00** |
| **7 ft.** | **-7.75** | -7.75 | -5.50 | **-2.50** | **3.25** |

**Improved Usability.** Regarding usability, for every hospital-treated injury related to stairs there are, on average for all stairs in the USA, about 4 million flight uses' thus there are many uses of a stair that are injury free; each of these uses has an economic value. For example, over the lifetime of a home stair flight there will be on the order of one million uses. Assuming the entire stair cost is devoted to these benign uses, this works out to a benefit costing on the order of one-tenth cent per use. How many people would object to improved stairs if they knew, that aside from the injury reduction benefits and the greatly improved visual appearance, each use was going to cost on the order of less than one-tenth cent? Also, as home occupants age and, increasingly want to stay in their home (as AARP surveys continually highlight as very important for over 80 percent of people over 50 years of age), what is the benefit of more-usable stairs. Note that, for decades (long before I arrived on the scene as an advocate for improved stairways) 7-inch (or lower) risers and 11-inch (or larger) tread depths were the national standard for usability and they remain so, *unchallenged,* today. Furthermore, some publications from the NAHB Research Center have even recommended "7-11" stairs for *retrofitting* homes where occupants have difficulty using stairways.

**Affordability: First Costs.** Over the last several years the homebuilders (and homebuilder representatives) have repeatedly claimed that first-cost impacts for even the 7 3/4 by 10 geometry (relative to the 8 1/4 by 9 geometry) have been in the range of $1,000 to $3,500. While still grossly overstated, the $3,500 claim is about 18 percent of the maximum $20,000 first-cost claim made by homebuilders in 1992 in relation to the "7-11" geometry. Underlining the inflated nature of their estimates, we can note that a story-to-story stairway (for a 7-ft, 6-in ceiling height), with "7-11" geometry, requires approximately 12 percent more area than does a stairway with 7 3/4 by 10 geometry which, in turn, requires about 12 percent more area than does a stairway with 8 1/4 by 9 geometry.

On the matter of several additional square feet of area required for new step geometry requirements, we need to note that this additional space for stairs amounts to only about one percent to about one or two percent of the *increase* (about 600 sq. ft.) in average home size in the USA in the last two decades (according to NAHB figures). (The average home size increase over the last 50 years in the USA is even more remarkable, totalling about 1,200 sq. ft. according to NAHB.) Considering only the increase over the last few decades, what did the home builders do with the additional 600 sq. ft. that made the 40-percent larger homes safer and more usable? Furthermore, how did the builders justify knocking about 19 million households out of the home buying market with this average size increase? The 600 square foot increase, if priced at $70 per square foot, is associated with a cost increase of $42,000; NAHB claims that, for every $100 increase in new home cost, 44,000 households cannot afford a new home. Affordability is not harmed by improved stairs anywhere close to the degree that other factors have. And, as shown in the benefit considerations discussed above, stairs provide very considerable benefits relative to their construction cost.

Clearly the homebuilders' cost impact estimates (like NFPA Committee member Mr. Christie's) have been wildly incorrect, even when we simply consider the proportions of area and cost here; i.e., according to the homebuilders, the 12 percent area increase to get the 7 3/4 by 10 geometry costs up to $3,500 more; the next 12 percent increase to get to the 7 by 11 geometry costs up to $16,500 more. In each case we are dealing with an area difference of only about 6 sq ft per story of stair (as shown in Table 6.) If we are to believe the homebuilders, the purported first-cost impacts work out to about $600 per square foot to $2,200 per square foot.

Also remarkable are the claimed cost impacts relative to the base costs of the stairs to the builder. Assuming that the builder buys a quality manufactured stair (rather than throwing something together on the site as is often the case), the builder's costs are on the order of $1,000 for a stairway (including railings) with straight flights to $10,000 or more for a fancy monumental curved stair. These data come from trade literature (including *Journal of Light Construction*, September 2000, p. 49). A more systematic, but dated analysis of all of the costs in a new home (with two above-grade floors and a full basement) was published by the Washington Post, May 1, 1993. Constructed in 1988 for a complete cost (to the home buyer) of $196,900, the stairs cost the builder $334 and stair railings $560. Constructed in 1993, the same home cost (to the buyer) was $239,000 with the stairs costing the builder $414 and the stair railings $768. (The builder's profits were $11,061 and $12,068 respectively.) In each case the stair apparently met the old 8 1/4 by 9 step geometry requirement.

Even by including a cost of $70 per square foot, this only adds (to the cost difference due to step size) about $400 (per story height of stairway) to go from the 7 3/4 by 10 geometry to the 7 by 11 geometry. (See prior discussion of Mr. Christie's flawed challenge to this estimate.) Clearly, the homebuilders' first-cost impact claims are completely out of line. Regrettably, since the builders' claims are seldom critically examined by politicians and others, this has led to many bad decisions not to adopt up-to-date BOCA and CABO code requirements in various jurisdictions over the last few year (e.g., New Jersey, Maryland, Virginia, Michigan and other jurisdictions).

**Industry's and Regulators' Reviews of Research**

**NAHB Research Center Reviews of Research in 1992 and 1993.** The NAHB Research Center developed some critical but incomplete and biased reviews of the stair safety literature shortly after BOCA members voted, in 1991, to adopt CABO/BCMC's recommendation and revise the *BOCA National Building Code* to require the "7-11" stair for dwellings. In one of his reviews, Dacquisto of the NAHB Research Center made the same mistake he accused stair safety researchers of making—drawing conclusions from data that are not statistically significant. He drew many dubious, misleading conclusions from his analysis presented in a memorandum which was also given to ICC/IRC Drafting Committee members in 1997 by one of the NAHB members of the Committee.

**Errors by Industry Representatives.** Other mistakes made in such reviews and by some code drafting committee members include accusing me of ignoring certain early studies of actual stair-related injuries (such as Miller and Esmay, 1961, and Jones, 1963). In fact such early studies were critically reviewed for their valuable contribution decades ago as can be attested by anyone aware of the much more comprehensive study performed during the 1970s at the U.S. National Bureau of Standards under the leadership of John Archea whose recommendations from that most-extensive study were for "7-11" stair geometry for all stairs, *especially those for dwellings* (Archea, et al., 1979). So, in resurrecting these two early studies and presenting them to fellow committee members, NAHB representatives ignored the far more extensive subsequent research which incorporated and went far beyond these early studies. Moreover, we should ask why the home builders—while waving these early studies around—fail to heed even their well-founded recommendations on improved step geometry including the matter of dimensional uniformity, provision of handrails and adequate lighting. No, the builders pull out of these studies mainly an isolated finding or two; for example the comment that stair slope is not a factor in the reported falls. They (and others who jump into the step geometry debate at code hearings) need to recognize that we are not arguing over slope; we are debating the actual dimensions. Both relatively good stairs and relatively bad stairs can be built with exactly the same slope!

**Older Homes Have Better Stairs.** Moreover, the home builders do not recognize that the homes surveyed in these early studies had step dimensions significantly better than the builders are putting into current homes. For example, the large survey (by Carson, et al. 1978) of homes in Milwaukee showed that homes built before recent decades had relatively good step geometry averaging 7.7-inch riser height and 10.3-inch tread depth. Their survey indicated that, of the homes checked, those older than 65 years (in 1978) had average tread depths of 10.8 inches. (See also Jones 1963.)

**Industry Should Participate in Research-Oriented Meetings.** Generally, regarding the writings of Dacquisto and his colleagues at NAHB Research Center and NAHB, if they really believe their criticisms are well founded they should publish them in the peer-reviewed safety literature and present them at major conferences focused on public health and safety research. After all it was the NAHB Research Center that received one million dollars from HUD (i.e., U.S. taxpayers' funds) in 1992 to examine the stair geometry issue and related

issues having a cost-benefit ramification; surely they could use some of this money to participate in—*or even sponsor*—conferences where research is critically discussed by a range of researchers concerned with safety, including epidemiology, rather than merely defending the selfish interests of home builders. Apparently, none of the NAHB staff or NAHB Research Center staff has attended even one of the recent national or international conferences on injury prevention and control (all of which I have attended, generally as a presenter). There is admittedly less research than I and other researchers would like on the relationship between step geometry and misstep/fall/injury rates. However, even the available studies on misstep rates and on usability aspects in relation to step geometry are valuable and provide important insights on injury prevention aspects. This important point is missed in the reviews of Mr. Dacquisto and his colleagues. Moreover, neither Mr. Dacquisto nor his colleagues have had the benefit of close examination—in the course of research or litigation-related investigations—of *actual* stair-related injuries which top stair researchers in the U.S. (e.g. Archea, Templer, Cohen) have done. I am also involved with stair-related litigation in the U.S. and Canada; therefore, I often investigate stair-related falls in depth and at least one of my three video productions, the two-hour video *The Pathology of Everyday Things* is widely used by top forensic experts also working on stair-related falls.

**Little Industry Support for Research.** Notably Mr. Larry Brown, in representing NAHB, has repeatedly quoted out of context my comment (noted again in the preceding paragraph) that there is "less research than I and other researchers would like on the relationship between step geometry and misstep/fall/injury rates." As a nonparticipant in research plus research-oriented meetings, and as one who apparently has no first-hand injury investigation experience (comparable to experts such as Archea, Templer, Cohen, Fruin, or myself—all of whom have publicly recommended the mainstreaming of the "7-11" rule to dwellings), Mr. Brown is on relatively poor grounds to comment on the complete technical basis for improved stairways. As the constructor of the vast majority of stairways on which serious injuries occur, the home builders should at least be supporting vastly increased research into all of the causes and countermeasures. In my own litigation-related investigations of stairway-related fall injuries, I typically expend on the order of one thousand dollars for each site investigation and associated documentation which is painstaking and detailed on as many as thirty environmental factors implicated in such falls. A million dollars a year in the USA devoted to equally careful examination of stairway fall sites would help improve our formal understanding of why and how such falls and injuries occur plus what countermeasures can be employed. To date NAHB has done nothing toward this goal although its members construct on the order of a few billion dollars of new stairways annually in new homes. The builders are not even investing the roughly 0.03 percent of the construction cost to help find out why the huge toll of injurious falls are occurring. That toll greatly exceeds, by a factor of about 40,000, the one million dollars of annual fall-site investigation recommended here.

**Views of a Concerned Code Professional.** Mr. Kelly, the ICBO-nominated member on the ICC/IRC Drafting Committee expressed a common concern: essentially, there seems to be no clear correlation between riser-tread geometry and injury occurrence; injuries occur for a variety of reasons. If the first statement is really true, then there should be no rule about riser-tread geometry in any code; however, not even the homebuilders believe this is the case—they always propose some requirement for riser-tread geometry. Without extremely expensive studies (requiring millions of dollars of funding, none of which the builders of these dangerous products appear willing to put up) we will never have the kind of findings Mr. Kelly and others say are essential. If such building code enforcement personnel genuinely believe that step geometry is not a sufficiently important factor in stairway safety and usability, they should work toward the *elimination* of all riser-tread rules for *all* buildings—including all those less-dangerous buildings where the "7-11" is now the most widely used step geometry standard. And while they are at this, they should also delete the hundreds of pages of code requirements for which there is even less epidemiological and etiological evidence. If size of public health problem and research evidence were taken into account in code revisions, codes would be very slim documents but stair geometry requirements would be part of those thin codes (rather than having requirements that, quantitatively, are in inverse relation to the size of the problem).

**Need to Act Expeditiously and Reasonably.** Hopefully, some day there will be additional research on the step geometry issue; for example, case-control studies comparing stair fall-related injury experience in homes built to the newer standards for step geometry with stair fall-related injury experience in homes built to the prevailing low standards maintained by reactionary homebuilders and submissive regulators. However, even though—as with every public health issue—more research would help, this does not mean we are excused from acting *now* on the problems. A leader in the U.S. injury prevention community put it well:

> There is more to understanding injury problems than epidemiology alone can deliver; the problems are complex, and such an understanding requires many different kinds of information, both quantitative and qualitative. . . . The world is not tidy. . . . We cannot wait for precise quantification before we attempt to collect and use the information available to us. . . . We must be clear [that] our quest for scientific purity does not divert attention from the epidemic. [Editorial in *American Journal of Public Health,* May 1993, by Carol Runyan, Director of the University of North Carolina Injury Prevention Research Center.]

The landmark report *Cost of Injury in the United States: A Report to Congress.* [Rice, D.P., McKenzie, E.J. and associates, San Francisco, CA: Institute for Health & Aging, University of California, and Injury Prevention Center, The Johns Hopkins University, 1989] also addressed this point in relation to information about benefit-cost issues:

> The number of injuries could be substantially reduced by greater application of current knowledge. . . . Although complete information needed to calculate the precise savings that would result from implementing numerous approaches is missing, the cost of preventable injuries is so large that implementation would have to be enormously expensive to contraindicate action.

These authors were likely not thinking about the home stair problem specifically, but it is certainly a good example with the estimated injury cost exceeding estimated construction cost by a factor of about ten (as noted above).

**Politically-driven Local and State Adoption Process**

Much of the testimony from builders and their representatives at model code hearings in recent years has dealt with the builders' success at stopping, at local and state levels, the normal adoption of model codes in as unamended a fashion as possible. Unlike in courts of law, these manipulations have not been based on balanced presentations of "the truth, the whole truth and nothing but the truth." As one documenting this process at national level as well as in the Commonwealth of Virginia, it is easy for me to describe the behavior of the homebuilders' chief representative, the National Association of Home Builders, as hypocritical, dishonest or uninformed. Despite claims to the contrary by the NAHB representative at code-change hearings, there is a policy encouraging and implementing such antisocial activity or behavior and that policy apparently comes from the highest levels of the NAHB—its officers and Board of Directors. For example, there is NAHB Resolution No. 14A, dated May 20, 1996, on which is indicated "Approval" by the "Board of Directors Action:"

> WHEREAS, NAHB was unsuccessful in preventing the change in the stair geometry requirement in the 1996 edition of the National Building Code (BOCA) and the 1995 edition of the CABO One and Two-Family Dwelling Code; and
>
> WHEREAS the safety benefits of the new 7 3/4" riser X 10" tread stair geometry are technically unsubstantiated and will produce an economic hardship upon first-time home buyers, in particular, and will generally make housing less affordable;

> NOW THEREFORE BE IT RESOLVED that the National Association of Home Builders recommends that all state and local governments who adopt the National Building Code (BOCA) and the Council of American Building Officials (CABO) model building codes, postpone the adoption of any new stair geometry,
>
> BE IT FURTHER RESOLVED that the National Association of Home Builders recommends that all state and local governments who automatically adopt BOCA and CABO model building codes, amend the 1996 and 1995 editions respectively to continue the use of the 1993 BOCA and CABO model codes as they relate to stair geometry provisions,
>
> BE IT FURTHER RESOLVED that the National Association of Home Builders urges all state and local affiliated Home Builders' Associations to contact state and local code authorities and persuade them to postpone the adoption of the new CABO and BOCA stair geometry standard, and
>
> BE IT FURTHER RESOLVED that the National Association of Home Builders continue to vigorously pursue the adoption of a stair geometry standard consistent with the 1993 BOCA Code.

At about the time this resolution was apparently approved by the Board, the NAHB began to make available—to its builder and association members—its "first *Building Code Action Kit."* Subtitled, *"Amending or Repealing 1995/96 Stair Geometry Code Requirements by Local Ordinance,"* this 260-page Kit includes a detailed strategy and set of tactics including a seven-step program for managing a grassroots effort; this included, as step seven: "Orchestrate Public Hearing. Get all the players on the same stage at the same time on the same side" (underlining added in this quote). Apparently many jurisdictions have found themselves at the receiving end of this NAHB-driven "Grassroots Effort." The effort includes a column ("Covert Corner") in the *Virginia Builder* (a publication of the Home Builders Association of Virginia) May 1997 issue. Declaring a victory in its campaign within the Virginia Board of Housing and Community Development—a group dominated by builders and developers, the author (Dick Covert, Executive Vice President, HBAV) noted:

> **Stair geometry and handrails:** The HCD board voted to keep the current standards for stair geometry and handrails. So, the model building code of 8 1/4-by-9-inch step geometries will stay on the books, saving builders plenty since they don't have to redesign current floor plans. Also, builders may continue to use readily available, standard handrails as they have in the past—another plus for your pocketbook. The board was not swayed that making the rails smaller would greatly increase the safety of the elderly and young.

I could not have expressed the selfishness of the builders much better than does HBAV's Mr. Covert who is *overt* about "saving builders plenty" and achieving "another plus for your [builder] pocketbook" while displaying disdain for "the safety of the elderly and young." Mr. Covert's opinion echoes the insensitive one of another builder in his supporting statement for BOCA Code Change Proposal B72-97:

> Safety concerns raised by proponents for shorter risers and deeper treads simply has not been convincing. . . . If this was the case, there would be a hewn outcry to stop such potential disasters. . . . Many people who turn up in hospital emergency rooms may say they fell down a set of stairs when the truth is, they were pushed by a spouse or parent.

This latter comment must surely rank as among the most unfounded, callous and insensitive to date in relation to the very real, large and growing problem of stair-related injuries. This underlines even more dramatically the need for a better informed homebuilder profession. For this comment to be followed immediately in the supporting statement by the following adds further insult to injury:

> Should we redesign homes and stair systems based upon hazards in around homes, absolutely not. Stair safety is important, more effort should be given to accident prevention through education in both the classroom and the home.

So, according to the proponent, the builders do not need the education (to build stairs better). If we are to believe the proponent, the fault lies solely with the users! If the proponent were better informed about the science and technology (including ergonomics) of injury prevention he would be quite aware that there is good agreement among leading public-health authorities that, of three injury prevention approaches—persuading behavior change, requiring behavior change, and providing automatic protection, the most effective is automatic protection through product and environmental design. For example, this was the view of the Committee on Trauma Research which prepared *Injury in America: a continuing public health problem,* 1985. This prestigious committee also noted the potential value of achieving this with laws and regulations.

Moreover, what and how do homebuilders think we should be teaching stair users? Might it entail posting warnings at every dwelling unit stair? Proposals for such warnings were not accepted during the hearings on the final version of the first edition of the International Residential Code.™

**Building and Marketing Improved Stairs.** Currently, as described briefly in my paper for the Pacific Rim Conference of Building Officials, home builders—with one known exception in the U.S.—do not build *and market* stairs built to even the intermediate standard adopted in the *CABO/ICC One and Two Family Code,* the *BOCA National Building Code*, the *Life Safety Code*® or the new ICC codes. A still-unpublished survey, performed for me in late 1997, entailed (someone posing as a prospective buyer) speaking with, and getting sales information from, sales agents for home builders selling new townhouses and smaller detached homes (examples of "affordable housing") in the greater Washington, DC, region (including nearby counties of Northern Virginia and Maryland) and the greater Richmond, VA, area. This region was chosen because of the *non-mandatory* use, in these areas, of a new requirement in the *BOCA National Building Code*, 1996 edition, and the *CABO One and Two Family Dwelling Code,* 1995 edition; these contain an intermediate stair geometry requirement—7 3/4 inches maximum rise and 10 inches minimum tread depth (run) which the NAHB and local homebuilder organizations were fighting. Asked if they knew whether the homes they were selling met the new stair requirements, only four of 54 (7 percent) responded "yes." Asked somewhat more pointedly: do the stairs meet new stair rules with 7 3/4 inch maximum riser height; 10-inch minimum tread of the BOCA-1996 Code or CABO-1995 Code, eight (16 percent) responded "yes;" three (6 percent) responded "no;" 39 (78 percent) did not know! Many sales representatives merely said that their new homes complied with codes without having any specific idea of what that meant. One major builder providing detailed sales literature as part of the survey response was known, from local newspaper coverage, for building townhouses to the new code requirement—including in a 16-foot (4.88 m) wide townhouse which sold well and even had its stairway located on one side between floors one and two and on the other side between floors two and three. Surprisingly, this builder's sales literature listed between 39 and 85 standard "included features"—including items as small as a mailbox; *however, there was absolutely no mention of the significantly improved stairways!*

Apparently (with only a few exceptions) home builders refuse to build, or even test the market for, improved stairs. So much for the builders' pleas that the marketplace, rather than codes, should govern. We do not have informed consumers in a position to chose knowledgeably what they should spend money on if the builders hide the fact when the improved stairs—which the builders protest are an *un*affordable feature in such homes—are installed. Perhaps this is a deliberate strategy on the part of a mean-spirited, powerful industry group intent on having its way by exercising, *effectively*, a veto on the adoption and enforcement of requirements for improved stairs in dwellings.

**An Exceptional Builder that Markets Improved Stairs.** One known exception to the dismal pattern described above is a builder, in Ohio, of new homes (totalling over 1,000 sales annually) with steps having riser heights of no more than 7 3/4 inches and tread depths at least 10 inches. Sales literature for Dominion Homes™ refers to these stairs as:

> **CABO Safer Stairs.** By adding one inch to the depth of each step and subtracting one half inch from the height of each step, as recommended by the Council of American Building Officials (CABO), we've made our stairs more user-friendly.

This builder turns what more short-sighted builders have seen as a liability into a selling point with the following statements in its sales literature (building on the fact that the new step geometry rule often utilizes 14 risers rather than the 13 risers needed under earlier editions of the CABO Code):

> Take these 14 steps to a *safer* home. . . . Your family's safety is one of our primary concerns. . . . Don't buy a new home unless CABO safer stairs come with it (the same way you shouldn't buy a car without airbags)

In a letter from Borror Corporation (builder of Dominion Homes™) to CABO, January 23, 1996, the Architectural Department Manager noted:

> In implementing the new CABO standard, we found that the effort was not nearly so burdensome as we had initially feared. We were required to slightly enlarge the foundations of 5 of the 31 models we build, and only slight adjustments were necessary to the majority of our homes. In retrospect, we believe the effort we have made to meet the new standard has been manageable, and to the extent that we were able to provide enhanced safety to our customers, we are extremely happy to do so.

Here is one response *from a builder* to the Specious Endangerment Argument (as I term it) propounded by other homebuilders who claim that improved stairs will be unworkable and mean the end of affordable housing as we know it. (My characterization owes its origin to NAHB's related tirade against the Endangered Species Act.) Builders should make their arguments on the benefit-cost of improved stairs on the basis of homes they actually build *and market* rather than on the basis of imagined or feared difficulties. They could learn a lot from car builders who, after years of fighting against improved safety and usability of automobiles, finally discovered consumers wanted these features and were willing to pay for them *and that these features and amenities could even be built into smaller, more fuel-efficient cars.* A similar challenge faces the modular and manufactured home industries which must, and can, fit more into smaller structures. If a choice is made to build multi-level homes, then ways must be devised to deal with stairs in a reasonable fashion given their huge impact on safety and usability.

A footnote on the above-noted builder: in mid-2000 I learned from a resident of Ohio that the builder has apparently stopped the marketing campaign. If true, was it because of pressure applied by other builders? Builders who do not toe the line are potentially vulnerable to pressure from fellow builders who can damage ones prospects for development, access to skilled workers, etc. This matter is being investigated further.

**Potential for Litigation Against Builders and Regulators.** The year 2000 marked a significant shift in my approach to the problem of the home building industry's backwardness, condoned or supported by the building regulatory community, regarding stair safety and usability. I gave an invited presentation to the Association of Trial Lawyers of America on August 1, 2000 at ATLA's annual convention in Chicago. The topic was "Representation of the Elderly in Premises Liability Cases with a Focus on Falls." The paper accompanying the presentation is both in the conference proceedings and on Westlaw; the presentation is sold both in audio tape form and as a one-hour video. These are geared to the legal community. In addition to detailed epidemiological and etiological information, as well as advice on selecting and pursuing cases effectively, I concluded with the following thoughts on the double standard plus the duty of home builders, their trade associations, the regulators and their trade associations. (Selected paragraphs from the original paper are excerpted here; the complete paper should be consulted for all of the concluding comments and other information.)

> **The Problem of the Double Standard.** The U.S. building industry is not unique, only more egregious (in my opinion), in applying a traditional *lower* standard of design and construction to dwellings relative to what is required, by building codes, for other buildings. Tragically, this traditional practice is incompatible with our increasing life span (which increased by about 60 percent during the 20th century). Thus, the very premises where user needs are the greatest, the codes are the most compromised and deficient! While national standards for building usability and safety require many of the features described in this paper, the model building code organizations in the USA have behaved in a most backward, reprehensible fashion in my opinion (as a 33-year veteran of international research and consulting related to codes and standards). At the heart of their behavior is the maintenance of the traditional double standard for home design and construction despite the huge and growing needs of the consumers, especially elderly ones. They have done this in the context of overly cozy relationships with home builders, especially the National Association of Homes Builders (NAHB). Astonishingly, even after home builders associations ("spreading money around" and using political clout generally) have successfully convinced state and local jurisdictions to reduce *below the already seriously compromised model code requirements* the rules adopted for local enforcement, the model code organizations have continued to appoint disproportionate numbers of NAHB representatives to model code development committees while rejecting memberships by individuals expert in, and supportive of, public health—the *raison d'etre* for codes.
>
> What all of this means for premises litigation is that there will be no significant reduction in premises-related injuries, especially from falls in homes, because the model codes of the late 20th century and the 21st century are not responsive to the needs of consumers, especially elderly ones who have greater needs for reasonable circulation facilities. Even worse, the codes actually adopted and enforced at state and local level are significantly compromised even further by the cozy relationship among regulators and builders. But the picture gets even more bleak; consumers are not even being given options for safer, more-functional dwellings nor have they been informed of design options when they purchase a new home. Even expensive homes have low-standard stairways; there is not a correlation between the price of a new home and the functionality and safety of its stairways. Home builders' protests that stair improvements will make homes unaffordable ring hollow; they have increased average home size in the USA by a factor one hundred times greater than the additional area required to build stairs to even the compromised—*but rarely enforced*—standard in the newest model codes for dwellings. The average area increase in new homes was over 600 square feet in two recent decades and about 1,200 square over the last 50 years (according to data from NAHB). Again, as noted at the beginning of this paper, stairs are an unusually dangerous consumer product with annual comprehensive injury costs exceeding costs of construction by an order of magnitude.
>
> At a minimum, consumers have a right to be informed about the safety of the products they buy and use. Moreover they have a right to be informed about measures they can take to mitigate residual dangers. Peters and Peters state this right most

effectively in their new book (Peters GA and Peters BJ. *Warnings, Instructions, and Technical Communications.* Lawyers & Judges Publishing Co., Inc., Tucson, Arizona, 1999; p. 4).

> It (the warning) should appropriately identify specific hazards, the magnitude of the associated risks, and describe the means by which a person can avoid the danger. In essence, its objective is informed consent or choice behavior. This is an internationally accepted legal concept that was highlighted in the Nuremberg war trials, which indicated that a person must consent to a personal exposure to significant risk and that such consent must be informed, voluntary, and revocable.

**Duty, Breach, Cause and Harm.** This paper has touched on personal and environmental factors to be considered, with the four essential legal elements, in many premises liability cases. As an expert (trained in science, engineering and architecture; enlightened in research; certified in ergonomics; experienced in consulting; disillusioned by model code development; and inspired by public health) how can I further assist trial attorneys in their socially beneficial role relative to the needs of the elderly? Often, I can contribute to the assessment of the last three of the key elements (breach, cause and harm) in successful litigation, especially in relation to proximate causes of premises-related injury. But it is the first of the elements—duty—that intrigues me most after 33 years in the field of building safety and usability. Premises owners are typically the defendants in premises liability cases. But what duty do the home builders have? What duty do the model code organizations have? I perceive their behavior as not only insensitive to, and negligent about, certain critical parts of the built environments for our increasingly elderly society; occasionally it appears wilful and wanton. What do the trial attorneys think? Will the pattern of litigation concerning tobacco and guns be followed by litigation on stairways whose safety and usability has been compromised? The prospect is intriguing.

Another pertinent and forceful view, that of a well-known trial attorney, reinforces my opinion about the longstanding deficiency of code requirements:

> Negligence is the failure to use due care. Safety standards, codes and practices seldom constitute documentation of what is due care in a given circumstance. Generally they represent much less than due care. [Harry Philo. Problems and potentialities of safety standards in tort litigation, codes and practices. *Trial*, June/July 1966, pp. 25-30.]

**Financial Ability to Withstand Litigation.** Having learned recently that the annual operating budget of the NAHB is about $60 million per year, I am intrigued by the relatively puny financial resources of not only NAHB but of the model code organizations relative to the potential damages that might be awarded if the home stairway issue were thoroughly litigated. The entire annual operating budgets of not only NAHB but also code groups like BOCA, ICBO, ICC, NFPA and SBCCI (all of which continue to publish model codes or standards with the flawed double standards for home stairways) would be wiped out with compensatory damage awards based on about one day's comprehensive injury costs for stair-related, nonfatal injuries in the USA! Punitive damages, based on wilful and wanton behavior on the part of defendants, could wipe out such organizations' financial resources even faster. There might even be the prospect, in some cases, of criminal charges based on conspiracy among builders and code groups to keep low the requirements for home stairways without so much as informing or warning home buyers of their rightful options for improved stairways. How well would these organizations fare in such civil or criminal proceedings? As I noted above, "The prospect is intriguing." This is especially the case when model code organizations like ICC permit such miserly limited deliberations (with a 90-second testimony limit and 60-second rebuttal limit) within code-change hearings, encouraging in effect, "sound-bite code development." What the courts offer, indeed demand, is a full and fair hearing of all the evidence and that evidence is presented and challenged *under oath.* By these standards, code-development in the USA today leaves much to be desired.

**Intimidation of Officials.** Also worthy of legal examination is the adoption and enforcement of codes and standards. The builders have had inordinate power which they have, in my opinion, exercised irresponsibly in the adoption of codes at local and state level. The extent of their power is reflected also in the damage done to the careers of professional code administrators who have dared to stand up to the political pressures of the builders. A case in point is the firing, on April 28, 2000, of a 17-year employee of the Virginia Department of Housing and Community Development (reported by Associated Press on September 10, 2000). Mrs. Carolyn Williams, a fire inspector (enforcing NFPA standards) and building code official, had among other activities, championed the case of a single standard for stairway geometry when she served as the Virginia representative on BOCA's Ad Hoc Committee on Stairway Safety. Despite her exceptional knowledge of the technical issues related to the stair geometry debate, she was never permitted (despite immense effort on her part and mine) to even testify to the Virginia Board of Housing and Community Development when it considered adoption of model code requirements for home stairs. Like other builder-dominated (or intimidated) state and local boards, the Virginia Board caved in to home builder demands that even the compromised 7 3/4 by 10 requirement of the BOCA and CABO codes not be adopted for the Uniform Statewide Building Code for Virginia which had previously been based on little or no amendment of national model codes. What has the world come to when a devoted government employee's efforts on behalf of the public is punished rather than being rewarded? From information I have, her case does not appear unique. Again, the courts will be the best way of addressing such intimidation of public officials whose efforts to observe their ethical codes of conduct (which stress duty to the public as uppermost) are punished.

**NFPA's Role.** As the organization with a better set of consensus-based codes/standards-development procedures than the code-development process controlled by ICC, NFPA is in a good position to lead the way in the resolution of long-standing disputes on the home stair riser-tread geometry issue. As a member of the NFPA Technical Committee working on NFPA 101B, and as a well known submitter of public proposals and comments on NFPA 101, NFPA 501 and (soon) NFPA 5000, I will do my utmost to have NFPA lead the way out of the current morass. One aspect of this was to submit, to the American Public Health Association (APHA) a public policy resolution on the public health role of codes and standards which was adopted in 1999 (APHA Public Policy 99-16). A follow up public policy proposal, more particularly focused on NFPA, was submitted in 2000 and is due to be approved by APHA in November 2000. One of its premises is that:

> In 1999 NFPA fundamentally expanded its mission statement: "to reduce the worldwide burden of fire and other hazards on the quality of life by advocating scientifically-based consensus codes and standards, research, training and education"

The proposed policy also notes APHA concern that:

> In its potential expanded role in developing a full set of codes and standards for the built environment, NFPA will be more subject to pressures from industry organizations to compromise requirements to the detriment of public health.

The proposed policy goes on to recommend that APHA:

> 4. Encourages NFPA and other organizations to develop codes and standards requiring home stairways to be designed and constructed so that steps and railings provide at least the same level of usability and safety from falls as do stairs and railings in other buildings.

More generally—*and this is central to the whole stairway debate as well*—the proposed policy also:

> 5. Encourages NFPA, in its development of codes and standards, generally to utilize a "Universal Design" or inclusive design philosophy, which maximizes safety and usability for the largest range of people, including elderly persons or those of any age with disabilities.

The complete public policy resolution is published in the September 2000 issue of *The Nation's Health*, pages 39-40. A public hearing on this and other public policy resolutions is scheduled for November 13, 2000, in Boston at APHA's Annual Meeting. APHA's Governing Council acts on all of the resolutions on November 15, 2000, after which, if adopted, they are APHA's public policy.

As this proposal is prepared, it is unclear how NFPA will accept the challenge from, as well as potential support of, the public health community promised in the APHA public policy resolution. Here it should be clear that this proposal as well as my views on potential litigation are entirely my own and do not represent the position of APHA or other organization. Regardless of what organizations like NFPA and APHA do, there is much scope for individuals like me to pursue fully all of the legitimate means to correct longstanding defects in the way homes are designed, constructed and regulated. The public health of Americans is benefitting immensely from the efforts of lawyers on issues such as tobacco and handguns. Given the huge toll of injuries and other losses because of inadequate stairways, I must utilize the considerable strengths and experience of lawyers in my own advocacy efforts on the safety and usability problems that should be better addressed through codes/standards development, adoption and enforcement.

**Summary**

The matter of riser-tread geometry is essentially very simple. If the so-called "7-11" stair geometry is the minimum standard—both for safety and usability—for nonresidential stairs where the toll of injuries is much lower and where the use conditions are far less demanding, then the "7-11" should be the minimum requirement for dwelling units where the use conditions include the widest range of user capabilities and needs. The "7-11" is the unchallenged minimum standard for stair geometry (other than for dwellings) in the *BOCA National Building Code, Uniform Building Code, Life Safety Code,® American National Standard for Accessibility and Usability of Buildings and Facilities* (ICC/ANSI A117.1), *National Building Code of Canada* plus the first edition of the *International Building Code.*™ There is no basis for the double standard which unreasonably imperils home stair users and which makes such stairs unnecessarily difficult to use.

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**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 27
NEGATIVE: 1

**EXPLANATION OF NEGATIVE:**

HABER: The fact still remains that insufficient data exists to identify the relationship between stair geometry and injury or injury prevention. This fact has been acknowledged by both opponents and proponents of a 7/11 stair geometry which the Technical Committee on Means of Egress is aware of. However, the lack of data continues to be allowed to be leveraged against existing data, which the technical committee is also aware of, clearly linking the negative cost impact on affordable housing this action will lead to. Further, with little to no substantiation or clearly defined benefit gained by 7/11 stairs in all residential dwellings.

Regarding the Comment on Affirmative stating that the Technical Committee on Means of Egress has consistently recommended 7/11 stairs in response to concerns about the carpeting of them, again, adequate data justifying such a recommendation simply does not exist.

Regarding the Comment on Affirmative stating the need for the Technical Committee on residential Occupancies to indicate why the stair geometry in a dwelling unit should be different, conversely, why should it be the same? Residential buildings are constructed for completely different purposes and

as such, are used by the occupants in a completely different manner. Every building code recognizes this fact. Further, and contrary to the implication made by the submitter of this proposal, there are no model codes and few if any jurisdictions, that require the same stair geometry in dwelling units as in required in other occupancies.

Regarding the Comment on Affirmative referring to the proposal submitter's original "extensive justification", the information the comment refers to is extensive, but again, fails to provide any justification for the 7/11 stairs. The data provided simply reinforces what is common knowledge, that people have accidents on stairs. Other then by age group, the data is not specified any further, not just with regard to actual geometry of the stairs involved in a particular incident, but with regard to the myriad of other factors that play a role in stair injuries in dwelling units. It further fails to provide the cost-benefit analysis the NFPA Standards Council has requested for code amendments that significantly impact housing affordability. This data is needed before a sound recommendation for 7/11 stairs for residential dwellings should be made.

**COMMENT ON AFFIRMATIVE:**

KOFFEL: This issue has been addressed several times and the Technical Committee on Means of Egress has consistently recommended the 7/11 stair. This is due, to the concern about carpet then being placed on the stair. Having said that, input is again needed from the Technical committee on Residential Occupancies to indicate why the stair geometry in a dwelling unit should be different.

PAULS: Updating my extensive justification on this proposal, let me simply note that on November 15, 2000, the American Public Health Association (APHA) adopted a public policy on NFPA that included the following recommendations.

4. (APHA) Encourages NFPA and other organizations to develop codes and standards requiring home stairways to be designed and constructed so that steps and railings provide at least the same level of usability and safety from falls as do stairs and railings in other buildings;

5. (APHA) Encourages NFPA, in its development of codes and standards, generally to utilize a "Universal Design" or inclusive design philosophy, which maximizes safety and usability for the largest range of people, including elderly persons or those of any age with disabilities;

This occurred subsequent to submission of the proposal and subsequent to the Technical Committee meeting dealing with this proposal.

Also subsequent to these events, I have prepared a detailed benefit-cost analysis for a change to the step geometry requirements for dwellings. This analysis was done in the context of state-wide requirements for the Commonwealth of Virginia. The bottom line of that analysis was that, over a fifty-year period, the injury-reduction benefit of the improved step geometry greatly exceeded (by as much as a factor of 25) the additional construction cost. This does not include the comparably large benefit to usability. An expanded, national analysis will be prepared for use later in the NFPA process on this controversial issue which I expect will be pursued at least to the appeal level in the NFPA Standards Council if not to the NFPA Board petition level. The Standards Council specifically requested that cost-benefit issues be explored in the further consideration of this matter by NFPA Technical Committees. I believe I did a substantial job on this in my justification for 101B-33; this comment simply reinforces the benefit-cost argument presented in that justification.

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(Log #CP19)

101B- 34 - (3-2.2.2.3): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise 3-2.2.2.3 Spiral Stairs to read as follows:

3-2.2.2.3 Spiral Stairs.

3-2.2.2.3.1 In the occupancies shown in Table 3-2.2.2.3.1 ~~3-2.2.2.3~~ , spiral stairs shall be permitted as a component in a means of egress in accordance with 3-2.2.2.3.2 and 3-2.2.2.3.3. ~~under the following conditions:~~

~~(a) The occupant load served is not more than five persons.~~

3-2.2.2.3.2 Spiral stairs shall be permitted provided the following criteria are met:

(1) Riser heights shall not exceed 7 in. (17.8 cm).

**Table 3-2.2.2.3.1 ~~3-2.2.2.3~~ Occupancies Permitting Spiral Stairs**

| Occupancy | Condition |
|---|---|
| Assembly | From lighting and access catwalks, galleries, and gridirons |
| Detention and correctional | For access to and between staff locations |
| Apartment buildings | Within a single dwelling unit |
| Dwellings | Within a single dwelling unit |
| Mercantile | — |
| Business | — |
| Industrial | — |
| Storage | — |

(2) The stairway shall have a tread depth of not less than 11 in. (27.9 cm) for a portion of the stairway width sufficient to provide egress capacity for the occupant load served in accordance with 3-3.3.1.

(3) At the outer side of the stairway, an additional 101/2 in. (26.7 cm) of width shall be provided clear to the other handrail, and this width shall not be included as part of the required egress capacity.

(4) Handrails complying with 3-2.2.4 shall be provided on both sides of the spiral stairway.

(5) The inner handrail shall be located within 24 in. (61.0 cm), measured horizontally, of the point where a tread depth not less than 11 in. (27.9 cm) is provided.

(6) The turn of the stairway shall be such that descending users have the outer handrail at their right side.

3-2.2.2.3.3 Where the occupant load served does not exceed three, spiral stairs shall be permitted, provided that the following criteria are met:

(1) ~~(b)~~ The clear width of the stairs shall be not less than 26 in. (66 cm).

(2) ~~(c)~~ The height of risers shall not exceed 91/2 in. (24.1 cm).

(3) ~~(d)~~ The headroom shall be not less than 6 ft 6 in. (198 cm).

(4) ~~(e)~~ Treads shall have a depth not less than 71/2 in. (19.1 cm) at a point 12 in. (30.5 cm) from the narrower edge.

(5) ~~(f)~~ All treads shall be identical.

(6) Handrails shall be provided on both sides of the stairway.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #31)

101B- 35 - (3-2.2.2.3): Accept in Principle

**SUBMITTER:** Jake Pauls, Jake Pauls Consulting Services

**RECOMMENDATION**: Revise text as follows:

Replace 3-2.2.2.3 Spiral Stairs with the requirements 7.2.2.2.3.2 and 7.2.2.2.3.3 of NFPA 101, 2000 edition. Permit continued use of existing spiral stairs complying with the current 3.2.2.2.3 of the Code and with 7.2.2.2.3.4 of NFPA 101, 2000 edition.

**SUBSTANTIATION:** This builds upon a larger proposal submitted by Jake Pauls recommending the mainstreaming of the "7-11" step geometry for dwellings. Allowing 9 1/2 inch riser heights and tread depths of 7 1/2 inches in dwellings is not appropriate in view of the stair safety and usability problems described at great length in that other proposal. Use of such mean step geometry for spiral stairs should be restricted to very limited population conditions such as industrial occupancies.

**COMMITTEE ACTION:** Accept in Principle.

See Proposal 101B-34 (Log #CP19) which accomplished most of that recommended by the submitter.

Also add a 5-3.2.2.2.3 as follows:

5-3-2.2.2.3 Spiral Stairs. In the occupancies shown in Table 5-3-2.2.2.3, existing spiral stairs shall be permitted as a component in a means of egress under the following conditions:

(a) The occupant load served shall not exceed five persons.
(b) The clear width of the stairs shall be not less than 26 in. (66 cm).
(c) The height of risers shall not exceed 91/2 in. (24.1 cm).
(d) The headroom shall be not less than 6 ft 6 in. (198 cm).
(e) Treads shall have a minimum depth of 71/2 in. (19.1 cm) at a point 12 in. (30.5 cm) from the narrower edge.
(f) All treads shall be identical.

Table 5-3-2.2.2.3 Occupancies Permitting Spiral Stairs

| Occupancy | Condition |
|---|---|
| Assembly | From lighting and access catwalks, galleries, and gridirons |
| Detention and correctional | For access to and between staff locations |
| Apartment buildings | Within a single dwelling unit |
| Dwellings | Within a single dwelling unit |
| Mercantile | - |
| Business | - |
| Industrial | - |
| Storage | - |

**COMMITTEE STATEMENT:** The action on this proposal and the referenced proposal should meet the submitter's intent.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP20)

101B- 36 - (3-2.2.3.3): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-2.2.3.3 as follows:
3-2.2.3.3* Tread and Landing Surfaces. Stair treads and landings shall be solid, without perforations, ~~uniformly slip resistant,~~ and free of projections or lips that could trip stair users. If not vertical, risers shall be permitted to slope under the tread at an angle of not more than 30 degrees from vertical; however, the permitted projection of the nosing shall not be more than 11/2 in. (3.8 cm).
Exception: Grated stair treads and landing floors shall be permitted in the following:
(a) Detentional and correctional occupancies
(b) Industrial occupancies
(c) Assembly occupancies in means of egress from lighting and access catwalks, galleries, and gridirons
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #30)

101B- 37 - (3-2.2.4.5.1): Accept
**SUBMITTER:** Jake Pauls, Jake Pauls Consulting Services
**RECOMMENDATION**: Revise text as follows:
3-2.2.4.5.1 Handrails on stairs and ramps shall ~~be~~ have a consistent height of at least 34 in. (86 cm) and not more than 38 in. (96 cm) above the surface of the stair tread or ramp walking surface, measured vertically to the top of the rail from the leading edge of the tread or the ramp walking surface.
**SUBSTANTIATION:** This provides an explicit requirement for handrail height for ramps. It also fills a regulatory gap regarding the expectation of consistency of handrail height that is both normal and expected by users.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #13)

101B- 38 - (3-2.2.4.5.2): Accept in Principle
**SUBMITTER:** Daniel M. McGee, Consultant on Construction Codes & Standards
**RECOMMENDATION**: Revise Paragraph 3-2.2.4.5.2 to read as follows:
3-2.2.4.5.2 Handrails shall provide a clearance of at least ~~2 1/4~~ 1 1/2 in. (~~5.7~~ 3.8 cm) between the handrail and the wall to which it is fastened.
**SUBSTANTIATION:** A minimum finger clearance of 1 1/2 inches between handrails and walls has been used satisfactorily for many years by NFPA 101, the model building codes, city and state codes. The requirement for 2 1/4 inches of clearance in 101B will cause the document to be in conflict with NFPA 101-2000, the International Building Code-2000, the Standard Building Code-1997, the Uniform Building Code-1997, the ADAAG Rules published by The Access Board and ANSI A117.1-98.
The inclusion of requirements in NFPA 101B inconsistent with those in other nationally accepted documents will discourage the use of NFPA 101B.
The use of the widely accepted minimum clearance of 1 1/2 inches will not prohibit individuals desiring a greater clearance from increasing the clearance.
**COMMITTEE ACTION:** Accept in Principle.
Make no changes.
**COMMITTEE STATEMENT:** The current document, in 3-2.2.4.5.2, has the 1 1/2-in. dimension that the submitter requested. Thus, no change is needed.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 27
NEGATIVE: 1
**EXPLANATION OF NEGATIVE:**
PAULS: This negative ballot is submitted to support my right to submit, at the public comment stage, a comment to change the 1-1/2 inch dimension to 2-1/4 inches, just as I have proposed it for NFPA 5000. (This was specifically discussed during the Technical Committee meeting when the action was taken on this proposal for NFPA 101B). I do not agree with the substantiation provided by the proponent of 101B-38; the 1-1/2 inch minimum clearance has not "been used satisfactorily for many years." Furthermore, requiring a larger minimum clearance than the 1-1/2 inches in other model codes and requirements would not necessarily cause a "conflict." Providing or requiring 2-1/4 inches when other codes require only 1-1/2 inches is not a "conflict." The other codes would still be satisfied with the larger clearance.

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(Log #CP21)

101B- 39 - (3-2.2.4.5.3): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-2.2.4.5.3 by splitting it into two paragraphs and making additional changes as follows:
3-2.2.4.5.3* Handrails shall have a circular cross section with an outside diameter of at least 11/4 in. (3.2 cm) and not more than 2 in. (5 cm).
Exception ~~No. 1~~ : Any other shape with a perimeter dimension of at least 4 in. (10.2 cm), but not more than 61/4 in. (15.9 cm), and with the largest cross-sectional dimension not more than 21/4 in. (5.7 cm) shall be permitted provided that edges are rounded so as to provide a minimum radius of 1/8 in. (0.3 cm).
3-2.2.4.5.4 † Handrails shall be continuously graspable along the entire length.
Exception ~~No. 2~~ : Handrail brackets or balusters attached to the bottom surface of the handrail shall not be considered to be obstructions to graspability provided the following criteria are met: ~~they do not project horizontally beyond the sides of the handrail within 21/2 in. (6.4 cm) of the bottom of the handrail, obstruct not more than 20 percent of the handrail length, and have edges with a 1/8-in. (0.3-cm) minimum radius.~~
(a) They do not project horizontally beyond the sides of the handrail within 11/2 in. (3.75 cm) of the bottom of the handrail.
(b) They have edges with a radius of not less than 1/8 in. (0.3 cm).

(c) They obstruct not in excess of 20 percent of the handrail length.

Renumber existing 3-2.2.4.5.4 and 3-2.2.4.5.5 to become 3-2.2.4.5.5 and 3-2.2.4.5.6.

Renumber existing 5-3-2.2.4.5.4 and 5-3-2.2.4.5.5 to become 5-3-2.2.4.5.5 and 5-3-2.2.4.5.6.

**SUBSTANTIATION:** Correlation with NFPA 101-2000. Note however that subpart (a) of the exception to 3-2.2.4.5.4 reads differently than NFPA 101 subpart (a) to the exception to subpart (4) of 7.2.2.4.5. The deletion of words corrects an error made in the processing of NFPA 101-2000 which incorrectly permitted a reduction in finger clearance to less than 1 1/2 inches.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 27

NEGATIVE: 1

**EXPLANATION OF NEGATIVE:**

PAULS: This negative ballot is submitted to support my right to submit, at the public comment stage, a comment to maintain a larger clearance at the bottom of the handrail. This would have the effect of modifying the current requirements in NFPA 101B along the lines of my proposal to NFPA 5000. Based on my ergonomic analyses and field observations, I do not believe that the 1-1/2 inch minimum clearance is adequate.

**COMMENT ON AFFIRMATIVE:**

ELVOVE: Later discussions held by the Means of Egress Committee during the NFPA 5000 ROP meeting in Tampa indicated a need to revise the exception to insert the word "graspable" before "edges" and to add a note/diagram/figure in the appendix (annex) that clarifies what an acceptable 1/8" graspable handrail surface might look like to ensure small edges (<1/8") used for decorative purposes would not be considered unacceptable. The intent of this provision is not to exclude surfaces that are less than 1/8" if by grasping them, they do not harm the user.

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(Log #14)

101B- 40 - (3-2.2.4.5.3 Exception No. 1): Reject

**SUBMITTER:** Daniel M. McGee, Consultant on Construction Codes & Standards

**RECOMMENDATION**: Revise text as follows:

Exception No. 1: Any other shape with a perimeter dimension of at least 4 in. (10.2 cm), but not more than 6 1/4 in. (15.9 cm) and with the largest cross-sectional dimension not more than 2 1/4 in. (5.7 cm) shall be permitted provided that edges are rounded so as to ~~provide a minimum radius of 1/8 in. (0.3 cm)~~ be free of any sharp or abrasive edges.

**SUBSTANTIATION:** Exception No. 1 to Paragraph 3-2.2.4.5.3 specifies that the edges of handrails have a minimum radius of 1/8 inch (3.2 mm). Such a requirement is of questionable validity and would most certainly eliminate many of the ordinary handrails currently in use.

The basis and source of the minimum 1/8 inch radius requirement is not known. However, it is well known that handrails with edges with curvatures of much less than 1/8 inch have been manufactured and used for years.

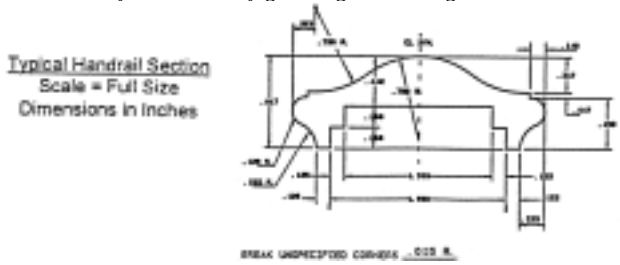
Depending on the material, method of manufacture, or desired appearance, the edges of handrail brackets may be chamfered, ground, extruded, or cast with edges that are specified to be “broken” to a radius as small as .015 inch. This industry practice has not resulted in the delivery of handrails that have not been found to provide satisfactory service.

To prevent injury or discomfort to the hand, it is not necessary to round all objects to a curvature as large as 1/8 inch. Many items commonly handled do not have radii defined edges. For example, cabinet handles, lever type door handles, wood and metal furniture, light switches, silverware, and so forth. Many of the items mentioned have square, chamfered or “broken” edges.

Noncircular handrail profiles with edges of less than 1/8 inch curvature have been in use for a long time and have not been found to be difficult to grasp or cause undue pressure on the hand. For example, the profile shown below is illustrative of railings used where architects or owners use an architecturally pleasing shape that has edges with a radius less than 1/8 inch.

The requirements should not be so restrictive as to prohibit some variety in the selection of handrails. The above profile would not have been specified for so many years if they caused harm or were unpleasant to grasp. Evidence that edges with only a slight radius are not uncomfortable to grasp is illustrated by silverware, cabinet handles and lever type door handles that are also squeezed in using.

The method of manufacturing noncircular profiles of wood and metal may dictate the edge condition. Profiles made by forging or extruding may result in edges that are most economically smoothed by grinding or sanding.




Typical Handrail Section

**COMMITTEE ACTION:** Reject.

**COMMITTEE STATEMENT:** The 1/8-in. radius is a well-documented minimum. The issue is not just one of comfort; it is a safety issue. A handrail is a tool and should not be equated with things such as a lever handle that operates a door latch.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

**COMMENT ON AFFIRMATIVE:**

PAULS: I simply am affirming the importance of the 1/8 inch as a (bare) minimum requirement; indeed 1/4 inch would be preferred as a biomechanical-based minimum for handrails used by more elderly hands which are prone to pressure-point problems when grasping a handrail. This comment is important relative to discussions and actions by the Means of Egress Technical Committee on NFPA 5000.

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(Log #15)

101B- 41 - (3-2.2.4.5.3 Exception No. 2): Accept in Part

**SUBMITTER:** Daniel M. McGee, Consultant on Construction Codes & Standards

**RECOMMENDATION**: Revise text as follows:

Exception No. 2: Handrail brackets or balusters attached to the bottom surface of the handrail shall not be considered obstructions to graspability provided they do not project horizontally beyond the sides of the handrail within ~~2 1/2~~ 1 1/2 in. (~~6.4~~ 3.8 cm) of the bottom of the handrail, ~~obstruct not more than 20 percent of the handrail length,~~ and ~~have edges with a 1/8 in. (0.3 cm) minimum radius.~~ not have any sharp or abrasive edges.

**SUBSTANTIATION:** Exception No. 2 to Paragraph 3-2.2.4.5.3 requires $2^1/_2$ inches of clearance between the bottom of the handrail and the horizontal portion of the handrail support bracket. Such a requirement is believed to be overly restrictive.

It is our understanding the basis for the $2^1/_2$ inches of clearance is to allow for the extended length of a person's fingers should they slide their hand along the handrail with fingers extended as shown in Figure 1 on the following page.

With fingers in an extended position, very large people may touch a handrail bracket of which there are generally only three per stair run.

One must truly ask, do persons actually place their hands on a handrail in such an extended manner? Do you use such an extended finger position on a handrail when you slide your hand down a handrail?

We must recognize the considerable variation in the range of users of handrails from children to adults and hence the range in finger length. The percentage of people with large hands that would grasp a handrail in the pictured manner is believed to be miniscule and hence in no way would justify a clearance to the handrail bracket of $2^1/_2$ inches. It should also be recognized that about 60 percent of stair users do not use the handrail at all. (The Staircase, John Templer, 1974.)

OTHER BUILDING CODES AND STANDARDS

Proposals to require $2^1/_2$ inches of vertical clearance to the handrail support bracket were considered during the 1999 code change cycles of the International Code Council and the National Fire Protection Association.

The proposal to the ICC International Building Code was discussed at the ICC Code Development Hearings in St. Louis, MO, which was attended by over 2,000 members of BOCA, ICBO, and SBCCI. The result of those discussions led to the adoption of a vertical clearance to the handrail bracket of $1^1/_2$ inches.

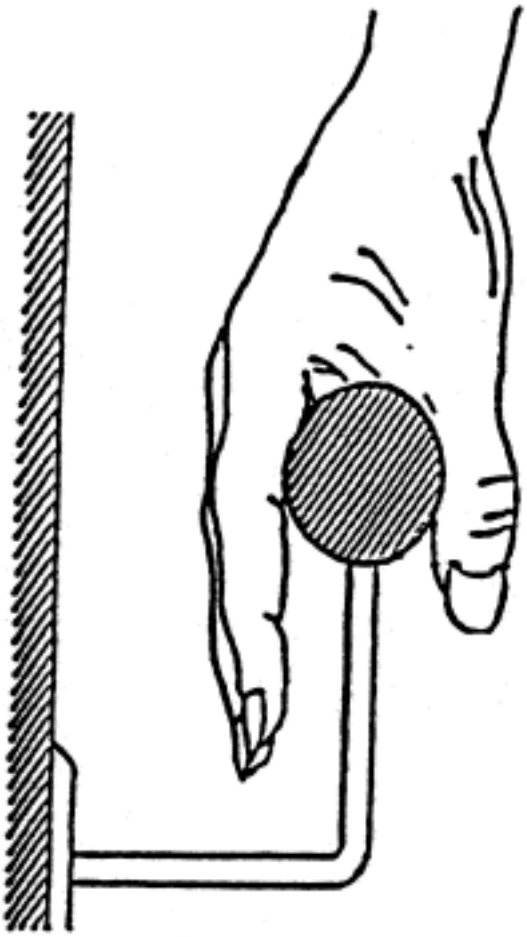

**Figure 1**


Figure 2

Similarly, the proposal to revise the NFPA 101, Life Safety Code, to require $1^1/_2$ inches of vertical clearance to the handrail bracket was adopted at the NFPA Conference in New Orleans, LA.

The adoption of $1^1/_2$ inches of clearance to the handrail bracket logically is in agreement with the long standing requirement for $1^1/_2$ inches of clearance between adjacent wall or other construction.

HANDRAIL GRIPS

In studies of handrail shapes and handrail grips, several methods of grasping handrails are most often mentioned — the power grip, the pinch grip, and the hook grip as shown below in Figure 2.

None of the research data I reviewed made any mention of a stiff finger grasp such that $2^1/_2$ inches of clearance would be required as illustrated earlier in Figure 1.

HANDRAIL BRACKET INJURIES

What is the danger or hazard created by a handrail bracket? Are there documented injuries?

Review of the U.S. Consumer Product Safety Commission National Injury Clearing House data on injuries reported by hospital emergency rooms in the United States through the National Electronic Injury Surveillance System did not reveal any injuries specifically related to handrail support brackets. Discussions with handrail manufacturers, fabricators, and installers of the need for increased clearance elicited no recollection of serious injuries or lawsuits related to the depth of the handrail brackets.

Since the personal injury data does not indicate a significant personal injury rate, it is reasonable to consider the financial cost and impact of increasing the handrail bracket clearance. Preliminary studies indicate the increase in bracket clearance will result in a need to increase the strength of brackets about fifty (50) percent. It should be recognized that such an increase will result in the need to redesign current brackets, many of which the strength is determined by load testing as frequently accepted design parameters are not available for the metals used. There are also ancillary costs in the revising of catalogues, reduction of current inventory, and resupply of new inventory. These are not insignificant costs to relatively small handrail component manufacturers.

Exception No. 2 also limits the accumulative attachment length of the brackets and balusters to a maximum of 20 percent of the handrail length.

The most immediate effect of the above requirement is to eliminate continuously supported handrails generally supported by glass or solid or perforated metal guards often specified where stairs have open sides. The use of solid type balusters has greatly increased in recent years to prevent children from falling from the side of stairs or through open guards.

Attachment A to this document contains pictures and engineering details of the most frequently used method of installing tempered glass balusters.

Elimination of the continuous stiffening effect of the top handrail section would significantly reduce the overall strength of the combination handrail-glass balustrade. Redesigning the handrail-glass balustrade system with vertical supports every six inches extending $2^1/_2$ inches below the handrail would not only be expensive, it may not be possible because of the stress concentrations occurring at the glass/fastener connection.

We have seen no data demonstrating that solid glass or perforated metal balusters have not performed satisfactorily. It is obvious that in handrail tests, a person can withstand a greater load with a fully circular grip on a handrail than on a less than full circle grasp. However, the test is not one of maximum individual strength; it is one of how much load must be withstood to restrain or right oneself in a slip.

It is recognized that there are many falls on stairs. However, these falls have statistically been shown to have resulted from carrying objects, tripping on objects, bad lighting, omission of handrails, and similar mishaps. Seldom, if ever, have the accident data shown that it was the shape of the handrail or the interference of a baluster that caused the fall. Handrails of all types and sizes have been used for centuries and significantly

contributed to preventing falls. Unfortunately, reliable research data indicates that only about 40 percent of stairway users make use of handrails.

In recognition of the above discussion, we believe the restrictions and limitation placed on the number of balusters and length of attachment of solid balusters is unduly restrictive and should be eliminated.

Exception No. 2 further specifies that the edges of handrail brackets or balusters attached to the bottom surface of the handrail have a minimum radius of 1/3 inch (3.2 mm). Such a requirement is of questionable validity and would most certainly eliminate many of the ordinary balusters and handrail support brackets currently in use.

The basis and source of the minimum 1/8 inch radius requirement is not known. However, it is well known that both balusters and handrail brackets with edges with curvatures of much less than 1/8 inch have been manufactured and used for years.

Depending on the material, method of manufacture, or desired appearance, the edges of handrail brackets and balusters may be chamfered, ground, extruded, or cast with edges that are specified to be "broken" to a radius as small as .015 inch. This industry practice has not resulted in the delivery of either balusters or handrail brackets that have not been found to provide satisfactory service.

To prevent injury or discomfort to the hand, it is not necessary to round all objects to a curvature as large as 1/8 inch. Many items commonly handled do not have radii defined edges. For example, cabinet handles, lever type door handles, wood and metal furniture, light switches, silverware, and so forth.

Many individual balusters and treillage patterns are manufactured with edges "broken" to .015 inch radius and have been used without incident. Some architectural panels may not be 1/8 inch thick and hence could not have 1/8 inch radius edges. (Attachment B.)

Note: Supporting material available for review at NFPA Headquarters.

**COMMITTEE ACTION:** Accept in Part.

See action on Proposal 101B-39 (Log CP#21) and reason for the committee rejection of Proposal 101B-40 (Log #14).

**COMMITTEE STATEMENT:** The 1 1/2-in. criterion requested by the submitter was accomplished via the referenced committee proposal. The remainder of the submitter's recommendation is rejected because the 1/8-in. radius is a well-documented minimum. The issue is not just one of comfort; it is a safety issue. A handrail is a tool and should not be equated with things such as a lever handle.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

**COMMENT ON AFFIRMATIVE:**

ELVOVE: Per the committee action taken in Tampa during the NFPA 5000 ROP meeting on this same issue (based upon a proposal from the same proponent who submitted Log #15), delete 3-2.2.4.5.4 Exception (c), "They obstruct not in excess of 20 percent of the handrail length."

PAULS: I simply am affirming the importance of the 1/8 inch as a (bare) minimum requirement; this comment is important relative to discussions and inconsistent actions on this topic by the Means of Egress Technical Committee on NFPA 5000. My separate comment on proposal 101B-38 addresses the other main change proposed by the proponent here.

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(Log #CP23)

101B- 42 - (3-2.5.5): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise 3-2.5.5 as follows:

3-2.5.5 Enclosure and Protection of Ramps. Ramps in a required means of egress shall be enclosed or protected as a stair in accordance with 3-2.2.5 and 3-2.2.6. The use of Exception No. 2 to 3-2.2.6.3 shall be prohibited.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP4)

101B- 43 - (3-2.6, 3-1.1.3, and 5-3.1.1.3): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Delete 3-1.1.3 and revise 3-2.6 as follows:

~~3-1.1.3 †Exit Passageways. An exit passageway that serves as a discharge from a stair enclosure shall have at least the same fire resistance rating and opening protective fire protection rating as that required for the stair enclosure, and shall be separated from other parts of the building in accordance with 3-1.1.2.~~

3-2.6* Exit Passageways.

3-2.6.1* General. Exit passageways shall be permitted to be used in the means of egress. Where exit passageways are used in the means of egress they shall conform to the general requirements of Section 3-1 and to the special requirements of 3-2.6.

3-2.6.2 Enclosure. An exit passageway shall be separated from other parts of the building as specified in 3-1.1.2.

Exception: Fire windows in accordance with 8.2.3.2.2 shall be permitted to be installed in such a separation in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

3-2.6.3 †Stair Discharge. An exit passageway that serves as a discharge from a stair enclosure shall have not less than the same fire resistance rating and opening protective fire protection rating as those required for the stair enclosure.

3-2.6.4 ~~3-2.6.2~~ Width. The width of an exit passageway shall be adequate to accommodate the aggregate required capacity of all exits discharging through it.

Exception No. 1: Where an exit passageway serves occupants of the level of exit discharge as well as other stories, capacity shall not be required to be aggregated.

Exception No. 2: An exit passageway in a covered mall building shall be permitted to accommodate the following independently:

(a) Its assigned occupant load from only the covered mall/pedestrian way

(b) The largest occupant load assigned to it from a single tenant space/store

3-2.6.5 ~~3-2.6.3~~ Floor. The floor shall be solid and without perforations.

Renumber and reposition 5-3-1.1.3 to become 5-3-2.6.3.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP69)

101B- 44 - (3-2.9.2.1 and 6-1.2.1): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: In 3-2.9.2.1 correct the title of ANSI A14.3 to read: "Safety Requirements for Fixed Ladders."

In 6-1.2.1 correct the title of ANSI A14.3 and update the edition year to read: "Safety Requirements for Fixed Ladders, 1992."

In 6-1.2.1 update the edition year of ANSI A1264.1 to 1995.

**SUBSTANTIATION:** Editorial corrections.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP24)

101B- 45 - (3-2.12.1): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise 3-2.12.1 as follows:

An area of refuge used as part of a required accessible means of egress in accordance with 3-5.4, or used as a part of any required means of egress, shall conform to the following:

(a) The general requirements of Section 3-1

(b) The special requirements of 3-2.12.2 and 3-2.12.3

Exception to (b): Areas of refuge consisting of stories of buildings that are protected throughout by an approved, supervised automatic sprinkler system.

~~(c) The detailed definition of Area of Refuge in Section 2-2~~

Exception ~~to (c):~~ In buildings protected throughout by an approved, supervised automatic sprinkler system, two rooms or spaces separated from each other by smoke-resistant partitions in accordance with the ~~Section 2-2~~ 3.3.6 definition of Area of Refuge shall not be required in hotels and dormitories, apartment buildings, mercantile occupancies, and business occupancies.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP25)

101B- 46 - (3-2.13.1): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-2.13.1 as follows:
3-2.13.1* General. An elevator that complies with the requirements of 3-2.13 shall be permitted to be used as a second means of egress from towers as defined in 3.3.108 ~~Section 2-2~~ under the following conditions:
(a) The tower and any attached structure is protected throughout by an approved, supervised automatic sprinkler system.
(b) The tower is subject to occupancy by not more than 90 persons.
(c) Primary egress discharges directly to the outside.
(d) There are no high-hazard content areas in the tower or attached structure.
(e) 100 percent of the egress capacity is provided independent of the elevators.
(f) An evacuation plan is implemented specifically including trained in operation and procedures for elevator emergency use in normal operating mode prior to fire fighter recall.
(g) The tower shall not be used by the general public.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP26)

101B- 47 - (Table 3-3.1.2): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Replace Table 3-3.1.2 with the table shown on the following page.

**Figure 3-3.1.2 Covered mall buildings occupant load factors.**
(Existing Figure 3-3.1.2 from NFPA 101B-1999)

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #21)

101B- 48 - (3-3.4.2): Accept
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Revise the wording of this paragraph as follows:
In business occupancies, the minimum width of any corridor or passageway serving an occupant load of 50 or more shall be 44 in. (112 cm) in the clear.
Delete the last sentence of A-3-3.4.2.
**SUBSTANTIATION:** The proposed changed to this paragraph reflects the change made to this requirement by the Technical Committee on Mercantile and Business Occupancies for the 2000 edition of NFPA 101. This change is submitted by the writer, a member of that Technical Committee, in order to maintain consistency between corresponding editions of NFPA 101 and NFPA 101B in the required width of these portions of the means of egress for business occupancies.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP27)

101B- 49 - (3-3.4.8): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-3.4.8 as follows:
3-3.4.8 Educational Occupancy Aisle Width. In educational occupancies ~~where there are more than 60 seats, every aisle shall be not less than 36 in. (91 cm) wide if serving seats on one side only and not less than 42 in. (107 cm) wide if serving seats on both sides. Where serving 60 seats or fewer, aisles shall be not less than 30 in. (76 cm) wide. The space between parallel rows of seats shall not constitute an aisle. No more than six seats shall intervene between any seat and an aisle. Aisles~~ aisles shall be not less than 30 in. (91 cm) wide. The space between parallel rows of seats shall not be subject to the minimum aisle width, provided that the number of seats that intervene between any seat and an aisle do not exceed six.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP28)

101B- 50 - (3-3.4.12.2, 3-3.1.31.9, 3-5.1.32.2.2, and A-3-5.1.32.1 Exception (b)): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise as follows:
3-3.4.12.2 In Class A ~~stores~~ mercantile occupancies, at least one aisle of 5 ft (1.5 m) minimum width shall lead directly to an exit.
3-5.1.31.9 Exit Access Through Storerooms. Exit access in Class A and Class B ~~stores~~ mercantile occupancies that are protected throughout by an approved, supervised automatic sprinkler system and exit access in all Class C ~~stores~~ mercantile occupancies shall be permitted to pass through storerooms, provided that the following conditions are met:
(a) Not more than 50 percent of exit access shall be provided through the storeroom.
(b) The storeroom shall not be subject to locking.
(c) The main aisle through the storeroom shall be not less than 44 in. (112 cm) wide.
(d) The path of travel, defined with fixed barriers, through the storeroom shall be direct and continuously maintained in an unobstructed condition.
3-5.1.32.2.2 Class A and Class B ~~stores~~ mercantile occupancies connected to a covered mall shall be provided with the number of means of egress required by Section 3-4 with no less than two means of egress remotely located from each other.
A-3-5.1.32.1 Exception (b) The minimum requirement for terminating mall exit access in not less than 66 in. (168 cm) of egress width relates to the minimum requirement for at least one aisle in Class A ~~stores~~ mercantile occupancies [30,000 ft $^2$ (2800 m $^2$ ) or greater sales area] to be 5 ft (152 cm) in width.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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**Table 3-3.1.2 Occupant Load Factor**

| Use | $ft^{2\dagger}$ (per person) | $m^{2\dagger}$ (per person) |
|---|---|---|
| **Assembly Use** | | |
| Concentrated use, without fixed seating | 7 net | 0.65 net |
| Less concentrated use, without fixed seating | 15 net | 1.4 net |
| Bench-type seating | 1 person / 18 linear in. | 1 person / 45.7 linear cm |
| Fixed seating | Number of fixed seats | Number of fixed seats |
| Waiting spaces | *See 3-3.1.3.4.* | *3-3.1.3.4* |
| Kitchens | 100 | 9.3 |
| Library stack areas | 100 | 9.3 |
| Library reading rooms | 50 net | 4.6 net |
| Swimming pools | 50 — of water surface | 4.6 — of water surface |
| Swimming pool decks | 30 | 2.8 |
| Exercise rooms with equipment | 50 | 4.6 |
| Exercise rooms without equipment | 15 | 1.4 |
| Stages | 15 net | 1.4 net |
| Lighting and access catwalks, galleries, gridirons | 100 net | 9.3 net |
| Casinos and similar gaming areas | 11 | 1 |
| Skating rinks | 50 | 4.6 |
| **Educational Use** | | |
| Classrooms | 20 net | 1.9 net |
| Shops, laboratories, vocational rooms | 50 net | 4.6 net |
| **Day-Care Use** | 35 net | 3.3 net |
| **Health Care Use** | | |
| Inpatient treatment departments | 240 | 22.3 |
| Sleeping departments | 120 | 11.1 |
| **Detention and Correctional Use** | 120 | 11.1 |
| **Residential Use** | | |
| Hotels and dormitories | 200 | 18.6 |
| Apartment buildings | 200 | 18.6 |
| Board and care, large | 200 | 18.6 |
| **Industrial Use** | | |
| General and high hazard industrial | 100 | 9.3 |
| Special purpose industrial | NA‡ | NA‡ |
| **Business Use** | 100 | 9.3 |
| **Storage Use** (other than mercantile storerooms) | NA‡ | NA‡ |
| **Mercantile Use** | | |
| Sales area on street floor §‡ | 30 | 2.8 |
| Sales area on two or more street floors ‡ | 40 | 3.7 |
| Sales area on floor below street floor ‡ | 30 | 2.8 |
| Sales area on floors above street floor ‡ | 60 | 5.6 |
| Floors or portions of floors used only for offices | *See business use.* | *See business use.* |
| Floors or portions of floors used only for storage, receiving, and shipping, and not open to general public | 300 | 27.9 |
| Covered mall buildings | Per factors applicable to use of space # | Per factors applicable to use of space # |

† All factors expressed in gross area unless marked "net".

‡ Not applicable. The occupant load shall be not less than the maximum probable number of occupants present at any time.

§ For the purpose of determining occupant load in mercantile occupancies where, due to differences in grade of streets on different sides, two or more floors directly accessible from streets (not including alleys or similar back streets) exist, each such floor shall be considered a street floor. The occupant load factor shall be one person for each 40 $ft^2$ (3.7 $m^2$) of gross floor area of sales space.

‡In mercantile occupancies with no street floor, as defined in 3.3.105, but with access directly from the street by stairs or escalators, the principal floor at the point of entrance to the mercantile occupancy shall be considered the street floor.

#The portions of the covered mall, where considered a pedestrian way and not used as gross leasable area, shall not be assessed an occupant load based on Table 3-3.1.2. However, means of egress from a covered mall pedestrian way shall be provided for an occupant load determined by dividing the gross leasable area of the covered mall building (not including anchor stores) by the appropriate lowest whole number occupant load factor from Figure 3-3.1.2.

Each individual tenant space shall have means of egress to the outside or to the covered mall based on occupant loads figured by using the appropriate occupant load factor from Table 3-3.1.2.

Each individual anchor store shall have means of egress independent of the covered mall.

(Log #CP29)

101B- 51 - (3-3.4.13): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-3.4.13 as follows:
3-3.4.13 Where a single exit access leads to an exit, its capacity, in terms of width, shall be at least equal to the required capacity of the exit to which it leads. Where more than one exit access leads to an exit, each shall have a minimum width sized in accordance with 3-3.3 for the number of persons it accommodates but not less than required by ~~3-3.4.12.1~~ 3.3.4.
**SUBSTANTIATION:** Correlation with NFPA 101-2000. This corrects an error in the reference.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #16)

101B- 52 - (3-4): Accept in Principle
**SUBMITTER:** Catherine L. Stashak, Des Plaines Fire Dept., IL
**RECOMMENDATION**: Delete the existing 3-4 (Number of Means of Egress) and add a new 3-4 as follows:

**3-4 Number of Means of Egress.**

**3-4.1** The minimum number of means of egress from any balcony, mezzanine, story, or portion thereof shall be two unless otherwise specified by this section.

**3-4.1.1** The minimum number of a means of egress from any story or portion thereof shall be as follows:
(a) Occupant load more than 500 but not more than 1,000 – 3
(b) Occupant load more than 1,000 – 4

**3-4.1.2** Only the occupant load of each story considered individually shall be required to be used in computing the number of means of egress at that story, provided that the required number of means of egress is not decreased in the direction of egress travel. Accessible means of egress, in accordance with 3-5.4, not utilizing elevators shall be permitted to serve as any or all of the required minimum number of means of egress.

**3-4.1.3 Special Structures.**

**3-4.1.3.1** For open structures the grade level is exempt from the requirements for the number of means of egress.

**3-4.1.3.2** Open structures occupied by not more than three persons, with a travel distance of not more than 200 ft (60 m), shall be permitted to have a single exit.

**3-4.1.3.3** Towers shall be permitted to have a single exit if the following conditions are met:
(a) The tower is subject to occupancy by fewer than 25 persons.
(b) The tower is not used for living or sleeping purposes.
(c) The tower is of noncombustible, limited-combustible, or heavy timber construction
(d) The tower has no combustible materials in, under, or in the immediate vicinity, except necessary furniture.
(e) There are no high-hazard occupancies in the tower or in the immediate vicinity.
(f) Where the tower is located above a building, the single exit from the tower shall be provided by one of the following:
1. An exit enclosure separated from the building with no door openings to or from the building.
2. An exit enclosure leading directly to an exit enclosure serving the building with walls and doors separating these exit enclosures from each other, and another door allowing access to the top floor of the building, which provides access to a second exit serving that floor.

**3-4.1.3.4** Towers with 360 degree line-of-sight requirements shall be permitted to have a single means of egress for a distance of travel not exceeding 75 ft (23 m) or 100 ft (30 m) if the tower is sprinklered throughout by an approved, supervised automatic sprinkler system.

**3-4.1.3.5** Piers used exclusively to moor cargo vessels and to store material shall be exempt from the requirements for the number of means of egress where provided with proper means of egress from structures thereon to the pier and a single means of access to the mainland, as appropriate with the pier's arrangement.

**3-4.1.4 Assembly Occupancies.**

**3-4.1.4.1 Balconies or Mezzanines.** A single means of egress shall be permitted from mezzanines and balconies if the occupant load is 50 or less and this means of egress shall be permitted to lead to the floor below. With occupant loads of greater than 50, but less than 100, at least two remote exits are required but they may also lead to the floor below.

**3-4.1.4.2 Lighting and Access Catwalks, Galleries, Gridirons.** A second means of egress shall not be required if a means of escape to a floor or a roof is provided. Ladders, alternating tread devices, or spiral stairs shall be permitted in such means of escape.

**3-4.1.4.3 Main Entrance/Exit.** Every assembly occupancy shall be provided with a main entrance/exit. The main entrance/exit shall have minimum width sufficient to accommodate one-half of the total occupant load and shall be at the level of exit discharge or shall connect to a stairway or ramp leading to a street. Each level of an assembly occupancy shall have access to the main entrance/exit, and such access shall have sufficient capacity to accommodate 50 percent of the occupant load of such levels. Where the main entrance/exit from an assembly occupancy is through a lobby or foyer, the aggregate capacity of all exits from the lobby or foyer shall be permitted to provide the required capacity of the main entrance/exit regardless of whether all such exits serve as entrances to the building.

**3-4.1.4.4 No Defined Main Entrance.*** In assembly occupancies where there is no well-defined main entrance/exit, exits shall be permitted to be distributed around the perimeter of the building, provided the total exit width furnishes a minimum of 100 percent of the width needed to accommodate the permitted occupant load.

**A-3-4.1.4.4** The original *Code* wording permitted certain exceptions such as sports arenas and railway stations. If an assembly occupancy is not similar to one of these, it is frequently rejected. A listing of exceptions also raises the question as to why other occupancies are not included and necessitates more additions to the list. For example, an exhibit hall of very large size can have several main entrances/exits. A theater extending the width of a block cannot really have a main entrance/exit in one confined location. A restaurant might have a main entrance serving the parking lot and another main entrance for those entering from the street. The authority having jurisdiction needs to determine where this is acceptable.

**3-4.1.4.5 Other Exits.** Each level of an assembly occupancy shall have access to the main entrance/exit and shall be provided with additional exits of sufficient width to accommodate a minimum of one-half of the total occupant load served by that level. Such exits shall discharge in accordance with Section 3-7. Such exits shall be located as far apart as practicable and as far from the main entrance/exit as practicable. Such exits shall be accessible from a cross aisle or a side aisle.

**3-4.1.4.6 Bowling Establishments.** A bowling establishment shall have a main entrance/exit capacity sufficient to accommodate 50 percent of the total occupant load regardless of the number of aisles that it serves.

**3-4.1.4.7 Multilevel Exhibits.** The upper deck of multilevel exhibits that are greater than 300 $ft^2$ shall have at least two remote means of egress.

**3-4.1.5 Day-Care Occupancies.**

**3-4.1.5.1** In group day-care homes, every story and all areas used for sleeping, living, or dining purposes shall have at least two means of escape at least one of which shall be a door or stairway that provides a means of unobstructed travel to the outside of the building at street or ground level. The second means of escape shall be permitted to be a window in accordance with 3-5.1.15. No room or space that is accessible only by a ladder or folding stairs or through a trap door shall be occupied for living or sleeping purposes.

**3-4.1.5.2** In group day-care homes where spaces on the story above the story of exit discharge are used by clients, at least one means of escape shall be an exit discharging directly to the outside. The second means of escape shall be permitted to be a window in accordance with 3-5.1.15.

**3-4.1.5.3** In group day-care homes where clients occupy a story below the level of exit discharge (basement), at least one means of escape shall be an exit discharging directly to the outside, and the vertical travel to ground level shall not exceed 8 ft. The second means of escape shall be permitted to be a window in accordance with 3-5.1.15. No facility shall be located more than one story below the ground. In group day-care homes, any stairway to the story above shall be cut off by a fire barrier containing a door that has at least a 20-minute fire protection rating and is equipped with a self-closing device.

**3-4.1.6 Health Care Occupancies.**

**3-4.1.6.1*** At least two exits shall be accessible from each smoke compartment. Egress shall be permitted through an adjacent compartment(s) but shall not require return through the compartment of fire origin.

**A-3-4.1.6.1** An exit is not necessary for each individual smoke compartment if there is access to an exit through other smoke compartments without passing through the smoke compartment of fire origin.

**3-4.1.6.2** In health care occupancies, at least one exit from each floor or fire section shall be one of the following:

(a) A door leading directly outside the building.
(b) A stair
(c) A smokeproof enclosure
(d) A ramp
(e) An exit passageway

Any fire section not meeting these requirements shall be considered part of an adjoining zone.

**3-4.1.7 Detention and Correctional Occupancies.**

**3-4.1.7.1*** A minimum of two separate exits shall be provided on every story and accessible from every part of every story, fire compartment, or smoke compartment. A minimum of one approved exit shall be accessible from each fire compartment and each required smoke compartment into which residents are potentially moved in a fire emergency with the exits arranged so that egress shall not require return through the zone of origin.

**A-3-4.1.7.1** An exit is not necessary from each individual fire compartment or smoke compartment if there is access to an exit through other fire compartments or smoke compartments without passing through the fire compartment or smoke compartment of fire origin.

**3-4.1.8 Hotels and Dormitories.**

**3-4.1.8.1** A single exit shall be permitted in buildings that are protected throughout by an approved, supervised automatic sprinkler system and have four stories or less with not more than four guest rooms or guest suites per floor under the following conditions:

(a) The stairway is completely enclosed or separated by barriers that have a fire resistance rating of at least 1 hour with self-closing 1-hour fire protection-rated doors protecting all openings between the stairway enclosure and the building.
(b) The stairway does not serve more than one-half story below the level of exit discharge.
(c) Exit access corridors shall have at least a 1-hour fire resistance rating.
(d) There is not more than 35 feet of travel distance from the entrance door of any guest room or guest suite to an exit.
(e) One-half-hour fire rated horizontal and vertical separation between guest rooms or guest suites is provided.

**3-4.1.9 Apartments.**

**3-4.1.9.1 Four Stories or Less.** A single exit shall be permitted in buildings that are protected throughout by an approved, supervised automatic sprinkler system and have four stories or less with not more than four apartments per floor under the following conditions:

(a) The building is protected throughout by an approved, supervised automatic sprinkler system.
(b) The stairway is completely enclosed or separated by barriers that have a fire resistance rating of at least 1 hour with self-closing 1-hour fire protection-rated doors protecting all openings between the stairway enclosure and the building.
(c) The stairway does not serve more than one-half story below the level of exit discharge.
(d) Exit access corridors shall have at least a 1-hour fire resistance rating.
(e) There is not more than 35 feet of travel distance from the entrance door of any guest room or guest suite to an exit.
(f) One-half-hour fire rated horizontal and vertical separation between guest rooms or guest suites is provided.

**3-4.1.9.2 Individual Dwelling Unit.** A single exit shall be permitted if the unit has an exit door opening directly to the street or yard at ground level, or has direct access to an outside stair complying with 3-2.2 that serves a maximum of two units, both of which are located on the same floor. A single exit shall be permitted if the unit has direct access to an interior stair serving only that unit and separated from all other portions of the building by fire barriers having a minimum 1-hour fire resistance rating with no openings therein.

**3-4.1.10 Mercantile Occupancies.**

**3-4.1.10.1** Where a minimum of two means of egress are required a minimum of two exits shall be as follows:

(a) Provided on every story
(b) Accessible from every part of every story and mezzanine. Exit access travel shall be permitted to be common for the distances allowed as common paths of travel by 3-5.1.8.

**3-4.1.10.2** Class C mercantile occupancies shall be permitted to have a single means of egress if the travel distance does not exceed 75 ft to the exit or to a covered mall (if it is considered a pedestrian way). Travel distance can be increased to 100 ft in a building protected throughout by an approved automatic supervised sprinkler system.

**3-4.1.10.3** A single means of egress is permitted from a mezzanine if the common path of travel does not exceed 75 ft to an exit or to a covered mall (if the mall is considered a pedestrian way). Travel distance can be increased to 100 ft in a building protected throughout by an approved automatic supervised sprinkler system.

**3-4.1.11 Business Occupancies.**

**3-4.1.11.1** For a room or area with a total occupant load of fewer than 100 persons having an exit that discharges directly to the outside at the level of exit discharge for the building, with a total distance of travel, including travel within the exit, from any point not over 100 ft (30 m), a single exit shall be permitted. Such travel shall be on the same floor level or, if traversing of stairs is required, such stairs shall be not more than 15 ft (4.5 m) in height, and the stairs shall be provided with complete enclosures to separate them from any other part of the building with no door openings therein. A single outside stair, in accordance with 3-2.2, shall be permitted to serve all floors allowed within the 15-ft (4.5-m) vertical travel limitation.

**3-4.1.11.2** Any business occupancy not over three stories and not exceeding an occupant load of 30 people per floor shall be permitted a single separate exit for each floor if the total travel distance to the outside of the building does not exceed 100 ft (30 m) and if such exit is enclosed in accordance with 3-1.1.2, serves no other levels, and discharges directly to the outside. A single outside stair in accordance with 3-2.2 shall be permitted to serve all floors.

**3-4.1.11.3** A single means of egress shall be permitted from a mezzanine if the common path of travel does not exceed 75 ft (23 m) or 100 ft (30 m) if the building is protected throughout by an approved, automatic sprinkler system.

**3-4.1.11.4** A single exit shall be permitted for a maximum two-story tenant space/building protected throughout by an approved, automatic sprinkler system if the total travel distance to the outside does not exceed 100 ft (30 m).

**3-4.1.11.5** Where a minimum of two means of egress are required a minimum of two exits shall be as follows:

(a) Provided on every story
(b) Accessible from every part of every story and mezzanine. Exit access travel shall be permitted to be common for the distances allowed as common paths of travel by 3-5.1.8.

**3-4.1.12 Industrial Occupancies.**

**3-4.1.12.1** In low- and ordinary-hazard industrial occupancies, a single means of egress shall be permitted from any story or section if the exit can be reached within 50 ft (15 m) or 100 ft (30 m) in buildings protected throughout by an approved, supervised automatic sprinkler system.

**3-4.1.12.2** Where a minimum of two means of egress are required, a minimum of one exit shall be reached without traversing another story.

**3-4.1.13 Storage Occupancies.**

**3-4.1.13.1** A single means of egress shall be permitted from any story or section if the exit can be reached within 50 ft (15 m) or 100 ft (30 m) in buildings protected throughout by an approved, supervised automatic sprinkler system.

**3-4.1.13.2** In low-hazard occupancies, a single means of egress shall be permitted from any story or section.

**3-4.1.13.3** In bulk storage elevators, there shall be at least two means of egress from all working levels of the head house. One of these means of egress shall be a stair to the level of exit discharge that is enclosed by a dust-resistant 1-hour fire resistance-rated enclosure in accordance with 3-1.1.2. The second means of egress shall be either (a) or (b):

(a) An exterior stair or basket ladder-type fire escape accessible from all working levels of the head house that provides a passage to ground level.
(b) An exterior stair or basket ladder-type fire escape accessible from all working levels of the head house that provides access to the top of adjoining structures and that provides a continuous path to the ground level.

**3-4.1.13.4** In underground spaces of bulk storage elevators, one means of egress and one means of escape shall be permitted in lieu of two means of egress.

**3-4.1.13.5** In parking structures an opening for the passage of automobiles shall be permitted to serve as an exit from a street floor, provided no door or shutter is installed therein.

**3-4.1.13.6** In a ramp-type open-air parking structure with open vehicle ramps not subject to closure, the ramp shall be permitted to serve in lieu of the second means of egress from floors above the level of exit discharge, provided the ramp discharges directly outside at the street level.

**3-4.1.13.7** For parking structures extending only one floor below the level of exit discharge, a vehicle ramp leading directly to the outside shall be permitted to serve in lieu of the second means of egress, provided no door or shutter is installed therein.

**3-4.1.14 Mezzanines or Balconies.**

**3-4.1.14.1** A mezzanine or balcony shall be permitted to have a single means of egress if the common path of travel limitations of 3-5.1.8 are met.

**3-4.1.15 Elevator Lobbies and Points of Access.**

**3-4.1.15.1** Elevator lobbies shall have access to at least one exit. Such exit access shall not require the use of a key, tool, special knowledge, or special effort.

**3-4.1.15.2** Any door at the point of access to an elevator car, other than the hoistway door and the elevator car door, shall be readily openable from the car side without a key, tool, special knowledge, or special effort.

**Special Note:**

It is the opinion of this submitter that the following paragraphs should be relocated to appropriate sections of 3-3, as these paragraphs seem to address capacity of means of egress and not number of exits. In 101 (2000) these paragraphs are found in the 13-2.3's – Capacity of Means of Egress. As they were found in the 3-4's (Number of Exits) in the 1999 edition of 101B I left them in that section as part of my proposal.

**3-4.1.4.3 Main Entrance/Exit.** Every assembly occupancy shall be provided with a main entrance/exit. The main entrance/exit shall have minimum width sufficient to accommodate one-half of the total occupant load and shall be at the level of exit discharge or shall connect to a stairway or ramp leading to a street. Each level of an assembly occupancy shall have access to the main entrance/exit, and such access shall have sufficient capacity to accommodate 50 percent of the occupant load of such levels. Where the main entrance/exit from an assembly occupancy is through a lobby or foyer, the aggregate capacity of all exits from the lobby or foyer shall be permitted to provide the required capacity of the main entrance/exit regardless of whether all such exits serve as entrances to the building.

**3-4.1.4.4 No Defined Main Entrance.*** In assembly occupancies where there is no well-defined main entrance/exit, exits shall be permitted to be distributed around the perimeter of the building, provided the total exit width furnishes a minimum of 100 percent of the width needed to accommodate the permitted occupant load.

**A-3-4.1.4.4** The original *Code* wording permitted certain exceptions such as sports arenas and railway stations. If an assembly occupancy is not similar to one of these, it is frequently rejected. A listing of exceptions also raises the question as to why other occupancies are not included and necessitates more additions to the list. For example, an exhibit hall of very large size can have several main entrances/exits. A theater extending the width of a block cannot really have a main entrance/exit in one confined location. A restaurant might have a main entrance serving the parking lot and another main entrance for those entering from the street. The authority having jurisdiction needs to determine where this is acceptable.

**3-4.1.4.5 Other Exits.** Each level of an assembly occupancy shall have access to the main entrance/exit and shall be provided with additional exits of sufficient width to accommodate a minimum of one-half of the total occupant load served by that level. Such exits shall discharge in accordance with Section 3-7. Such exits shall be located as far apart as practicable and as far from the main entrance/exit as practicable. Such exits shall be accessible from a cross aisle or a side aisle.

**3-4.1.4.6 Bowling Establishments.** A bowling establishment shall have a main entrance/exit capacity sufficient to accommodate 50 percent of the total occupant load regardless of the number of aisles that it serves.

**SUBSTANTIATION:** I represent myself for this proposal. But as information only, I served on the TCC Task Group to prepare proposals for 101B. So many exceptions to a requirement make the Code difficult and frustrating to use. This proposal places the requirements for number of exits in individual sections based on occupancy classification. These sections were placed in the order found in NFPA 101-2000. This should make using 3-4 much easier. All exceptions were removed.

**COMMITTEE ACTION:** Accept in Principle.

See action on Proposal 101B-53 (Log #7).

**COMMITTEE STATEMENT:** The action on the referenced proposal accomplishes that which the submitter recommended. However, the committee prefers the format and content of the referenced proposal over that of the submitter.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #7)

101B- 53 - (3-4.1): Accept in Principle

**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office

**RECOMMENDATION**: Delete the existing 3-4.1.

Add a new 3-4.1 as follows:

**3-4.1** The minimum number of means of egress from any balcony, mezzanine, story or portion thereof shall be two unless otherwise specified by this section.

**3-4.1.1 Mezzanine or Balcony.**

**3-4.1.1.1** A mezzanine or balcony shall be permitted to have a single means of egress if the common path of travel limitations of 3-5.1.8 are met.

**3-4.1.2 Assembly Occupancies.**

**3-4.1.2.1** Balconies or mezzanines that have an occupant load of not greater than 50 shall be permitted to be served by a single means of egress and such means of egress shall be permitted to lead to the floor below.

**3-4.1.2.2** Balconies or mezzanines that have an occupant load greater than 50 but not greater than 100 shall have at least two remote means of egress, but both such means of egress shall be permitted to lead to the floor below.

**3-4.1.2.3** A second means of egress shall not be required from lighting and access catwalks, galleries, and gridirons if a means of escape to a floor or a roof is provided. Ladders, alternating tread devices, or spiral stairs shall be permitted in such means of escape.

**3-4.1.3 Residential Occupancies.**

**3-4.1.3.1** Hotels, dormitories, or apartment buildings that are protected by an approved, supervised automatic sprinkler system and have four stories or less with not more than four guest rooms or suites or apartments per floor shall be permitted to have a single exit under the following conditions:

(a) The stairway is completely enclosed or separated by barriers that have a fire resistance rating of at least 1 hour with self-closing 1-hour fire protection-rated doors protecting all openings between the stairway enclosure and the building.

(b) The stairway does not serve more than one-half story below the level of exit discharge.

(c) All corridors serving as access to exits have at least a 1-hour fire resistance rating.

(d) There is not more than 35 ft (10.7 m) of travel distance from the entrance door of any guest room or guest suite or apartment to an exit.

(e) One-half-hour fire rated horizontal and vertical separation between guest rooms or guest suites or apartments is provided.

**3-4.1.3.2** In apartment buildings, any dwelling unit shall be permitted to have a single exit provided that one of the following conditions is met:

(a) The dwelling unit has an exit door opening directly to the street or yard at ground level.

(b) The dwelling unit has direct access to an outside stair complying with 3-2.2 that serves a maximum of two units, both of which are located on the same floor.

(c) The dwelling unit has direct access to an interior stair serving only that unit and separated from all other portions of the building by fire barriers having a minimum 1-hour fire resistance rating with no openings therein.

**3-4.1.4 Mercantile Occupancies.**

**3-4.1.4.1** A single means of egress shall be permitted in a Class C mercantile occupancy provided that one of the following conditions is met:

(a) The travel distance does not exceed 75 ft (23 m) to the exit or to a covered mall (if it is considered a pedestrian way).

(b) The travel distance does not exceed 100 ft (30 m) to the exit or to a covered mall (if it is considered a pedestrian way), and the story on which the occupancy is located and all communicating levels that must be traversed to reach the exit or covered mall are protected throughout by an approved, supervised automatic sprinkler system.

**3-4.1.4.2** A single means of egress to an exit or to a covered mall (if it is considered a pedestrian way) shall be permitted from a mezzanine if the common path of travel does not exceed 75 ft (23 m) or 100 ft (30 m) if the building is protected throughout by an approved, supervised automatic sprinkler system.

**3-4.1.5 Business Occupancies.**

**3-4.1.5.1** For a room or area with a total occupant load of fewer than 100 persons having an exit that discharges directly to the outside at the level of exit discharge for the building, with a total distance of travel, including travel within the exit, from any point not over 100 ft (30 m), a single exit shall be permitted. Such travel shall be on the same floor level or, if traversing of stairs is required, such stairs shall be not more than 15 ft (4.5 m) in height, and the stairs shall be provided with complete enclosures to separate them from any other part of the building with no door openings therein. A single outside stair, in accordance with 3-2.2, shall be permitted to serve all floors allowed within the 15-ft (4.5-m) vertical travel limitation.

**3-4.1.5.2** Any business occupancy not over three stories and not exceeding an occupant load of 30 people per floor shall be permitted a single separate exit for each floor if the total travel distance to the outside of the building does not exceed 100 ft (30 m) and if such exit is enclosed in accordance with 3-1.1.2, serves no other levels, and discharges directly to the outside. A single outside stair in accordance with 3-2.2 shall be permitted to serve all floors.

**3-4.1.5.3** A single means of egress shall be permitted from a mezzanine if the common path of travel does not exceed 75 ft (23 m) or 100 ft (30 m) if the building is protected throughout by an approved, supervised automatic sprinkler system.

**3-4.1.5.4** A single exit shall be permitted for a maximum two-story tenant space/building protected throughout by an approved, supervised automatic sprinkler system if the total travel distance to the outside does not exceed 100 ft (30 m).

**3-4.1.6 Industrial Occupancies.**

**3-4.1.6.1** In low- and ordinary-hazard industrial occupancies, a single means of egress shall be permitted from any story or section if the exit can be reached within 50 ft (15 m) or 100 ft (30 m) in buildings protected throughout by an approved, supervised automatic sprinkler system.

**3-4.1.7 Storage Occupancies.**

**3-4.1.7.1** A single means of egress shall be permitted from any story or section if the exit can be reached within 50 ft (15 m) or 100 ft (30 m) in buildings protected throughout by an approved, supervised automatic sprinkler system.

**3-4.1.7.2** In low-hazard occupancies, a single means of egress shall be permitted from any story or section.

**3-4.1.7.3** In bulk storage elevators, there shall be at least two means of egress from all working levels of the head house. One of these means of egress shall be a stair to the level of exit discharge that is enclosed by a dust-resistant 1-hour fire resistance-rated enclosure in accordance with 3-1.1.2. The second means of egress shall be either (a) or (b):

(a) An exterior stair or basket ladder-type fire escape accessible from all working levels of the head house that provides a passage to ground level.

(b) An exterior stair or basket ladder-type fire escape accessible from all working levels of the head house that provides access to the top of adjoining structures and that provides a continuous path to the ground level.

**3-4.1.7.4** In underground spaces of bulk storage elevators, one means of egress and one means of escape shall be permitted in lieu of two means of egress.

**3-4.1.7.5 Parking Structures.**

**3-4.1.7.5.1** An opening for the passage of automobiles shall be permitted to serve as an exit from a street floor, provided no door or shutter is installed therein.

**3-4.1.7.5.2** In a ramp-type open-air parking structure with open vehicle ramps not subject to closure, the ramp shall be permitted to serve in lieu of the second means of egress from floors above the level of exit discharge, provided the ramp discharges directly outside at the street level.

**3-4.1.7.5.3** For parking structures extending only one floor below the level of exit discharge, a vehicle ramp leading directly to the outside shall be permitted to serve in lieu of the second means of egress, provided no door or shutter is installed therein.

**3-4.1.8 Group Day Care Homes.**

**3-4.1.8.1** Every story occupied by clients shall have not fewer than two remotely located means of escape.

**3-4.1.8.2** Every room used for sleeping, living, or dining purposes shall have at least two means of escape, at least one of which shall be a door or stairway that provides a means of unobstructed travel to the outside of the building at street or ground level. The second means of escape shall be permitted to be a window in accordance with 3-5.1.15. No room or space that is accessible only by a ladder or folding stairs or through a trap door shall be occupied for living or sleeping purposes.

**3-4.1.8.3** Where spaces on the story above the story of exit discharge are used by clients, at least one means of escape shall be an exit discharging directly to the outside. The second means of escape shall be permitted to be a window in accordance with 3-5.1.15.

**3-4.1.8.4** Where clients occupy a story below the level of exit discharge (basement), at least one means of escape shall be an exit discharging directly to the outside, and the vertical travel to ground level shall not exceed 8 ft (2.4 m). The second means of escape shall be permitted to be a window in accordance with 3-5.1.15. No facility shall be located more than one story below the ground. Any stairway to the story above shall be cut off by a fire barrier containing a door that has at least a 20-minute fire protection rating and is equipped with a self-closing device.

**3-4.1.9 Open Structures.**

**3-4.1.9.1** The grade level is exempt from the requirements for the number of means of egress.

**3-4.1.9.2** Open structures occupied by not more than three persons, with a travel distance of not more than 200 ft (60 m), shall be permitted to have a single exit.

**3-4.1.10 Towers.**

**3-4.1.10.1** Towers shall be permitted to have a single exit if the following conditions are met:

(a) The tower is subject to occupancy by fewer than 25 persons.

(b) The tower is not used for living or sleeping purposes.

(c) The tower is of noncombustible, limited-combustible, or heavy timber construction.

(d) The tower has no combustible materials in, under, or in the immediate vicinity, except necessary furniture.

(e) There are no high-hazard occupancies in the tower or in the immediate vicinity.

(f) Where the tower is located above a building, the single exit from the tower shall be provided by one of the following:

1. An exit enclosure separated from the building with no door openings to or from the building.

2. An exit enclosure leading directly to an exit enclosure serving the building with walls and doors separating these enclosures from each other, and another door allowing access to the top floor of the building, which provides access to a second exit serving that floor.

**3-4.1.10.2** Towers with 360 degree line-of-sight requirements shall be permitted to have a single means of egress for a distance of travel not exceeding 75 ft (23 m) or 100 ft (30 m) if the tower is sprinklered throughout by an approved, supervised automatic sprinkler system.

**3-4.1.11 Piers.**

**3-4.1.11.1** Piers used exclusively to moor cargo vessels and to store material shall be exempt from the requirements for the number of means of egress where provided with proper means of egress from structures thereon to the pier and a single means of access to the mainland, as appropriate with the pier's arrangement.

**SUBSTANTIATION:** The purpose of this proposal is to eliminate the lengthy list of exceptions to this paragraph by stating all of the current requirements, including exceptions, in paragraph form. There is no intent to delete, add, or modify any of the existing requirements of this existing section.

**COMMITTEE ACTION:** Accept in Principle.

Do as the submitter requested, but move the 3-4.1.8 Group Day-Care Home provisions to Chapter 4 to become Section 4-7.

**COMMITTEE STATEMENT:** The group day-care homes provisions utilize means of escape, rather than means of egress, and, thus, are are better suited to presentation in Chapter 4.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

(Log #8)

101B- 54 - (3-4.1 Exception No. 7 (b)): Accept
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Revise the wording of this exception as follows: ...protected throughout by an approved, supervised automatic sprinkler system.
**SUBSTANTIATION:** The proposed change to this exception reflects the change made to this requirement by the Technical Committee on Mercantile and Business Occupancies for the 2000 edition of NFPA 101. This change is submitted by the writer, a member of that Technical Committee, in order to maintain consistency between corresponding editions of NFPA 101 and NFPA 101B in the levels of automatic sprinkler protection required for this exception.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #9)

101B- 55 - (3-4.1 Exception No. 8): Accept
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Revise the wording of this exception as follows: ...protected throughout by an approved, supervised automatic sprinkler system.
**SUBSTANTIATION:** The proposed change to this exception reflects the change made to this requirement by the Technical Committee on Mercantile and Business Occupancies for the 2000 edition of NFPA 101. This change is submitted by the writer, a member of that Technical Committee, in order to maintain consistency between corresponding editions of NFPA 101 and NFPA 101B in the levels of automatic sprinkler protection required for this exception.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP30)

101B- 56 - (3-5.1.8 and 5-3-5.1.8 (New)): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-5.1.8 as follows:
3-5.1.8 † Common paths of travel and dead-end corridors shall be limited to the distances shown in Table 3-5.1.8 on the following page.

Add a 5-3-5.1.8 as follows:
5-3-5.1.8 Common Path of Travel in Detention and Correctional Occupancies. In existing nonsprinklered detention and correctional occupancies undergoing alterations or repairs, no common path of travel shall exceed 50 ft (15 m).
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP31)

101B- 57 - (3-5.1.9.3): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise as follows:
3-5.1.9.3 Underground Assembly ~~and Educational~~ Occupancies.
3-5.1.9.3.1 In assembly occupancies ~~and educational occupancies~~ , underground buildings or portions of buildings that have a floor level more than 30 ft (9.1 m) below the level of exit discharge shall comply with the requirements of 3-5.1.9.3.2 through 3-5.1.9.3.4.
Exception No. 1: Areas within buildings used only for service to the building, such as boiler/heater rooms, cable vaults, and dead storage.
Exception No. 2: Auditoriums without intervening occupiable levels that comply with the requirements of this chapter.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP65)

101B- 58 - (3-5.1.10.1): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-5.1.10.1 as follows:
3-5.1.10.1* ~~Means of egress from industrial occupancy ancillary facilities shall be arranged to permit travel in independent directions such that both means of egress paths are not compromised by the same fire or similar emergency.~~ Industrial occupancy ancillary facilities shall be arranged to allow travel in independent directions after leaving the ancillary facility so that both means of egress paths do not become compromised by the same fire or similar emergency.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #5)

101B- 59 - (3-5.1.14, 3-5.1.22): Accept in Principle in Part
**SUBMITTER:** Catherine L. Stashak, Des Plaines Fire Dept., IL
**RECOMMENDATION**: Revise text to read as follows:
a. Eliminate the 3-5.1.14 and 3-5.1.22 and create a new 3-5.1.14.
b. Relocate the Arena Floor Egress (old 3-5.1.18) into appropriate section in the 3-5's dealing with Assembly Occupancies.
c. Rearrange numbering so like paragraphs are together.
Retitle as necessary:
3-5.1.12 Educational and Day-Care Occupancies Windows for Rescue. (change in this text submitted under another proposal by different proponent).
3-5.1.13 Educational and Day-Care Occupancies Flexible Plan and Open Plan Buildings. (no change in text)
3-5.1.14 Educational and Day-Care Occupancy Exit Access. In day-care occupancies, every room or space with an occupant load of more than 50 persons or an area of more than 1000 ft$^2$ shall have at least two exit access doorways ~~as~~ remotely located from each other ~~as practicable~~ in accordance with 3-5.1.3. Such doorways shall provide access to separate exits, but where egress is through corridors, the doorways shall be permitted to open onto a common corridor leading to separate exits located in opposite directions.
3-5.1.15 Educational Occupancy Floor Location. (no change in text)
3-5.1.16 Educational Occupancy Corridor Obstructions. (no change in text)
3-5.1.17 Educational Occupancy Corridor Access. (no changes in text)
3-5.1.18 Day-Care Occupancies in Apartment Buildings. (no changes in text)
3-5.1.19 Day-Care Occupancies Closet Doors. (no change in text)
3-5.1.20 Day-Care Occupancies Bathroom Doors. (no change in text)
**SUBSTANTIATION:** I represent myself for this proposal. But as information only, I served on the TCC Task Group to prepare proposals for 101B. I also chair the Technical Committee on Educational and Day Care Occupancies. This Code deals with new construction only and it should be easy

**Table 3-5.1.8 Common Path and Dead-End Corridor Limits by Occupancy**

| | Common Path Limit | | Dead-End Corridor Limit | |
|---|---|---|---|---|
| **Type of Occupancy** | **Unsprinklered ft (m)** | **Sprinklered[j] ft (m)** | **Unsprinklered ft (m)** | **Sprinklered[k] ft (m)** |
| **ASSEMBLY** | 20/75[a,c] ~~[b]~~ (6.1/23) | 20/75[a,c] ~~[b]~~ (6.1/23) | 0 ~~20~~[b,c] (0) ~~(6.1)~~ | 0 ~~20~~[b,c] (0) ~~(6.1)~~ |
| **EDUCATIONAL** | 75 (23) | 100 ~~75~~ (30) ~~(23)~~ | 20 (6.1) | 50 ~~20~~ (15) ~~(6.1)~~ |
| **DAY CARE** | | | | |
| Day-care center | 75 (23) ~~N.R.~~[c,d] | 100 (30) ~~N.R.~~[c,d] | 20 (6.1) | 50 (15) ~~20 (6.1)~~ |
| **HEALTH CARE** | | | | |
| Hospital, nursing home, limited care | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ | 30 (9.1) | 30 (9.1) |
| **AMBULATORY HEALTH CARE** | 75[e] (23) ~~N.R.~~[e] | 100[e] (30) ~~N.R.~~[e] | 20[e] (6.1) ~~30 (9.1)~~ | 50[e] (15) ~~30 (9.1)~~ |
| **DETENTION AND CORRECTIONAL** | | | | |
| Use Conditions II, III, IV | 50 (15) | 100 (30) | 50 (15) | 50 (15) |
| Use Condition V | 50 (15) | 100 (30) | 20 (6.1) | 20 (6.1) |
| **RESIDENTIAL** | | | | |
| One- and two-family dwellings | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ |
| Lodging and rooming houses | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ |
| Hotels and dormitories | 35[f] ~~[e]~~ (10.7) | 50[f] ~~[e]~~ (15) | 35 (10.7) | 50 (15) |
| Apartments | 35[f] ~~[e]~~ (10.7) | 50[f] ~~[e]~~ (15) | 35 (10.7) | 50 (15) |
| Residential board and care | | | | |
| Small | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ | N.R.[d] ~~50 (15)~~ | N.R.[d] ~~50 (15)~~ |
| Large | N.A.[g] ~~35[f] (10)~~ | 125 (38) ~~35[f] (10)~~ | N.A.[g] ~~50 (15)~~ | 50 (15) |
| **MERCANTILE** | | | | |
| Stores | 75 (23) | 100 (30) | 20 (6.1) | 50 (15) |
| Open air | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ | 0 (0) | 0 (0) |
| Covered mall | 75 (23) | 100 (30) | 20 (6.1) | 50 (15) |
| **BUSINESS** | 75[h] ~~[g]~~ (23) | 100 ~~[g]~~ (30) | 20 (6.1) | 50 (15) |
| **INDUSTRIAL** | | | | |
| General | 50 (15) | 100 (30) | 50 (15) | 50 (15) |
| Special purpose | 50 (15) | 100 (30) | 50 (15) | 50 (15) |
| High hazard | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Aircraft servicing hangars, ground floor | 50[i] ~~[h]~~ (15) | 100 ~~50~~[i] ~~[h]~~ (30) ~~(15)~~ | 50[i] ~~[h]~~ (15) | 50[i] ~~[h]~~ (15) |
| Aircraft servicing hangars, mezzanine floor | 50[i] ~~[h]~~ (15) | 75 ~~50~~[i] ~~[h]~~ (23) ~~(15)~~ | 50[i] ~~[h]~~ (15) | 50[i] ~~[h]~~ (15) |
| **STORAGE** | | | | |
| Low hazard | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ | N.R.[d] ~~[c]~~ |
| Ordinary hazard | 50 (15) | 100 (30) | 50 (15) | 100 (30) |
| High hazard | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Parking garages, open | 50 (15) | 50 (15) | 50 (15) | 50 (15) |
| Parking garages, enclosed | 50 (15) | 50 (15) | 50 (15) | 50 (15) |

**Table 3-5.1.8 Common Path and Dead-End Corridor Limits by Occupancy (continued)**

| | Common Path Limit | | Dead-End Corridor Limit | |
|---|---|---|---|---|
| **Type of Occupancy** | **Unsprinklered ft (m)** | **Sprinklered[l] ft (m)** | **Unsprinklered ft (m)** | **Sprinklered[k] ft (m)** |
| Aircraft storage hangars, ground floor | 50[i] ~~[h]~~ (15) | 100[i] ~~[h]~~ (30) | 50[i] ~~[h]~~ (15) | 50[i] ~~[h]~~ (15) |
| Aircraft storage hangars, mezzanine floor | 50[i] ~~[h]~~ (15) | 75[i] ~~[h]~~ (23) | 50[i] ~~[h]~~ (15) | 50[i] ~~[h]~~ (15) |
| Underground spaces in grain elevators | 50[i] ~~[h]~~ (15) | 100[i] (30)<br>~~50[h] (15)~~ | 50[i] (15)<br>~~N.R.[c,h]~~ | 100[i] (30)<br>~~N.R.[c,h]~~ |

[a] 20 ft (6.1 m) for common path serving >50 persons; 75 ft (23 m) for common path serving ≤50 persons.

[b] Dead-end corridors not permitted; 20 ft (6.1 m) dead-end aisles permitted.

[c] ~~[b]~~ See Section 3-14 for special considerations for assembly seating ~~aisle accessways, aisles,~~ and mezzanines.

[d] ~~[c]~~ No requirement.

[e] Per business occupancy common path and dead-end corridor limits.

~~[d] See Section 3-5 for requirement for second exit access based on room capacity or area.~~

[f] ~~[e]~~ This dimension is from the room/corridor or suite/corridor exit access door to the exit; thus it applies to corridor common path.

[g] Not applicable because *Code* assumes sprinklers are required by the building code. *(See A-1-3 Application, second paragraph.)*

~~[f] See Section 3-5 for requirement for second exit access based on room area.~~

[h] ~~[g]~~ For single tenant spaces with an occupant load of not more than 30 persons, 100 ft (30 m) permitted if common path occurs wholly within the single tenant space.

[i] ~~[h]~~ 0 ft (0 m) if high hazard except as permitted by Exception to 3-11.3.

[j] Sprinkler system must be electrically supervised for educational, day care, health care, ambulatory health care, detention and correctional, hotels and dormitories, apartments, large residential board and care, mercantile, business, industrial, and storage occupancies.

[k] Sprinkler system must be electrically supervised for educational, day care, health care, ambulatory health care, detention and correctional, hotels and dormitories, apartments, large residential board and care, mercantile, business, and storage occupancies.

to be able to create exit access arrangements that meet the remoteness requirements of 3-5.1.3. The rearranging of paragraph numbering should make the section of the 3-5's dealing with Educational and Day-Care Occupancies consistent and more user friendly. The paragraph on Arena Floor Egress (old 3-5.1.18) should be relocated into the 3-5 paragraphs dealing with Assembly Occupancies.

**COMMITTEE ACTION:** Accept in Principle in Part.

See Proposal 101B-60 (Log #CP32) which deleted 3-5.1.14 and 3-5.1.22.

Do not create a new 3-5.1.14. Do not move items.

Add boldface titles to current 3-5.1.12 and 3-5.1.13 (i.e., the submitter's 3-5.1.19 and 3-5.1.20).

**COMMITTEE STATEMENT:** The referenced proposal deletes the material that the submitter asked be deleted.

The current NFPA101-2000 does not require for either day-care or educational occupancies the material that the submitter recommended as a new 3-5.1.14.

Items don't need to be moved because there is no aggregation of assembly occupancy requirements in the 3-5's.

The boldface headings do improve readability.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP32)

101B- 60 - (3-5.1.14 and 3-5.1.22): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Delete 3-5.1.14 and 3-5.1.22 as follows:

~~3-5.1.14 In day-care occupancies, every room or space with an occupant load of more than 50 persons or an area of more than 1000 ft2 (93 m2) shall have at least two exit access doorways as remotely located from each other as practicable. Such doorways shall provide access to separate exits, but where egress is through corridors, the doorways shall be permitted to open onto a common corridor leading to separate exits located in opposite directions.~~

~~3-5.1.22 Educational Occupancy Exit Accesses. In educational occupancies, every room or space with a capacity of more than 50 persons or an area of more than 1000 ft2 (93 m2) shall have at least two exit access doorways as remotely located from each other as practicable. Such doorways shall provide access to separate exits but, where egress is through corridors, they shall be permitted to open onto a common corridor leading to separate exits located in opposite directions.~~

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP33)

101B- 61 - (3-5.1.15): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Replace 3-5.1.15 as follows:

3-5.1.15 Educational and Day-Care Occupancies Windows for Rescue ~~and Ventilation. In day-care occupancies, every room or space normally subject to client occupancy, other than bathrooms, shall have at least one outside window for emergency rescue and ventilation. Such window shall be openable from the inside without the use of tools and shall provide a clear opening of not less than 20 in. (51 cm) in width, 24 in. (61 cm) in height, and 5.7 ft2 (0.53 m2) in area. The bottom of the opening shall be not more than 44 in. (112 cm) above the floor. The clear opening shall permit a rectangular solid, with a minimum width and height that provides the required 5.7 ft2 (0.53 m2) opening and a minimum depth of 20 in. (51 cm), to pass fully through the opening.~~

~~Exception No. 1: In buildings protected throughout by an approved, automatic sprinkler system.~~

~~Exception No. 2: Where the room or space has a door leading directly to the outside of the building.~~

~~Exception No. 3: In educational occupancies, in rooms located higher than three stories above grade, the openable clear height,~~

~~width, and area of the window shall be permitted to be modified to the dimensions necessary for ventilation~~ .

3-5.1.15.1 In educational occupancies, every room or space greater than 250 ft2 (23.2 m2) used for classroom or other educational purposes or normally subject to student occupancy shall have not less than one outside window for emergency rescue that complies with the following:

(1) Such windows shall be openable from the inside without the use of tools and shall provide a clear opening of not less than 20 in. (51 cm) in width, 24 in. (61 cm) in height, and 5.7 ft2 (0.53 m2) in area.

(2) The bottom of the opening shall be not more than 44 in. (112 cm) above the floor, and any latching device shall be capable of being operated from not more than 54 in. (137 cm) above the finished floor.

(3) The clear opening shall allow a rectangular solid, with a width and height that provides not less than the required 5.7-ft2 (0.53-m2) opening and a depth of not less than 20 in. (51 cm), to pass fully through the opening.

(4) Such windows shall be accessible by the fire department and shall open into an area having access to a public way.

Exception No. 1: This requirement shall not apply to buildings protected throughout by an approved, supervised automatic sprinkler system.

Exception No. 2: This requirement shall not apply where the room or space has a door leading directly to the outside of the building.

Exception No. 3: This requirement shall not apply to rooms located higher than three stories above grade.

3-5.1.15.2 In day-care occupancies, every room or space normally subject to client occupancy, other than bathrooms, shall have not less than one outside window for emergency rescue that complies with the following:

(1) Such windows shall be openable from the inside without the use of tools and shall provide a clear opening of not less than 20 in. (51 cm) in width, 24 in. (61 cm) in height, and 5.7 ft2 (0.53 m2) in area.

(2) The bottom of the opening shall be not more than 44 in. (112 cm) above the floor.

(3) The clear opening shall allow a rectangular solid, with a width and height that provides not less than the required 5.7-ft2 (0.53-m2) opening and a depth of not less than 20 in. (51 cm), to pass fully through the opening.

Exception No. 1: This requirement shall not apply to buildings protected throughout by an approved, supervised automatic sprinkler system.

Exception No. 2: This requirement shall not apply where the room or space has a door leading directly to the outside of the building.

**SUBSTANTIATION:** Correlation with NFPA 101-2000. The rescue window requirements for educational occupancies differ from those for day-care occupancies. The differences justify placing the requirements in separate paragraphs.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP61)

101B- 62 - (3-5.1.19 Exception (New) ): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Add an exception to 3-5.1.19 as follows:

3-5.1.19 Educational Occupancy Floor Location. In educational occupancies, rooms normally occupied by preschool, kindergarten, or first-grade pupils shall not be located above or below the level of exit discharge. Rooms normally occupied by second-grade pupils shall not be located more than one story above the level of exit discharge.

Exception: Rooms or areas located on floor levels other than as specified in 3-5.1.19 shall be permitted to be used where provided with independent means of egress dedicated for use by the preschool, kindergarten, first-grade, or second-grade students.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP34)

101B- 63 - (3-5.1.28 and 5-3-5.1.28 (New)): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise 3-5.1.28 as follows; replace Table 3-5.1.28 with the following table so as to delete any option for a nonsprinklered new detention and correctional occupancy.

3-5.1.28 † Subdivision of Detention and Correctional Occupancy Resident Housing Spaces. Subdivision of facility spaces shall comply with Table 3-5.1.28.

**Table 5-3-5.1.28 Subdivision of Resident Table 3-5.1.28 Subdivision of Resident Housing Spaces**

| | Use Condition | | | | | |
|---|---|---|---|---|---|---|
| **Feature** | **II** | **III** | | **IV** | | **V** |
| Room to room separation | NR | NR | | NR | | SR |
| Room face to corridor separation | NR | NR | | NR | | SR |
| Room face to common space separation | NR | NR ≤50 ft (≤15 m)† | SR >50 ft (>15 m)† | NR ≤50 ft (≤15 m)† | SR >50 ft (>15 m)† | SR |
| Common space to corridor separation | NR | NR | | NR | | SR |
| Total openings in solid room face where room face is required to be smoke resistant or fire rated‡ | 120 in.$^2$ (0.08 m$^2$) | 120 in.$^2$ (0.08 m$^2$) | | 120 in.$^2$ (0.08 m$^2$) | | 120 in.$^2$ (0.08 m$^2$), closable from inside, or 120 in.$^2$ (0.08 m$^2$) with smoke control |

NR: No requirement.

SR: Smoke resistant.

Notes:

. Doors in openings in partitions required to be smoke resistant (SR) in accordance with Table 3-5.1.28 shall be substantial doors of construction hat resists the passage of smoke. Latches and door closers shall not be required on cell doors.

. Under Use Condition II, Use Condition III, or Use Condition IV, a space subdivided by open construction (any combination of grating doors and grating walls or solid walls) shall be permitted to be considered one room if housing not more than 16 persons. The perimeter walls of such space shall be of smoke-resistant construction. Smoke detection shall be provided in such space. Under Use Condition IV, common walls between sleeping areas within the space shall be smoke resistant, and grating doors and fronts shall be permitted to be used. Under Use Condition II and Use Condition III, open dormitories shall be permitted to house more than 16 persons as permitted by other sections of this hapter.. Where barriers are required to be smoke resistant (SR), the provisions of 3-13 applicable to smoke partitions shall not apply.

Travel distance through the common space to the exit access corridor.

"Total openings in solid room face" includes all openings (for example, undercuts, food passes, grilles), the total of which shall not

Add a new 5-3-1.28 as follows:
5-3-5.1.28* Subdivision of Detention and Correctional Occupancy Resident Housing Spaces. In nonsprinklered detention and correctional occupancies undergoing alterations or repairs, subdivision of facility spaces shall comply with Table 5-3-5.1.28.
A-5-3-5.1.28 The requirements in Table 5-3-5.1.28 for smoke-resistant and fire-rated separations include taking the necessary precautions to restrict the spread of smoke through the air-handling system. However, the intent is that smoke dampers are required to be provided for each opening. Smoke dampers would be one acceptable method; however, other techniques, such as allowing the fans to continue to run with 100 percent supply and 100 percent exhaust, would be acceptable.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #10)

101B- 64 - (3-5.1.31.9): Accept
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Revise the wording of the first sentence of this paragraph as follows:
...protected throughout by an approved, supervised automatic sprinkler system...
**SUBSTANTIATION:** The proposed change to this exception reflects the change made to this requirement by the Technical Committee on Mercantile and Business Occupancies for the 2000 edition of NFPA 101. This change is submitted by the writer, a member of that Technical Committee, in order to maintain consistency between corresponding editions of NFPA 101 and NFPA 101B in the levels of automatic sprinkler protection required for this egress arrangement.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP35)

101B- 65 - (3-5.3.4): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-5.3.4 as follows:
3-5.3.4 ~~Exit access balconies shall not have~~ Exterior exit access shall be arranged so that there are no dead ends in excess of those permitted for dead-end corridors by 3-5.1.8.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP36)

101B- 66 - (3-5.3.5): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Delete 3-5.3.5 as follows:
~~3-5.3.5 Educational Occupancy Exterior Exit Access.~~
~~3-5.3.5.1* In educational occupancies where exterior corridors or balconies are provided as means of egress, they shall open to the outside air except for railings or balustrades, with stairs or exits level to grade not over the allowable travel distance apart and located so that an exit will be available in either direction from the door to any individual room or space, with dead ends not to exceed 20 ft (6.1 m). If balconies are enclosed by glass or in any other manner, they shall be treated as interior corridors.~~
~~3-5.3.5.2 In educational occupancies, the floors of balconies (exterior corridors) and stairs shall be solid, without openings, and shall comply with requirements for outside stairs with respect to balustrades or railings, width and pitch of stairs, and other details. However, they shall not be required to be shielded from fire within the building by blank walls, wired glass windows, or the like where the stairs are located on the side of the balcony or corridor away from the building and are separated from the building by the full required width of the balcony or corridor.~~
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #23)

101B- 67 - (3-5.4): Reject
**SUBMITTER:** John Ng, Escape Consult Mobiltex Ptd Ltd
**RECOMMENDATION**: Add new text as follows:
To protect the mobility-impaired people during vertical evacuation by providing alternative - and equally safe - methods of egress in the built environment for achieving and acceptable level of life protection to give mobility-impaired individuals the same opportunity that able-bodied people have during and emergency evacuation.
**SUBSTANTIATION:** Designing egress elements into the built environment will become even more challenging in the coming years. The perennial problems of land scarcity in many nations around the world will see more larger scale high-rise and high-density developments emerging in future building designs. In addition, the world working population will continue to grow older, and that a majority will still be actively working and living a better life. Given the reality that their life will be centered wound high-rise environments, for many individuals “escape” down fire stairs is more “wish” that reality. Staircases, while serving as emergency exits, are not exactly friendly to the elderly, or the disabled for that matter. In a fire or other emergency situations, tragedy might befall those who cannot use staircase for escape.
To address this issue of vertical escape is to look beyond the normal means of egress and to explore alternative - and equally safe - methods of egress elements in the built environment for achieving an acceptable level of life protection to mobility-impaired individuals during vertical evacuation. By making provision of this special egress feature in the built environment, it would give this special group of people the same opportunity that able-bodied people have in attempting vertical escape during an evacuation. Furthermore, this would also serve as a better alternative for fire rescue service to climb to the rescue in an emergency.
Finally, when the Code requires designer to examine all these elements at the building design stage it would avoid having to correct the egress deficiencies when the building is constructed.
Note: Supporting material is available for review at NFPA headquarters.
**COMMITTEE ACTION:** Reject.
**COMMITTEE STATEMENT:** The submitter has not proposed text that is appropriate for placement within the body of the Code. The committee is not clear on what the submitter is trying to require.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #11)

101B- 68 - (Table 3-6.1): Accept in Principle
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Add a note f to the entry of this table for Sprinklered Stores to state as follows:
f Permitted when the automatic sprinkler system is supervised.
**SUBSTANTIATION:** The proposed change to this exception reflects the change made to this requirement by the Technical Committee on Mercantile and Business Occupancies for the 2000 edition of NFPA 101. This change is submitted by the writer, a member of that Technical Committee, in order to maintain consistency between corresponding editions of NFPA 101 and NFPA 101B in the levels of automatic sprinkler protection required for this egress arrangement.
**COMMITTEE ACTION:** Accept in Principle.
See Committee Proposal 101B-69 (Log #CP37).
**COMMITTEE STATEMENT:** The action taken on the referenced proposal accomplishes that which the submitter requested.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP37)

101B- 69 - (3-6.1 and 5-3.6.1 (New)): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise 3-6.1 as follows:

3-6.1* ‡ The travel distance in any occupied space to at least one exit, measured in accordance with the following requirements, shall not be more than the limits specified in Table 3-6.1.

Exception No. 1: Open structures shall be exempt from travel distance limitations.

Exception No. 2: Towers occupied by not more than three persons shall be exempt from travel distance limitations.

**Table 3-6.1 Travel Distance Limits by Occupancy**

| | Travel Distance Limit | |
|---|---|---|
| **Type of Occupancy** | **Unsprinklered ft (m)** | **Sprinklered [h] ft (m)** |
| ASSEMBLY | 150[a] (45) | 200[a] (60) |
| Within the exhibit booth or exhibit enclosure to an exit access aisle | 50 (15) | 50 (15) |
| EDUCATIONAL | 150 (45) | 200 (60) |
| DAY CARE | | |
| Day care center | | |
| From room door to exit | 100 (30) | 150 (45) |
| Total travel distance | 150 (45) | 200 (60) |
| Within sleeping room to exit access door | 50 (15) | 50 (15) |
| HEALTH CARE | | |
| Hospital, nursing home, and limited care | | |
| Within room to exit access door | N.A.[b] ~~50 (15)~~ | 50 (15) |
| From room door to exit | N.A.[b] ~~100 (30)~~ | 150 (45) |
| Total travel distance | N.A.[b] ~~150 (45)~~ | 200 (60) |
| AMBULATORY HEALTH CARE | | |
| From room door to exit | 100 (30) | 150 (45) |
| Total travel distance | 150 (45) | 200 (60) |
| DETENTION AND CORRECTIONAL | | |
| Within sleeping room to exit access door | N.A.[b] ~~50 (15)~~ | 100 (30) |
| Within open dormitory, with smoketight construction and minimum two exit access doors, to exit access door | N.A.[b] ~~100 (30)~~ | 100 (30) |
| From room door to exit | N.A.[b] ~~100 (30~~) | 150 (45) |
| Total travel distance | N.A.[b] ~~150 (45)~~ | 200 (60) |
| RESIDENTIAL | | |
| One- and two-family dwellings | N.R.[c] ~~b~~ | N.R.[c] ~~b~~ |
| Lodging and rooming houses | N.R.[c] ~~b~~ | N.R.[c] ~~b~~ |
| Hotels and dormitories | | |
| Within guest room or guest suite to corridor door | 75 (23) | 125 (38) |
| From corridor door to exit | 100 (30) | 200 (60) |
| From corridor door to exit via exterior exit access | 200 (60) | 200 (60) |
| Total travel distance if exterior exit access (addressed in above line) is used | 275 (84) | 325 (99) |
| Total travel distance without exterior exit access | 175 (53) | 325 (99) |
| Apartments | | |
| Within living unit to corridor door | 75 (23) | 125 (38) |
| From corridor door to exit | 100 (30) | 200 (60) |
| From corridor door to exit via exterior exit access | 200 (60) | 200 (60) |
| From areas other than living units to exit | 200 (60) | 250 (76) |
| Total travel distance if exterior exit access (addressed in above line) is used | 275 (84) | 325 (99) |
| Total travel distance without exterior exit access | 175 (53) | 325 (99) |
| Board and care | | |
| Small | N.R.[c] ~~b~~ | N.R.[c] ~~b~~ |
| Large | | |
| Within room, suite, or living unit to corridor door | 75 (23) | 125 (38) |
| From corridor door to exit | 100 (30) | 200 (60) |
| From corridor door to exit via exterior exit access | 200 (60) | 200 (60) |
| Total travel distance if exterior exit access (addressed in above line) is used | 275 (84) | 325 (99) |
| Total travel distance without exterior exit access | 175 (53) | 325 (99) |
| MERCANTILE | | |
| Stores | 100 (30) | 200 (60) |
| Open air | N.R.[c] ~~b~~ | N.R.[c] ~~b~~ |
| Covered mall | 100 (30) | 400[d] ~~c~~ (120) |
| BUSINESS | 200 (60) | 300 (91) |
| INDUSTRIAL | | |
| General | 200 (60) | 250[e] ~~d~~ (75) |
| Special purpose, not high hazard | 300 (91) | 400 (122) |
| High hazard | 75 (23) | 75 (23) |
| Aircraft servicing hangars, ground floor | Note [f] ~~e~~ | Note [f] ~~e~~ |
| Aircraft servicing hangars, mezzanine floor | 75 (23) | 75 (23) |

**Table 3-6.1 Travel Distance Limits by Occupancy (continued)**

| | | |
|---|---|---|
| STORAGE | | |
| Low hazard | N.R.~~c b~~ | N.R.~~c b~~ |
| Ordinary hazard | 200 (60) | 400 (122) |
| High hazard | 75 (23) | 100~~g~~ (30) |
| Parking garages, open | 200 (60) | 300 (91) |
| Parking garages, enclosed | 150 (45) | 200 (60) |
| Aircraft storage hangars, ground floor | Note f ~~e~~ | Note f ~~e~~ |
| Aircraft servicing hangars, mezzanine floor | 75 (23) | 75 (23) |
| Underground spaces in grain elevators | 200 (60) | 400 (122) |

[a] See 3-14.10 for special considerations for smoke-protected assembly seating ~~in arenas and stadia~~.

b Not applicable because Code assumes sprinklers are required by the building code. *(See A-1-3 Application, second paragraph.)*

c ~~b~~ No requirement.

d ~~c~~ See 3-5.1.32 for special travel distance considerations in covered malls that are considered pedestrian ways.

e ~~d~~ 400 ft (122 m) if single-story low or ordinary hazard with smoke and heat venting.

f ~~e~~ Provide exits along exterior wall at ≤150-ft (45-m) intervals and in horizontal exits at ≤100-ft (30-m) intervals.

g ~~—~~ 150 ft (45 m) where flammable and combustible liquid products are stored and protected in accordance with NFPA 30, *Flammable and Combustible Liquids Code*.

h Sprinkler system must be electrically supervised

Add a 5-3-6.1 as follows:

5-3-6.1 Travel Distance in Detention and Correctional Occupancies. In existing nonsprinklered detention and correctional occupancies undergoing alterations or repairs, travel distance shall not be more than the limits specified in Table 5-3-6.1.

**Table 5-3-6.1 Nonsprinklered Detention and Correctional Occupancy Travel Distance Limits**

| Type of Occupancy | Travel Distance Limit Unsprinklered ft (m) |
|---|---|
| DETENTION AND CORRECTIONAL | |
| Within sleeping room to exit access door | 50 (15) |
| Within open dormitory, with smoketight construction and minimum two exit access doors, to exit access door | 100 (30) |
| From room door to exit | 100 (30) |
| Total travel distance | 150 (45) |

**SUBSTANTIATION:** Correlation with NFPA 101-2000. Note h to Table 3-6.1 explains that for all occupancies the sprinkler system must be supervised in order to qualify for the travel distance increase. This is a change from NFPA 101-2000 where all occupancies other than business require the supervision. For new construction, the supervison requirement tied to the increased travel distance allowance is a reasonable requirement for business occupancies. It helps create consistency within NFPA 101B.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #12)

101B- 70 - (3-7.10): Accept
**SUBMITTER:** Kenneth E. Bush, MD State Fire Marshal's Office
**RECOMMENDATION**: Revise the wording of this paragraph as follows:

...protected throughout by an approved, supervised automatic sprinkler system...

**SUBSTANTIATION:** The proposed change to this exception reflects the change made to this requirement by the Technical Committee on Mercantile and Business Occupancies for the 2000 edition of NFPA 101. This change is submitted by the writer, a member of that Technical Committee, in order to maintain consistency between corresponding editions of NFPA 101 and NFPA 101B in the levels of automatic sprinkler protection required for this egress arrangement.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP38)

101B- 71 - (3-8.1.3 Exception No. 2 (New) ): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Add an exception to 3-8.1.3 as follows:

3-8.1.3* The floors and other walking surfaces within an exit and within the portions of the exit access and exit discharge designated in 3-8.1.1 shall be illuminated to values of at least 1 ft-candle (10 lux) measured at the floor.

Exception No. 1: In assembly occupancies, the illumination of the floors of exit access shall be at least 0.2 ft-candle (2 lux) during periods of performances or projections involving directed light.

Exception No. 2:* This requirement shall not apply where operations or processes require low lighting levels.

A-3-8.1.3 Exception No. 2 Some processes, such as manufacturing or handling of photosensitive materials, cannot be performed in areas provided with the minimum specified lighting levels. The use of spaces with lighting levels below 1 ft-candle (10 lux) might necessitate additional safety measures, such as written emergency plans, training of new employees in emergency evacuation procedures, and periodic fire drills.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP39)

101B- 72 - (Table 3-9.1.1): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise Table 3-9.1.1 as follows:

**Table 3-9.1.1 Emergency Lighting Requirements**

| Occupancy | Conditions | Exceptions |
|---|---|---|
| ASSEMBLY | — | Private party tents <1200 ft$^2$ (111.5 m |
| EDUCATIONAL | For interior stairs and corridors, assembly use ~~normally occupied~~ spaces, flexible and open-plan area, interior or windowless portions, shops and labs | ~~Exempted from administrative area general classroom mechanical rooms and storage rooms~~ |

**Table 3-9.1.1 Emergency Lighting Requirements (continued)**

| | | |
|---|---|---|
| DAY CARE | | |
| Day-care centers | For interior stairs and corridors, normally occupied spaces, flexible, and open-plan area, interior or windowless portions, shops and labs | Exempted from administrative areas, general classrooms, mechanical rooms, and storage rooms |
| HEALTH CARE | | |
| Hospital, nursing home, limited care | And supply the required power from life safety branch of electricals *(see NFPA 99)* if using life-support systems | |
| AMBULATORY HEALTH CARE ~~centers~~ | And supply from the required power essential electrical system *(see NFPA 99)* if using life-support systems for other than emergency purposes only | — |
| DETENTION AND CORRECTIONAL | — | — |
| RESIDENTIAL | | |
| Hotels and dormitories | >25 rooms | All rooms direct to grade |
| Apartment buildings | >12 units or >3 stories | All apartments direct to grade |
| Board and care, large | >25 rooms | All rooms direct to grade |
| MERCANTILE | >1 story or >3000 ft$^2$ (280 m$^2$) gross sales area, and malls | — |
| BUSINESS | ≥2 stories above LED, or ≥50 people above or below LED, or ≥300 people total | — |
| INDUSTRIAL | — | Special purpose without routine occupancy, or daylight operations with windows |
| STORAGE | — | Not normally occupied, or daylight operations with windows |
| ~~Day-care centers~~ | ~~For interior stairs and corridors, normally occupied spaces, flexible, and open-plan area, interior or windowless portions, shops and labs~~ | ~~Exempted from administrative areas, general classrooms, mechanical rooms, and storage rooms~~ |

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #25)

101B- 73 - (3-10): Accept in Principle
**SUBMITTER:** Manny Muniz, Manny Muniz Assoc.
**RECOMMENDATION**: Revise section 3-10 with Section 7-10 of NFPA 101, 2000 edition.

The 2000 Edition of NFPA 101 has completely revised Section 7.10 Marking of Means of Egress.

The intent of this code change is to bring those revisions of NFPA 101 to NFPA 101B, Section 3-10 Marking of Means of Egress.

The rationale for this change is to make NFPA 101 and 101B consistent and compatible as to Marking of Means of Egress.

Amend Section 3-10.1.4 as follows:

3-10.1.4* Access to exits shall be marked by approved, readily visible signs in all cases where the exit or path to reach it is not readily apparent to the occupants. Sign placement shall be such that no point in the exit access corridor is more than 100 ft. (30 M) from the nearest externally illuminated sign and not in excess of the marked rating for internally illuminated signs.

Exception: Signs in exit access corridors in existing buildings shall not be required to meet the placement distance requirements.

Amend Section 3-10.1.6 as follows:

3-10.1.6* Where floor proximity exit signs are required elsewhere in this Code, exit signs shall be placed near the floor level in addition to those signs required for doors or corridors. These signs shall be sized and illuminated in accordance with 3-10.2 and 3-10.3. The bottom of the sign shall be at least 6 in. (15.2 cm) but not more than 8 in. (20.3 cm) above the floor. For exit doors, the sign shall be mounted on the door, or adjacent to the door, with the nearest edge of the sign within 4 in. (10.2 cm) of the door frame.

Amend Section 3-10.4 as follows:

3-10.4 Specific Requirements.

3-10.4.11.9* Directional Signs. 3-10.4.1.1* A sign that complies with 3-10.21.10 reading "EXIT", or similar designation with a directional indicator showing the direction of travel shall be placed in every location where the direction of travel to reach the nearest exit is not apparent. Directional signs shall be listed.

Renumber Appendix Section A-3-10.4.1.1 to A-3-10.1.9.

Add a new section 3-10.1.10 as follows and renumber the remainder.

3-10.1.10* Sign Legend.

Signs required by 3-10.1 and 3-10.1.2 shall have the word "EXIT" or other appropriate wording in plainly legible letters.

Renumber Appendix Section A-3-10.2 to A-3-10.1.10.

Renumber and amend Section 3-10.3.5 as follows:

3-10.3.51.11 Power Source. Where emergency lighting facilities are required by 3-9.1.1, the exit signs shall be illuminated by the emergency lighting facilities. The level of illumination of the exit sign shall be a the levels provided in accordance with 3-10.3.2 or 3-10.3.3 for the required emergency lighting time duration as specified in 3-9.2.1, but shall be permitted to decline to 60 percent of the illumination level at the end of the emergency lighting time duration.

Exception: Approved self-luminous signs.

Renumber Sections 3-10.1.9 through 3-10.1.9.5 to 3-10.1.12 through 3-10.1.12.5.

Renumber Appendix Sections A-3-10.1.9 and A-3-10.1.9.5 to A-3-10.1.12 and A-3-10.1.12.5 respectively.

Renumber and amend Section 3-10.3 as follows:

3-10.32* Illumination of Signs.

Delete Appendix Section A-3-10.3.

Amend Section 3-10.3.1 as follows:

3.10.2.1* General. 3-10.3.1* Every sign required by 3-10.1.2 or 3-10.1.4, other than where operations or processes require low lighting levels, shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be legible in both the normal and emergency lighting mode.

Renumber appendix Section A-3-10.3.1 to A-3-10.2.1.

Renumber and amend Section 3-10.3.4 as follows:

3-10.3.42.2* Continuous Illumination. Every sign required to be illuminated by 3-10.3.4 and 3-10.4 shall be continuously illuminated as required under the provisions of Section 3-8.

Exception: *Illumination for signs shall be permitted to flash on and off upon activation of the fire alarm system.

Renumber Appendix Section A-3-10.3.4 to A-3-109.2.2.

Amend Section 3-10.2 as follows:

3-10.2* Size of Signs.

3-10.3 Externally Illuminated Signs.

3-10.2.13.2† Size of Signs. Externally illuminated signs required by 3-10.1. and 3-10.4.1.11.9 shall have the word "EXIT" or other appropriate wording in plainly legible letters not less than 6 in. (15.2 cm) high with the principal strokes of letters not less than

3/4 in. (1.9 cm) wide. The word "EXIT" shall have letters of a width not less than 2 in. (5 cm), except the letter "l", and the minimum spacing between letters shall be not less than 3/8 in. (1 cm). Signs larger than the minimum established in this paragraph shall have letter widths, strokes, and spacing in proportion to their height.

Exception No 1: Approved This requirement shall not apply to existing signs having the required wording in plainly legible letters not less than 4 in. (102 cm) high.

Exception No. 2: This requirement shall not apply to Mmarking required by 3-10.1.3 and 3-10.1.8.

Amend Section 3-10.4.1.2 as follows:

3-10.4.1.23.3*† Size and Location of Directional Indicator. The directional indicator shall be located outside of the EXIT legend, not less than 3/8 in. (1 cm) from any letter, and shall be permitted to be integral to or separate from the sign body. The directional indicator shall be of a chevron type as shown in Figure 3-10.4.1.23.3 and shall be identifiable as a directional indicator at a minimum distance of 40 ft (12.2 m) at 30 ft-candle (300 lux) and 1 ft-candle (10 lux) average illumination on the floor representing normal and emergency lighting levels, respectively. Directional indicators larger than the minimum established in this paragraph shall be proportionately increased in height, width and stroke. The directional indicators shall be located at the end of the sign for the direction indicated.

Exception: This requirement shall not apply to approved existing signs.

Renumber Figure 3-10.4.1.2 as follows:

Figure 3-10.4.1.23.3 Chevron-type indicator.

Amend Appendix Section 3-10.4.1.2 as follows:

A-3-10.4.1.23.3 Figure A-3-10.4.1.23.3 shows examples of acceptable locations of directional indicators with regard to left and right orientation. Directional indicators are permitted to be placed under the horizontal stroke or the letter "T" provided, provided that the spacing of not less than 3/8 in. (1 cm) is maintained from the horizontal and vertical strokes of the letter T.

Renumber Appendix Figure A-3-10.4.1.2 as follows:

Figure A-3-10.4.1.23.3 Directional indicators.

Amend Section 3-10.3.2 as follows:

5-10.3.23.4* Level of Illumination. Externally illuminated signs shall be illuminated by not less that 5 ft-candles (54 lux) on the face of the sign at the illuminated surface and shall have a contrast ratio of not less than 0.5.

Renumber Appendix Section A-3-10.3.2 to A-3-10.3.4.

Delete Section 3-10.3.3.

Delete Section 3-10.2.2 and add a new section as follows:

3-10.4 Internally Illuminated Signs.

3-10.4.1 Internally illuminated signs, other than approved existing signs, or existing signs having the required wording in legible letters not less than 4 in. (10.2 cm) high, shall be listed in accordance with UL 924, *Standard for Safety Emergency Lighting and* Power Equipment.

Exception: This requirement shall not apply to signs that are in accordance with 3-10.1.3 and 5-10.1.6.

Renumber Section 3-10.4.2 and Appendix Section 3-10.4.2 to 3-10.4.3 and A-3-10.4.3 respectively.

Renumber Section 3-10.4.3 to 3-10.4.4.

Add a new Section 3-10.4.2 as follows:

3-10.4.2* Photo luminescent Signs. The face of a photo luminescent sign shall be continually illuminated while the building is occupied. The illumination levels on the face of photo luminescent signs shall be in accordance with its listing. The charging illumination shall be a reliable light source as determined by the authority having jurisdiction. The charging light source shall be a a type specified in the product markings.

Add a new Appendix Section A-3-10.4.2 as follows:

A-3-10.4.2 Photo luminescent signs need a specific minimum level of light on the face of the sign to ensure that the sign is charged for emergency operation and legibility in both the normal and emergency modes. Additionally, the type of light source (for example, UV) that might affect the ability of some photo luminescent signs to charge and might also affect the amount of light output available during emergency mode. This type of sign would not be suitable where the illumination levels are permitted to decline. The charging light source should not be connected to automatic timers, because the continuous illumination of the sign is needed; otherwise, the sign illumination would not be available because it would be discharged.

**SUBSTANTIATION:** NFPA 101, 2000 Edition has completely revised Section 3-10 and added requirements for photo luminescent exit signs. This change is needed for consistency and to avoid conflicts.

**COMMITTEE ACTION:** Accept in Principle.

See Proposal 101B-74 (Log #CP40).

**COMMITTEE STATEMENT:** The action taken on the referenced proposal accomplishes that which the submitter requested.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP40)

101B- 74 - (3-10): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Replace Section 3-10 with the following:

**3-10 MARKING OF MEANS OF EGRESS**

**3-10.1 General.**

**3-10.1.1 Where Required.** Means of egress shall be marked in accordance with this section for every building and structure except as exempted by Table 3-10.1.1.

**Table 3-10.1.1 Exit Marking Exceptions**

| Occupancy | Exceptions |
|---|---|
| ASSEMBLY | On seating side of vomitories from seating areas where exit marking is provided in the concourse, and such marking is readily apparent from the vomitories |
| EDUCATIONAL | Where locations of exits are otherwise obvious and familiar to occupants |
| DETENTION AND CORRECTIONAL | In residential housing areas |
| RESIDENTIAL | |
| 1- and 2-Family Dwellings | All 1- and 2-family dwellings |
| Lodging or Rooming houses | All lodging or rooming houses |
| Apartment buildings | Apartment buildings that require only one exit |
| Board and care, small | All small board and care facilities |
| MERCANTILE | Where an exit is immediately apparent from all portions of the sales area |
| UNUSUAL STRUCTURES | |
| Towers | Where occupied by not more than three persons, or not routinely inhabited by humans |
| Open Structures | All open structures |
| Water-Surrounded Structures | Not routinely inhabited by humans |

**3-10.1.2* Exits.** Exits, other than main exterior exit doors that obviously and clearly are identifiable as exits, shall be marked by an approved sign readily visible from any direction of exit access.

**3-10.1.3 Exit Stair Door Tactile Signage.** Tactile signage shall be located at each door into an exit stair enclosure, and such signage shall read as follows:

EXIT

Signage shall comply with CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, and shall be installed adjacent to the latch side of the door 60 in. (152 cm) above the finished floor to the centerline of the sign.

**3-10.1.4* Exit Access.** Access to exits shall be marked by approved, readily visible signs in all cases where the exit or way to reach the exit is not readily apparent to the occupants. Sign placement shall be such that no point in an exit access corridor is in excess of 100 ft (30 m) from the nearest externally illuminated sign and is not in excess of the marked rating for internally illuminated signs.

**3-10.1.5* Floor Proximity Exit Signs.** Where floor proximity exit signs are required elsewhere in this *Code*, signs shall be placed near the floor level in addition to those signs required for doors or corridors. These signs shall be illuminated in accordance with 3-10.5. Externally illuminated signs shall be sized in accordance with 3-10.6.1. The bottom of the sign shall be not less than 6 in. (15.2 cm) but not more than 8 in. (20.3 cm) above the floor. For exit doors, the sign shall be mounted on the door or adjacent to the door with the nearest edge of the sign within 4 in. (10.2 cm) of the door frame.

**3-10.1.6* Floor Proximity Egress Path Marking.** Where floor proximity egress path marking is required elsewhere in this *Code*, a listed and approved floor proximity egress path marking system that is internally illuminated shall be installed within 8 in. (20.3 cm) of the floor. The system shall provide a visible delineation of the path of travel along the designated exit access and shall be essentially continuous, except as interrupted by doorways, hallways, corridors, or other such architectural features. The system shall operate continuously or at any time the building fire alarm system is activated. The activation, duration, and continuity of operation of the system shall be in accordance with 3-9.2.

**3-10.1.7* Visibility.** Every sign required in Section 3-10 shall be located and of such size, distinctive color, and design that it is readily visible and shall provide contrast with decorations, interior finish, or other signs. No decorations, furnishings, or equipment that impairs visibility of a sign shall be permitted. No brightly illuminated sign (for other than exit purposes), display, or object in or near the line of vision of the required exit sign that could detract attention from the exit sign shall be permitted.

**3-10.2* Directional Signs.** A sign complying with 3-10.3 with a directional indicator showing the direction of travel shall be placed in every location where the direction of travel to reach the nearest exit is not apparent.

**3-10.3* Sign Legend.** Signs required by 3-10.1 and 3-10.2 shall have the word EXIT or other appropriate wording in plainly legible letters.

**3-10.4* Power Source.** Where emergency lighting facilities are required by 3-9.1.1, the signs, other than approved self-luminous signs and listed photoluminescent signs in accordance with 3-10.7, shall be illuminated by the emergency lighting facilities. The level of illumination of the signs shall be in accordance with 3-10.6.3 or 3-10.7 for the required emergency lighting duration as specified in 3-9.2.1. However, the level of illumination shall be permitted to decline to 60 percent at the end of the emergency lighting duration.

**3-10.5 Illumination of Signs.**

**3-10.5.1 General.** Every sign required by 3-10.1.2 or 3-10.1.4, other than where operations or processes require low lighting levels, shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be legible in both the normal and emergency lighting mode.

**3-10.5.2* Continuous Illumination.** Every sign required to be illuminated by 3-10.6.3 and 3-10.7 shall be continuously illuminated as required under the provisions of Section 3-8.

*Exception*: Illumination for signs shall be permitted to flash on and off upon activation of the fire alarm system.*

**3-10.6 Externally Illuminated Signs.**

**3-10.6.1* †Size of Signs.** Externally illuminated signs required by 3-10.1 and 3-10.2 shall have the word EXIT or other appropriate wording in plainly legible letters not less than 6 in. (15.2 cm) high with the principal strokes of letters not less than $^3/_4$ in. (1.9 cm) wide. The word EXIT shall have letters of a width not less than 2 in. (5 cm), except the letter *I*, and the minimum spacing between letters shall be not less than $^3/_8$ in. (1 cm). Signs larger than the minimum established in this paragraph shall have letter widths, strokes, and spacing in proportion to their height.

*Exception: This requirement shall not apply to marking required by 3-10.1.3 and 3-10.1.5.*

**3-10.6.2* †Size and Location of Directional Indicator.** The directional indicator shall be located outside of the EXIT legend, not less than $^3/_8$ in. (1 cm) from any letter. The directional indicator shall be of a chevron type, as shown in Figure 3-10.6.2. The directional indicator shall be identifiable as a directional indicator at a distance of 40 ft (12.2 m). A directional indicator larger than the minimum established in this paragraph shall be proportionately increased in height, width and stroke. The directional indicator shall be located at the end of the sign for the direction indicated.

**Figure 3-10.6.2 Chevron-type indicator.** (Existing NFPA 101-2000 Figure 7.10.6.2)

**3-10.6.3* Level of Illumination.** Externally illuminated signs shall be illuminated by not less than 5 ft-candles (54 lux) at the illuminated surface and shall have a contrast ratio of not less than 0.5.

**3-10.7 Internally Illuminated Signs.**

**3-10.7.1 Listing.** Internally illuminated signs shall be listed in accordance with UL 924, *Standard for Safety Emergency Lighting and Power Equipment*.

*Exception: This requirement shall not apply to signs that are in accordance with 3-10.1.3 and 3-10.1.6.*

**3-10.7.2* Photoluminescent Signs.** The face of a photoluminescent sign shall be continually illuminated while the building is occupied. The illumination levels on the face of the photoluminescent sign shall be in accordance with its listing. The charging illumination shall be a reliable light source as determined by the authority having jurisdiction. The charging light source shall be of a type specified in the product markings.

**3-10.8 Special Signs.**

**3-10.8.1* †No Exit.** Any door, passage, or stairway that is neither an exit nor a way of exit access and that is located or arranged so that it is likely to be mistaken for an exit shall be identified by a sign that reads as follows:

**NO**

EXIT

Such sign shall have the word NO in letters 2 in. (5 cm) high with a stroke width of $^3/_8$ in. (1 cm) and the word EXIT in letters 1 in. (2.5 cm) high, with the word EXIT below the word NO.

**3-10.8.2 Elevator Signs.** Elevators that are a part of a means of egress *(see 3-2.13.1)* shall have the following signs, with minimum letter height of $^5/_8$ in. (1.6 cm), in every elevator lobby:

(1) * Signs that indicate that the elevator can be used for egress, including any restrictions on use

(2) * Signs that indicate the operational status of elevators

**A-3-10.1.2** Where a main entrance serves also as an exit, it will usually be sufficiently obvious to occupants so that no exit sign is needed.

The character of the occupancy has a practical effect on the need for signs. In any assembly occupancy, hotel, department store, or other building subject to transient occupancy, the need for signs will be greater than in a building subject to permanent or semipermanent occupancy by the same people, such as an apartment house where the residents are presumed to be familiar with exit facilities by reason of regular use thereof. Even in a permanent residence-type building, however, there is need for signs to identify exit facilities such as outside stairs that are not subject to regular use during the normal occupancy of the building.

There are many types of situations where the actual need for signs is debatable. In cases of doubt, however, it is desirable to be on the safe side by providing signs, particularly as posting signs does not ordinarily involve any material expense or inconvenience.

The requirement for the locations of exit signs visible from any direction of exit access is illustrated in Figure A-3-10.1.2.

**Figure A-3-10.1.2 Location of exit signs**. (Existing NFPA 101-2000 Figure A.7.10.1.2)

**A-3-10.1.4** Based on 6-in. (15.2-cm) high letters, it is recognized that exit signs are legible at a distance of 100 ft (30 m). However, placing signs every 100 ft (30 m) in other than exit access corridors might create operating difficulties or encourage placement of a sign above the line of sight. To resolve the viewing distance versus placement issue, consideration should be given to increasing the size of the exit legend to the viewing distance proportionally if signs are placed at greater distances.

**A-3-10.1.5** See A-3-10.3.

**A-3-10.1.6** See 3.3.64 for definition of *internally illuminated.*

**A-3-10.1.7** In stores, for example, an otherwise adequate exit sign could be rendered inconspicuous by a high-intensity illuminated advertising sign located in the immediate vicinity.

Red is the traditional color for exit signs and is required by law in many places. However, at an early stage in the development of the *Code*, a provision made green the color for exit signs, following the concept of traffic lights in which green indicates safety and red is the signal to stop. During the period when green signs were specified by the *Code*, many such signs were installed, but the traditional red signs also remained. In 1949, the Fire Marshals Association of North America voted to request that red be restored as the required exit sign color, as it was found that the provision for green involved difficulties in law enactment that were out of proportion to the importance of safety. Accordingly, the 10th edition of the *Code* specified red where not otherwise required by law. The present text avoids any specific requirement for color on the assumption that either red or green will be used in most cases and that there are some situations in which a color other than red or green could actually provide better visibility.

**A-3-10.2** A sign complying with 3-10.2 indicating the direction of the nearest approved exit should be placed at the point of entrance to any escalator or moving walk. *(See A-3-10.3.)*

**A-3-10.3** Where graphics are used, the symbols provided in NFPA 170, *Standard for Fire Safety Symbols*, should be used. Such signs need to provide equal visibility and illumination and are to comply with the other requirements of Section 3-10.

**A-3-10.4** It is not the intent of this paragraph to require emergency lighting but only to have the sign illuminated by emergency lighting if emergency lighting is required and provided.

It is not the intent to require that the entire stroke width and entire stroke height of all letters comprising the word EXIT be visible per the requirements of 3-10.6.3 under normal or emergency lighting operation, provided that the sign is visible and legible at a 100-ft (30-m) distance under all room illumination conditions.

**A-3-10.5.2** It is the intent to prohibit a freely accessible light switch to control the illumination of either an internally or externally illuminated exit sign.

**A-3-10.5.2 Exception.** The flashing repetition rate should be approximately one cycle per second, and the duration of the off-time should not exceed $^1/_4$ second per cycle. During on-time, the illumination levels need to be provided in accordance with 3-10.6.3. Flashing signs, when activated with the fire alarm system, might be of assistance.

**A-3-10.6.1 Experience has shown that the word EXIT or other appropriate wording is plainly legible at 100 ft (30 m) if the letters are as large as specified in 3-10.6.1.**

**A-3-10.6.2** Figure A-3-10.6.2 shows examples of acceptable locations of directional indicators with regard to left and right orientation. Directional indicators are permitted to be placed under the horizontal stroke of the letter T, provided that the spacing of not less than $^3/_8$ in. (1 cm) is maintained from the horizontal and vertical strokes of the letter T.

**Figure A-3-10.6.2 Directional indicators.** (Existing NFPA 101-2000 Figure A.7.10.6.2)

**A-3-10.6.3** Colors providing a good contrast are red or green letters on matte white background. Glossy background and glossy letter colors should be avoided.

The average luminance of the letters and background is measured in footlamberts or candela per square meter. The contrast ratio is computed from these measurements by the following formula:

$$\text{Contrast} = (Lg - Le) / Lg$$

Where *Lg* is the greater luminance and *Le* is the lesser luminance, either the variable *Lg* or *Le* is permitted to represent the letters, and the remaining variable will represent the background. The average luminance of the letters and background can be computed by measuring the luminance at the positions indicated in Figure A-3-10.6.3 by numbered spots.

**Figure A-3-10.6.3 Measurement of exit sign luminance.** (Existing NFPA 101-2000 Figure A.7.10.6.3)

**A-3-10.7.2** Photoluminescent signs need a specific minimum level of light on the face of the sign to ensure that the sign is charged for emergency operation and legibility in both the normal and emergency modes. Additionally, the type of light source (for example, incandescent, fluorescent, halogen, metal halide) is important. Each light source produces different types of visible and invisible light (for example, UV) that might affect the ability of some photoluminescent signs to charge and might also affect the amount of light output available during emergency mode. This type of sign would not be suitable where the illumination levels are permitted to decline. The charging light source should not be connected to automatic timers, because the continuous illumination of the sign is needed; otherwise, the sign illumination would not be available because it would be discharged.

**A-3-10.8.1** The likelihood of occupants mistaking passageways or stairways that lead to dead-end spaces for exit doors and becoming trapped governs the need for exit signs. Thus, such areas should be marked with a sign that reads as follows:

NO EXIT

Supplementary identification indicating the character of the area, such as TO BASEMENT, STOREROOM, LINEN CLOSET, or the like, is permitted to be provided. *(See A-3-10.2.)*

**A-3-10.8.2(1)** These signs are to be used in place of signs that indicate that elevators are not to be used during fires. Examples of these signs include the following:

In the event of fire, this elevator will be used by the fire department for evacuation of people.

PROTECTED ELEVATOR —

USABLE IN EMERGENCIES

**A-3-10.8.2(2)** The wording of these signs should reflect human behavior in fires and the control specifics of the elevator system. Subparagraph 3-10.8.2 addresses signs, but provisions for notification of the vision impaired need to be considered. For information about human behavior with respect to elevator evacuation see Groner and Levin, "Human Factors Considerations in the Potential for Using Elevators in Building Emergency Evacuation Plans"; Levin and Groner, "Human Behavior Aspects of Staging Areas for Fire Safety in GSA Buildings"; and Levin and Groner, "Human Factors Considerations for the Potential Use of Elevators for Fire Evacuation of FAA Air Traffic Control Towers." Some examples of messages on signs that could be displayed are shown in Table A-3-10.8.2(2).

**Table A-3-10.8.2(2) Elevator Status Messages**

| Elevator Status | Message |
|---|---|
| Nrmal use | Elevator in Service |
| Elevators recalled and waiting for fire service | Please Wait for Fire Department or Use Stairs |
| Elevator out of service | Elevator Out of Service |

**SUBSTANTIATION:** Correlation with NFPA 101-2000. Proposed 3-10.4 was further revised to addess photoluminescent signs in accordacne with 3-10.7. This was an oversight in NFPA 101-2000 that was corrected here.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP66)

101B- 75 - (3-10.1.4): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Further revise 3-10.1.4 and A-3-10.1.4 from that shown in Proposal 101B-74 (Log #CP40) so that it reads:

3-10.1.4* Exit Access. Access to exits shall be marked by approved, readily visible signs in all cases where the exit or way to reach the exit is not readily apparent to the occupannts. Sign placement shall be such that no point in an exit access corridor is more than the rated viewing distance or 100 ft (30 m), whichever is less, from the nearest sign. ~~in excess of 100 ft (30 m) from the nearest externally illumininated sign and is not in excess of the marked rating for internally illuminated signs.~~

A-3-10.1.4 ~~Based on 6 in. (15.2 cm) high letters, it is recognized that exit signs are legible at a distance of 100 ft (30 m).~~ For externally illuminated signs in accordance with 3-10.6 and internally illuminated signs listed without a viewing distance, the rated viewing distance should be considered to be 100 ft (60 m). However, placing signs ~~every 100 ft (30 m)~~ to meet the 100 ft (60 m) viewing distance in other than exit access corridors might create operating difficulties or encourage placement of a sign above the line of sight. To resolve the viewing distance versus placement issue, consideration should be given to increasing the level of illumination and the size of the exit legend to the viewing distance proportionally if signs are place at greater distances.

**SUBSTANTIATION:** The proposed change reflects that UL 924 lists signs for viewing distances of 50 ft (15 m) up to 100 ft (30 m), but doesn't specify the viewing distance for signs that meet the default of 100 ft (30 m).
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28
**COMMENT ON AFFIRMATIVE:**
MENUZ: Add the word "marked" to the first sentence of A-3-10.1.4, between "..without a.." and "...viewing distance..." All signs have a viewing distance, it is only those without a marked viewing distance that should be considered as suitable for 100 feet.

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(Log #22)

101B- 76 - (3-10.1.6): Reject
**SUBMITTER:** Northcentral Regional Fire Code Dev. Committee
**RECOMMENDATION**: Revise text to read as follows:

3-10.1.6* Where floor proximity exit signs are required elsewhere in this code, exit signs shall be placed near the floor level in addition to those signs required for doors or corridors. These signs shall be sized and illuminated in accordance with 3-10.2 and 3-10.3. The bottom of the sign shall be at least 6 in. (15.2 cm) but not more than 30 ~~8~~ in. (203. cm) above the floor. For exit doors, the sign shall be mounted on the door, or adjacent to the door, with the nearest edge of the sign within 4 in. (10.2 cm) of the door frame.

**SUBSTANTIATION:** Construction design may not permit a floor proximity sign to serve the desired intent at a maximum measurement of 8 in. above the floor. The use of baseboard heating appliances in construction design or the location of other electrical or mechanical equipment may also limit the application of this requirement. The new text will provide a more flexible sign location and also keep the original intent of this section for floor proximity exit signs. The new text also provides flexibility in the location of other electrical or mechanical devices and will decrease vandalism.
**COMMITTEE ACTION:** Reject.
**COMMITTEE STATEMENT:** The submitter has not provided substantiation to justify changing the 8 in. height dimension to 30 in. The committee believes that the current 8-in. limitation is appropriate.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #24)

101B- 77 - (3-10.1.6): Reject
**SUBMITTER:** Paul L. Dove, Michigan Fire Inspector's Society
**RECOMMENDATION**: Revise text as follows:

3-10.1.6* Where floor proximity exit signs are required elsewhere in this code, exit signs shall be placed near the floor level in addition to those signs required for doors or corridors. These signs shall be sized and illuminated in accordance with 3-10.3 and 3-10.3. The bottom of the sign shall be at least 6 in. (15.2 cm) but not more than ~~8 in. (20.3 cm)~~ 30 in. (? cm) above the floor. For exit doors, the sign shall be mounted on the door, or adjacent to the door, with the nearest edge of the sign within 4 in. (10.2 cm) of the door frame.

**SUBSTANTIATION:** Construction design may not permit a floor proximity sign to serve the desired intent at a maximum measurement of 8 in. above the floor. The use of baseboard heating appliances in construction design or the location of other electrical or mechanical equipment may also limit the application of this requirement. The new text will provide a more flexible sign location and also keep the original intent of this section for floor proximity exit signs. The new text also provides flexibility in the location of other electrical or mechanical devices and will decrease vandalism.
**COMMITTEE ACTION:** Reject.
**COMMITTEE STATEMENT:** The submitter has not provided substantiation to justify changing the 8 in. height dimension to 30 in. The committee believes that the current 8-in. limitation is appropriate.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP68)

101B- 78 - (3-10.2.1): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Paragraph 3-10.2.1 is being renumbered to become 3-10.6.1 via Proposal 101B-74 (Log #CP40). Revise the new 3-10.6.1 by adding a second exception to read:

3-10.6.1* †Size of Signs. Externally illuminated signs required by 3-10.1 and 3-10.2 shall have the word EXIT or other appropriate wording in plainly legible letters not less than 6 in. (15.2 cm) high with the principal strokes of letters not less than 3/4 in. (1.9 cm) wide. The word EXIT shall have letters of a width not less than 2 in. (5 cm), except the letter I, and the minimum spacing between letters shall be not less than 3/8 in. (1 cm). Signs larger than the minimum established in this paragraph shall have letter widths, strokes, and spacing in proportion to their height.

Exception No. 1 : This requirement shall not apply to marking required by 3-10.1.3 and 3-10.1.

Exception No. 2: Where approved by the authority having jurisdiction, pictograms shall be permitted.

Revise the new 3-10.3 and A-3-10.3 from that shown in Proposal 101B-74 (Log #CP40) to read:

3-10.3* Sign Legend. Signs required by 3-10.1 and 3-10.2 shall have the word EXIT or other appropriate wording in plainly legible letters.

Exception: Where approved by the authority having jurisdiction, pictograms shall be permitted.

A-3-10.3 Pictograms may be used in lieu of, or in addition to, signs with text. Where graphics are used, the symbols provided in NFPA 170, Standard for Fire Safety Symbols, should be used. Such signs need to provide equal visibility and illumination and are to comply with the other requirements of Section 3-10.

**SUBSTANTIATION:** The proposed change will permit the authority having jurisdiction to allow pictograms. Such graphics are used extensively internationally.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

**COMMENT ON AFFIRMATIVE:**

HELTON: The committee has recommended acceptance of this proposal that identifies acceptable symbols as the ones in NFPA 170. Prior to accepting these symbols, where possible, it would be desirable to harmonize these symbols with international standards that are already in existence.

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(Log #CP41)

101B- 79 - (3-11.1 Exception (New) ): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Add an exception to 3-11.1 to read as follows:

3-11.1* Where the contents are classified as high hazard, exits of such types and numbers shall be provided and arranged to permit all occupants to escape from the building or structure or from the hazardous area thereof to the outside or to a place of safety with a travel distance of not more than 75 ft (23 m), measured as required in 3-6.2.

Exception: A travel distance of not more than 150 ft (45 m) shall be permitted where flammable and combustible products are stored and protected in accordance with NFPA 30, Flammable and Combustible Liquids Code.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP51)

101B- 80 - (3-13 (New) ): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Add a new 3-13 on smoke partitions as follows; renumber existing 3-13 on smoke barriers to become 3-14; renumber existing 3-14 on assembly occupancy seating to become 3-15.

3-13 Subdivision of Building Space via Smoke Partitions.

3-13.1 Where required elsewhere in this Code, smoke partitions shall be provided to limit the transfer of smoke.

3-13.2 Smoke partitions shall extend from the floor to the underside of the floor or roof deck above, through any concealed spaces, such as those above suspended ceilings, and through interstitial structural and mechanical spaces.

Exception*: Smoke partitions shall be permitted to terminate at the underside of a monolithic or suspended ceiling system where the following conditions are met:

(a) The ceiling system forms a continuous membrane.

(b) A smoketight joint is provided between the top of the smoke partition and the bottom of the suspended ceiling.

(c) The space above the ceiling is not used as a plenum.

3-13.3 Doors.

3-13.3.1 Doors in smoke partitions shall comply with 3-13.3.2 through 3-13.3.5.

3-13.3.2 Doors shall comply with the provisions of 3-2.1.

3-13.3.3 Doors shall not include louvers.

3-13.3.4* Door clearances shall be in accordance with NFPA 80, Standard for Fire Doors and Fire Windows.

3-13.3.5 Doors shall be self-closing or automatic-closing in accordance with 3-2.1.8.

3-13.4 Penetrations and Miscellaneous Openings in Smoke Partitions.

3-13.4.1 Pipes, conduits, bus ducts, cables, wires, air ducts, pneumatic tubes and ducts, and similar building service equipment that pass through smoke partitions shall be protected as follows:

(1) The space between the penetrating item and the smoke partition shall meet one of the following conditions:

a. It shall be filled with a material that is capable of limiting the transfer of smoke.

b. It shall be protected by an approved device that is designed for the specific purpose.

(2) Where the penetrating item uses a sleeve to penetrate the smoke partition, the sleeve shall be solidly set in the smoke partition, and the space between the item and the sleeve shall meet one of the following conditions:

a. It shall be filled with a material that is capable of limiting the transfer of smoke.

b. It shall be protected by an approved device that is designed for the specific purpose.

(3) Where designs take transmission of vibrations into consideration, any vibration isolation shall meet one of the following conditions:

a. It shall be made on either side of the smoke partitions.

b. It shall be made by an approved device that is designed for the specific purpose.

3-13.4.2 Openings located at points where smoke partitions meet the outside walls, other smoke partitions, smoke barriers, or fire barriers of a building shall meet one of the following conditions:

(1) They shall be filled with a material that is capable of limiting the transfer of smoke.

(2) They shall be made by an approved device that is designed for the specific purpose.

3-13.4.3* Air transfer openings in smoke partitions shall be provided with approved dampers designed to limit the transfer of smoke. Dampers in air transfer openings shall close upon detection of smoke by approved smoke detectors installed in accordance with NFPA 72, National Fire Alarm Code.

A-3-13.2 Exception An architectural, exposed, suspended-grid acoustical tile ceiling with penetrations for sprinklers, ducted HVAC supply and return air diffusers, speakers, and recessed light fixtures is capable of limiting the transfer of smoke.

A-3-13.3.4 Gasketing of doors should not be necessary, as the clearances in NFPA 80, Standard for Fire Doors and Fire Windows, effectively achieve resistance to the passage of smoke if the door is relatively tight-fitting.

A-3-13.4.3 An air transfer opening as defined in NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems, is an opening designed to allow the movement of environmental air between two contiguous spaces.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP42)

101B- 81 - (3-13.2.1 Exception No. 2 and Exception No. 2 (New)): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Add two exceptions as follow:

3-13.2.1 The ambulatory health care facility shall be divided into at least two smoke compartments on patient treatment floors.

Exception No. 1: Facilities of less than 5000 ft 2 (465 m 2 ) and protected by an approved, automatic smoke detection system.

Exception No. 2: Facilities of less than 10,000 ft 2 (930 m 2 )and protected throughout by an approved, supervised automatic sprinkler system.

Exception No. 3: An area in an adjoining occupancy shall be permitted to serve as a smoke compartment for the ambulatory health care facility if the following criteria are met:

(a) The separating wall and both compartments meet the requirements of 3-13.2.

(b) The ambulatory health care facility is less than 22,500 ft 2 (2100 m 2 )

(c) Access from the ambulatory health care facility to the other occupancy is unrestricted.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP43)

101B- 82 - (3-13.3.1 Exception No. 2, 3-13.3.1 and 3-13.3.10): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise Exception No. 2 to 3-13.3.1 to read as follows:

3-13.3.1 Smoke barriers shall be provided to divide every story used for sleeping by residents, or any other story having an occupant load of 50 or more persons, into a minimum of two compartments.

Exception No. 1: Protection shall be permitted to be accomplished with horizontal exits. (See 3-2.4.)

~~Exception No. 2: *Smoke compartments having direct exit to a public way; a building separated from the resident housing area by a 2-hour fire resistance rating or 50 ft (15 m) of open space; or a secured open area having a holding space located 50 ft (15 m) from the housing area that provides 15 ft2 (1.4 m2) or more of refuge area for each person (resident, staff, visitors) potentially present at the time of a fire fulfills the requirements for subdivision of such spaces, provided the locking arrangement of the direct exit doors involved meets the requirements for doors at the smoke barrier for the applicable use condition.~~

Exception No. 2:* The requirement for subdivision of building space shall be permitted to be fulfilled by one of the following:

(a) Smoke compartments having exit to a public way where such exit serves only one area and has no openings to other areas

(b) A building separated from the resident housing area by a 2-hour fire resistance rating or 50 ft (15 m) of open space

(c) A secured, open area having a holding space located 50 ft (15 m) from the housing area that provides 15 ft 2 (1.4 m2 ) or more of refuge area for each person (resident, staff, visitors) potentially present at the time of a fire

Doors used to access the areas specified in (a), (b), and (c) of this exception shall meet the requirements for doors at smoke barriers for the applicable use condition.

Revise 3-13.3.2 as follows:

3-13.3.2 Where smoke barriers are required by 3-13.3.1, smoke barriers shall be provided to limit the following:

(a) The housing to a maximum of 200 residents in any smoke compartment

(b) The travel distance to a door in a smoke barrier

1. From any room door required as exit access to a maximum of 150 ft (45m) ~~100 ft (30 m~~ .

2. From any point in a room to a maximum of 200 ft (60 m) ~~150 ft (45 m)~~

~~Exception to (b): The maximum permitted travel distance shall be increased by 50 ft (15 m) in smoke compartments protected throughout by an approved, automatic sprinkler system or smoke control system.~~

Delete 3-13.3.10 as follows:

~~3-13.3.10 Means shall be provided to evacuate smoke from the smoke compartment of fire origin. Any of the following means shall be acceptable:~~

~~(a) Operable windows on at least two sides of the building, spaced not more than 30 ft (9.1 m) apart, that provide openings with minimum dimensions of not less than 22 in. (56 cm) in width and 24 in. (61 cm) in height~~

~~(b) * Manual or automatic smoke vents~~

~~(c) Engineered smoke control system~~

~~(d) Mechanical exhaust system providing at least six air changes per hour~~

~~(e) Another method acceptable to the authority having jurisdiction~~

~~Exception: Buildings protected throughout by an approved, automatic sprinkler system.~~

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP63)

101B- 83 - (3-13.3.2, 3-13.3.10, 5-3-13.3.2, and 5-3-13.3.10): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise 3-13.3.2 and 3-13.3.10 as follows:

3-13.3.2 † Where smoke barriers are required by 3-13.3.1, smoke barriers shall be provided to limit the following:

(a) The housing to a maximum of 200 residents in any smoke compartment

(b) The travel distance to a door in a smoke barrier

1. From any room door required as exit access to a maximum of 150 ft (45 m) ~~100 ft (30 m)~~

2. From any point in a room to a maximum of 200 ft (60 m) ~~150 ft (45 m)~~

~~Exception to (b): The maximum permitted travel distance shall be increased by 50 ft (15 m) in smoke compartments protected throughout by an approved, automatic sprinkler system or smoke control system.~~

3-13.3.10 †Smoke Venting. Reserved. ~~Means shall be provided to evacuate smoke from the smoke compartment of fire origin. Any of the following means shall be acceptable:~~

~~(a) Operable windows on at least two sides of the building, spaced not more than 30 ft (9.1 m) apart, that provide openings with minimum dimensions of not less than 22 in. (56 cm) in width and 24 in. (61 cm) in height~~

~~(b) * Manual or automatic smoke vents~~

~~(c) Engineered smoke control system~~

~~(d) Mechanical exhaust system providing at least six air changes per hour~~

~~(e) Another method acceptable to the authority having jurisdiction~~

~~Exception: Buildings protected throughout by an approved, automatic sprinkler system.~~

Create a new 5-3-13.3.2 and 5-3-13.3.10 as follows:

5-3-13.3.2 Smoke Barriers in Detention and Correctional Occupancies. In nonsprinklered buildings undergoing alterations or repairs for which smoke barriers are required by 3-13.3.1, smoke barriers shall be provided to limit the following:

(a) The housing to a maximum of 200 residents in any smoke compartment

(b) The travel distance to a door in a smoke barrier

1. From any room door required as exit access to a maximum of 100 ft (30 m)

2. From any point in a room to a maximum of 150 ft (45 m)

5-3-13.3.10 Smoke Venting in Detention and Correctional Occupancies. In nonsprinklered buildings undergoing alterations or repairs means shall be provided to evacuate smoke from the smoke compartment of fire origin. Any of the following means shall be acceptable:

(a) Operable windows on at least two sides of the building, spaced not more than 30 ft (9.1 m) apart, that provide openings with minimum dimensions of not less than 22 in. (56 cm) in width and 24 in. (61 cm) in height

(b) *Manual or automatic smoke vents
(c) Engineered smoke-control system
(d) Mechanical exhaust system providing at least six air changes per hour
(e) Another method acceptable to the authority having jurisdiction

Renumber A-3-13.3.10(b) as follows:

A-5-3-13.3.10(b) ~~A-3-13.3.10(b)~~ The automatic smoke venting should be in accordance with NFPA 204, Guide for Smoke and Heat Venting, for light-hazard occupancies.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP44)

101B- 84 - (3-13.4 (New) ): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Add a new 3-13.4 for educational occupancies smoke barriers as follows:

3-13.4 Educational Occupancies.

3-13.4.1 School buildings shall be subdivided into compartments by smoke barriers having a 1-hour fire resistance rating where one or both of the following conditions exist:

(1) The maximum area of a compartment, including the aggregate area of all floors having a common atmosphere, exceeds 30,000 ft $^2$ (2800 m $^2$ ).

(2) The length or width of the building exceeds 300 ft (91 m).

Exception No. 1: This requirement shall not apply where all spaces normally subject to student occupancy have not less than one door opening directly to the outside or to an exterior or exit access balcony or corridor in accordance with 3-5.3.

Exception No. 2: This requirement shall not apply to buildings that consist of only one story and are protected throughout by an approved, supervised automatic sprinkler system.

3-13.4.2 The area of a smoke compartment shall not exceed 30,000 ft $^2$ (2800 m $^2$ ), with no dimension exceeding 300 ft (91 m).

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system, there shall be no limitation on smoke compartment size, provided that the floor is divided into not less than two smoke compartments.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP45)

101B- 85 - (3-14.4.7.1): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-14.4.7.1 as follows:

3-14.4.7.1 Ramped aisles that have a gradient exceeding 1 in 12 and aisle stairs shall be provided with handrails at one side or along the centerline in accordance with 3-2.2.4.5.1, 3-2.2.4.5.2, and the first sentence of 3-2.2.4.5.3.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP46)

101B- 86 - (3-14.9 and A-3-14.1): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 3-14.9 as follows and delete A-3-14.1:

3-14.9 Life Safety Evaluation.

3-14.9.1* Where a life safety evaluation is required by other provisions of the *Code*, it shall be done by persons acceptable to the authority having jurisdiction. The life safety evaluation shall include a written assessment of safety measures for conditions listed in 3-14.9.2. The life safety evaluation shall be approved annually by the authority having jurisdiction and shall be updated for special or unusual conditions.

3-14.9.2 Life safety evaluations shall include an assessment of the following conditions and the related appropriate safety measures:

(a) Nature of the events and the participants and attendees
(b) Access and egress movement including crowd density problems
(c) Medical emergencies
(d) Fire hazards
(e) Permanent and temporary structural systems
(f) Severe weather conditions
(g) Earthquakes
(h) Civil or other disturbances
(i) Hazardous materials incidents within and near the facility
(j) Relationships among facility management, event participants, emergency response agencies, and others having a role in the events accommodated in the facility

3-14.9.3* Life safety evaluations shall include assessments of both building systems and management features upon which reliance is placed for the safety of facility occupants. Such assessments shall consider scenarios appropriate to the facility.

A.3.14.9.1 Life safety evaluations are examples of performance-based approaches to life safety. The general approach to performance criteria, scenarios, evaluation, safety factors, documentation, maintenance, and periodic assessment (including a warrant of fitness) all apply to the broader considerations in a life safety evaluation. A life safety evaluation deals not only with fire but also with fire, storm, collapse, crowd behavior, and other related safety considerations for which a checklist is provided in A-3-14.9.3. Means of egress facilities plus facility management capabilities should be adequate to cope with scenarios where certain egress routes are blocked for some reason.

In addition to making realistic assumptions about the capabilities of persons in the facility (for example, an assembled crowd including many disabled persons or persons unfamiliar with the facility), the life safety evaluation should include a factor of safety of not less than 2.0 in all calculations relating to hazard development time and required egress time (the combination of flow time and other time needed to detect and assess an emergency condition, initiate egress, and move along the egress routes). The factor of safety takes into account the possibility that half of the egress routes might not be used (or be usable) in certain situations.

Regarding crowd behavior, the potential hazards created by larger masses of people and greater crowd densities (which can be problematic during ingress, occupancy, and egress) demand that technology be used by designers, managers, and authorities responsible for buildings to compensate for the relaxed egress capacity provisions of Table 3-14.10.3. In very large buildings for assembly use, the hazard of crowd crushes can exceed that of fire or structural failure. Therefore, the building designers, managers, event planners, security personnel, police authorities, and fire authorities, as well as the building construction authorities, should understand the potential problems and solutions, including coordination of their activities. For crowd behavior, this understanding includes factors of space, energy, time, and information, as well as specific crowd management techniques such as metering. Published guidance on these factors and techniques is found in the *SFPE Handbook of Fire Protection Engineering*, Section 3, Chapter 13, pp. 3-263-3-285 (Pauls, J., "Movement of People"), and the publications referenced therein.

Tables 3-14.1 and 3-14.10.3 are based on a linear relationship between number of seats and nominal flow time, with not less than 200 seconds (3.3 minutes) for 2000 seats plus 1 second for every additional 50 seats up to 25,000. Beyond 25,000 total seats, the nominal flow time is limited to 660 seconds (11 minutes). Nominal flow time refers to the flow time for the most able group

of patrons; some groups less familiar with the premises or less able groups might take longer to pass a point in the egress system. Although three or more digits are noted in the tables, the resulting calculations should be assumed to provide only two significant figures of precision.

A-3-14.9.3 Factors to be considered in a Life Safety Evaluation include the following.

(a) Nature of the Events Being Accommodated

(1) Ingress, intra-event movement, and egress patterns

(2) Ticketing and seating policies/practices

(3) Event purpose (e.g., sports contest, religious meeting)

(4) Emotional qualities (e.g., competitiveness) of event

(5) Time of day when event held

(6) Time duration of single event

(7) Time duration of attendees' occupancy of the building

(b) Occupant Characteristics and Behavior

(1) Homogeneity

(2) Cohesiveness

(3) Familiarity with building

(4) Familiarity with similar events

(5) Capability (as influenced by factors such as age, physical abilities)

(6) Socioeconomic factors

(7) Small minority involved with recreational violence

(8) Emotional involvement with the event and other occupants

(9) Use of alcohol or drugs

(10) Food consumption

(11) Washroom utilization

(c) Management

(1) Clear, contractual arrangements for facility operation/use as follows:

a. Between facility owner and operator

b. Between facility operator and event promoter

c. Between event promoter and performer

d. Between event promoter and attendee

e. With police forces

f. With private security services

g. With ushering services

(2) Experience with the building

(3) Experience with similar events and attendees

(4) Thorough, up-to-date operations manual

(5) Training of personnel

(6) Supervision of personnel

(7) Communications systems and utilization

(8) Ratios of management and other personnel to attendees

(9) Location/distribution of personnel

(10) Central command location

(11) Rapport between personnel and attendees

(12) Personnel supportive of attendee goals

(13) Attendees respect for personnel due to the following:

a. Dress (uniform) standards

b. Age and perceived experience

c. Personnel behavior, including interaction

d. Distinction between crowd management and control

e. Management's concern for facility quality (e.g., cleanliness)

f. Management's concern for entire event experience of attendees (i.e., not just during the occupancy of the building)

(d) Emergency Management Preparedness

(1) Complete range of emergencies addressed in operations manual

(2) Power loss

(3) Fire

(4) Severe weather

(5) Earthquake

(6) Crowd incident

(7) Terrorism

(8) Hazardous materials

(9) Transportation accident (e.g., road, rail, air)

(10) Communications systems available

(11) Personnel and emergency forces ready to respond

(12) Attendees clearly informed of situation and proper behavior

(e) Building Systems

(1) Structural soundness

(2) Normal static loads

(3) Abnormal static loads (e.g., crowds, precipitation)

(4) Dynamic loads (e.g., crowd sway, impact, explosion, wind, earthquake)

(5) Stability of nonstructural components (e.g., lighting)

(6) Stability of movable (e.g., telescoping) structures

(7) Fire protection

(8) Fire prevention (e.g., maintenance, contents, housekeeping)

(9) Compartmentation

(10) Automatic detection and suppression of fire

(11) Smoke control

(12) Alarm and communications systems

(13) Fire department access routes and response capability

(14) Structural integrity

(15) Weather protection

(16) Wind

(17) Precipitation (attendees rush for shelter or hold up egress of others)

(18) Lightning

(19) Circulation systems

(20) Flowline or network analysis

(21) Waywinding and orientation

(22) Merging of paths (e.g., precedence behavior)

(23) Decision/branching points

(24) Route redundancies

(25) Counterflow, crossflow, and queuing situations

(26) Control possibilities, including metering

(27) Flow capacity adequacy

(28) System balance

(29) Movement time performance

(30) Flow times

(31) Travel times

(32) Queuing times

(33) Route quality

(34) Walking surfaces (e.g., traction, discontinuities)

(35) Appropriate widths and boundary conditions

(36) Handrails, guardrails, and other rails

(37) Ramp slopes

(38) Step geometries

(39) Perceptual aspects (e.g., orientation, signage, marking, lighting, glare, distractions)

(40) Route choices, especially for vertical travel

(41) Resting/waiting areas

(42) Levels of service (overall crowd movement quality)

(43) Services

(44) Washroom provision and distribution

(45) Concessions

(46) First aid and EMS facilities

(47) General attendee services

A scenario-based approach to performance-based fire safety is addressed in Chapter 5 of NFPA 101, *Life Safety Code*. In addition to using such scenarios and, more generally, the attention to performance criteria, evaluation, safety factors, documentation, maintenance, and periodic assessment required when the performance-based option is used, life safety evaluations should consider scenarios based on characteristics important in assembly occupancies. These characteristics include the following:

(1) Whether there is a local or mass awareness of an incident, event, or condition that might provoke egress

(2) Whether the incident, event, or condition stays localized or spreads

(3) Whether or not egress is desired by facility occupants

(4) Whether there is a localized start to any egress or mass start to egress

(5) Whether exits are available or not available

Examples of scenarios and sets of characteristics that might occur in a facility include the following.

(a) *Scenario 1.* Characteristics: Mass start, egress desired (by management and attendees), exits not available, local awareness.

Normal egress at the end of an event occurs just as a severe weather condition induces evacuees at the exterior doors to retard or stop their egress. The backup that occurs in the egress system is not known to most evacuees, who continue to press forward (potentially resulting in a crowd crush).

(b) *Scenario 2. Characteristics: Mass start, egress not desired (by management), exits possibly not available, mass awareness.*

An earthquake occurs during an event. The attendees are relatively safe in the seating area. The means of egress outside the seating areas are relatively unsafe and vulnerable to aftershock damage. Facility management discourages mass egress until the means of egress can be checked and cleared for use.

(c) *Scenario 3. Characteristics: Local start, incident stays local, egress desired (by attendees and management), exits available, mass awareness.*

A localized civil disturbance (for example, firearms violence) provokes localized egress, which is seen by attendees, generally, who then decide to leave also.

(d) *Scenario 4. Characteristics: Mass start, egress desired, incident spreads, exits not available, mass awareness.*

In an open-air facility unprotected from wind, precipitation, and lightning, sudden severe weather prompts egress to shelter but not from the facility. The means of egress congest and block quickly as people in front stop once they are under shelter while people behind them continue to press forward (potentially resulting in a crowd crush).

These scenarios illustrate some of the broader factors to be taken into account when assessing the capability of both building systems and management features on which reliance is placed in a range of situations, not just fire emergencies. Some scenarios also illustrate the conflicting motivations of management and attendees based on differing perceptions of danger and differing knowledge of hazards, countermeasures, and capabilities. Mass egress might not be the most appropriate life safety strategy in some scenarios, such as Scenario 2.

Table A-3-14.9.3 (shown below) summarizes the characteristics in the scenarios and provides a framework for developing other characteristics and scenarios that might be important for a particular facility, hazard, occupant type, event, or management.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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**Table A-3.14.9.3 Life Safety Evaluation Scenario Characteristics Matrix**

| | | | | | Management | | Occupants | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Scenario** | **Local Awareness** | **Mass Awareness** | **Incident Localized** | **Incident Spreads** | **Egress Desired** | **Egress Not Desired** | **Egress Desired** | **Egress Not Desired** | **Local Start** | **Mass Start** | **Exits Available** | **Exits Not Available** | **Other** |
| 1 | X | | | | X | | X | | | X | | X | |
| 2 | | X | | | | X | | | | X | | X | |
| 3 | | X | X | | X | | X | | X | | | | |
| 4 | | X | | X | | | X | | | X | | X | |

(Log #CP47)

101B- 87 - (3-14.11 and 3-14.12 (New)): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Replace 3-14.11 with a new 3-14.11 and 3-14.12 as follows:

3-14.11 Grandstands.

3-14.11.1 General. Grandstands shall comply with the provisions of this chapter as modified by 3-14.11.

3-14.11.2 Seating.

3-14.11.2.1 Where grandstand seating without backs is used indoors, rows of seats shall be spaced not less than 22 in. (55.9 cm) back-to-back.

3-14.11.2.2 The depth of footboards and seat boards in grandstands shall be not less than 9 in. (22.9 cm). Where the same level is not used for both seat foundations and footrests, footrests independent of seats shall be provided.

3-14.11.2.3 Seats and footrests of grandstands shall be supported securely and fastened in such a manner that they cannot be displaced inadvertently.

3-14.11.2.4 Individual seats or chairs shall be permitted only if secured in rows in an approved manner, unless seats do not exceed 16 in number and are located on level floors and within railed-in enclosures, such as boxes.

3-14.11.3 Guards and Railings.

3-14.11.3.1 Railings or guards not less than 42 in. (107 cm) above the aisle surface or footrest or not less than 36 in. (91 cm) vertically above the center of the seat or seat board surface, whichever is adjacent, shall be provided along those portions of the backs and ends of all grandstands where the seats are more than 4 ft (1.2 m) above the floor or ground.

Exception: This requirement shall not apply where an adjacent wall or fence affords equivalent safeguard.

3-14.11.3.2 Where the front footrest of any grandstand is more than 2 ft (0.6 m) above the floor, railings or guards not less than 33 in. (84 cm) above such footrests shall be provided.

Exception: In grandstands, or where the front row of seats includes backrests, the rails shall be not less than 26 in. (66 cm) high.

3-14.11.3.3 Cross aisles located within the seating area shall be provided with rails not less than 26 in. (66 cm) high along the front edge of the cross aisle.

Exception: Where the backs of the seats in front of the cross aisle project 24 in. (61 cm) or more above the surface of the cross aisle, the rail shall not be required.

3-14.11.3.4 Vertical openings between guardrails and footboards or seat boards shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

3-14.11.3.5 An opening between the seat board and footboard located more than 30 in. (76 cm) above grade shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

3-14.12 Folding and Telescopic Seating.

3-14.12.1 General. Folding and telescopic seating shall comply with the provisions of this chapter as modified by 3-14.12.

3-14.12.2 Seating.

3-14.12.2.1 The horizontal distance of seats, measured back-to-back, shall be not less than 22 in. (55.9 cm) for seats without backs. There shall be a space of not less than 12 in. (30.5 cm) between the back of each seat and the front of each seat immediately behind it. If seats are of the chair type, the 12-in. (30.5-cm) dimension shall be measured to the front edge of the rear seat in its normal unoccupied position. All measurements shall be taken between plumb lines.

3-14.12.2.2 The depth of footboards (footrests) and seat boards in folding and telescopic seating shall be not less than 9 in. (22.9 cm). Where the same level is not used for both seat foundations and footrests, footrests independent of seats shall be provided.

3-14.12.2.3 Individual chair-type seats shall be permitted in folding and telescopic seating only if firmly secured in groups of not less than three.

3-14.12.3 Guards and Railings.

3-14.12.3.1 Railings or guards not less than 42 in. (107 cm) above the aisle surface or footrest or not less than 36 in. (91 cm) vertically above the center of the seat or seat board surface, whichever is adjacent, shall be provided along those portions of the backs and ends of all folding and telescopic seating where the seats are more than 4 ft (1.2 m) above the floor or ground.

Exception: This requirement shall not apply where an adjacent wall or fence affords equivalent safeguard.

3-14.12.3.2 Where the front footrest of folding or telescopic seating is more than 2 ft (0.6 m) above the floor, railings or guards not less than 33 in. (84 cm) above such footrests shall be provided.

Exception: Where the front row of seats includes backrests, the rails shall be not less than 26 in. (66 cm) high.

3-14.12.3.3 Cross aisles located within the seating area shall be provided with rails not less than 26 in. (66 cm) high along the front edge of the cross aisle.

Exception: Where the backs of the seats in front of the cross aisle project 24 in. (61 cm) or more above the surface of the cross aisle, the rail shall not be required.

3-14.12.3.4 Vertical openings between guardrails and footboards or seat boards shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

3-14.12.3.5 An opening between the seat board and footboard located more than 30 in. (76 cm) above grade shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #4)

101B- 88 - (4-1.1(f) (New) ): Accept

**SUBMITTER:** Catherine L. Stashak, Des Plaines Fire Dept., IL

**RECOMMENDATION**: Add new (f) to read:

(f) Group day-care homes

**SUBSTANTIATION:** NFPA 101B, 3-4.1 (1999) allows the use of a means of escape in Exception No. 21, No. 22, and No. 23 for group day-care homes.

NFPA 101 (2000) allows the use of a means of escape for group day-care homes.

This should eliminate conflicts and inconsistencies.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP48)

101B- 89 - (4-2.1.3(c)4(New)): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Add an item 4 to subpart (c) of 4-2.1.3 as follows:

4-2.1.3* Secondary Means of Escape. The secondary means of escape shall be one of the following:

(a) A door, stairway, passage, or hall that provides a way of unobstructed travel to the outside of the dwelling at street or ground level that is independent of and remote from the primary means of escape

(b) A passage through an adjacent nonlockable space, independent of and remote from the primary means of escape, to any approved means of escape

(c) * An outside window or door operable from the inside without the use of tools, keys, or special effort and that provides a clear opening of not less than 5.7 ft $^2$ (0.53 m $^2$ ) with the width not less than 20 in. (51 cm) and the height not less than 24 in. (61 cm). The bottom of the opening shall be not more than 44 in. (112 cm) above the floor. Such means of escape shall be acceptable under any of the following conditions:

1. The window is within 20 ft (6.1 m) of grade.

2. The window is directly accessible to fire department rescue apparatus as approved by the authority having jurisdiction.

3. The window or door opens onto an exterior balcony.

4. The window has a sill height below the adjacent ground level and is provided with a window well meeting the following criteria:

a. The window well shall have horizontal dimensions that allow the window to be fully opened.

b. The window well shall have an accessible net clear opening of not less than 9 ft $^2$ (0.82 m $^2$ )with a length and width of not less than 36 in. (91.4 cm).
c. A window well with a vertical depth of more than 44 in. (112 cm) shall be equipped with an approved permanently affixed ladder or with steps meeting the following criteria:
1. The ladder or steps shall not encroach more than 6 in. (15.2 cm) into the required dimensions of the window well.
2. The ladder or steps shall not be obstructed by the window.

A-4-2.1.3(c) A window with dimensions of 20 in. x 24 in. (51 cm x 61 cm) has an opening of 3.3 ft $^2$ (0.31 m $^2$ ), which is less than the required 5.7 ft $^2$ (0.53 m $^2$ ). Therefore, either the height or width needs to exceed the minimum requirement to provide the required clear area. See Figure A-4-2.1.3(c).

**Figure A.24.2.2.3(c) Escape window utilizing a window well.**
(Existing NFPA 101-2000 FIGURE A.24.2.2.3(c))

**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #29)

101B- 90 - (4-2.4): Reject
**SUBMITTER:** Jake Pauls, Jake Pauls Consulting Services
**RECOMMENDATION**: Add the following new text:
4-2.4.5. Stairways shall be provided with lighting fixtures and controls capable of illuminating the treads and landings to a minimum level of 10 footcandles (108 lux) measured at the center of treads and on landings. The lighting control or controls shall be usable without traversing any step of the stairway.
**SUBSTANTIATION:** This parallels a requirement in the ICC International Building Code(TM) applicable to dwelling unit stairs. Note that the proposal does not require that the stairs be actually illuminated at the 10 footcandle level but that there is the potential to do so using the installed lighting control which could be a dimmer to permit lower light levels at night when adjoining spaces are darker. The need for adequate illumination on stairways follows from the huge stair safety problem identified in detail in an accompanying proposal by Pauls. The 10 footcandle criterion, as well as being in the IBC, is recommended by the Illuminating Engineering Society of North America although IESNA actually recommends that the 10 footcandles be adjusted up to a minimum of 20 footcandles for elderly users or where there is little contrast in the walking surfaces.
**COMMITTEE ACTION:** Reject.
**COMMITTEE STATEMENT:** The submitter's recommended illumination level of 10 footcandles is inconsistent with the minimum 1 footcandle illumination level required within the means of egress for public buildings. The submitter has not substantiated the need to require a higher illumination level within the means of escape of a dwelling where the stair serves few people in comparison to the stair serving the public building.
If the system suggested were installed, it would generally result in the need to install a second lighting system. The system providing the 10 footcandles would be considered too bright or harsh to serve on a day-to-day basis for most people. The second system would provide a minimum lighting level that the dwelling unit's occupants find to be nonobtrusive but adequate.
The committee is unaware of a technology that would permit a single lighting system to serve both needs. Typically a dimmer would be used to lower the lighting level to less than the 10 footcandles, but the dimmer is located either at the top or the bottom of the stair. The location without the dimmer would have a three-way switch that has no control over the dimmer. This would not satisfy the submitter's requirement that the lighting controls be usable without traversing any step in the stairway.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 27
NEGATIVE: 1
**EXPLANATION OF NEGATIVE:**
PAULS: My negative ballot is triggered for several reasons. There is not an inconsistency between the traditional one footcandle emergency lighting requirement and the ten-footcandle requirement based on stairway safety especially in dwellings. The latter issue is much bigger than that of emergency lighting in case of power failure. See my extensive justification for proposal 101B-33 for the background on dwelling unit stair safety problems.
Secondly, contrary to what is claimed in the committee statement, there is no need to install two lighting systems. A dimmer can readily and inexpensively deal with the desire of home occupants to match lighting levels in adjoining spaces, for example in nighttime conditions.
Third, this is another unfortunate case of an NFPA code/standard having a worse standard for something as critical as stairway safety than is found in the (relatively) industry-dominated IRC. The latest IRC requires the 10 footcandles as does the IBC and the BOCA National Building Code. Moreover, the revised draft of NFPA 5000 will have significant requirements for space lighting (using the language "capable of illuminating") well in excess of one footcandle.
Fourth, I do not agree with the committee statement about the technology. Unfortunately, due to much work required on NFPA 5000, I am unable to explore this fully in time for this negative ballot.
A much more extensive public comment and rebuttal to the committee statement will be submitted with the latest recommendations of the Illuminating Engineering Society of North America (IESNA). The ten-footcandle minimum is based on the central value recommended in the IESNA Ready Reference I have used for this proposal. Lighting fixtures capable of 20 footcandles of stairway illumination are actually better for older stairway users. Stairway lighting is important, indeed essential, if we are to address adequately the huge problem of stairway safety (as described at length in my proposal 101B-33).

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(Log #CP49)

101B- 91 - (4-6.3): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise the title of 4-6.3 and make editorial revisions as follows:
4-6.3 Secondary Means of Escape from Sleeping Rooms. In addition to the primary route, each sleeping room in small residential board and care homes that are not protected by an approved, automatic sprinkler system shall have a secondary means of escape that consists of one of the following:
(a) A door, stairway, passage, or hall providing a path of unobstructed travel to the outside of the dwelling at street or ground level that is independent of and remotely located from the primary means of escape
(b) A passage through an adjacent nonlockable space, independent of and remotely located from the primary means of escape, to any approved means of escape
(c) * An outside window or door operable from the inside without the use of tools, keys, or special effort, and that provides a clear opening of not less than 5.7 ft2 (0.53 m $^2$ ) with the width not less than 20 in. (51 cm) and the height not less than 24 in. (61 cm). The bottom of the opening shall be not more than 44 in. (112 cm) above the floor. Such means of escape shall be acceptable under any of the following conditions:
1. The window is within 20 ft (6.1 m) of grade.
2. The window is directly accessible to fire department rescue apparatus, as approved by the authority having jurisdiction.
3. The window or door opens onto an exterior balcony.

Exception: If the sleeping room has a door leading directly to the outside of the building with access to grade or to a stairway that meets the requirements of exterior stairs, that means of escape shall be considered as meeting all the escape requirements for the sleeping room.
**SUBSTANTIATION:** Correlation with NFPA 101-2000 and editorial clarification.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP50)

101B- 92 - (4-6.8.1): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise the small board and care occupancy corridor wall provisions of 4-6.8.1 as follows:
4-6.8.1 The separation walls of sleeping rooms shall be capable of resisting fire for at least 1/2 hour, which is considered to be achieved if the partitioning is finished on both sides with lath and plaster or material that provides a 15-minute thermal barrier. Sleeping room doors shall be substantial doors, such as those of 13/4-in. (4.4-cm) thick, solid bonded wood core construction or of other construction of equal or greater stability and fire integrity. Any vision panels shall be fixed fire window assemblies or shall be wired glass not exceeding 1296 in.$^2$ (84 cm$^2$) each in area and installed in approved frames.
Exception No. 1: In prompt evacuation capability facilities, all sleeping rooms shall be separated from the escape route by smoke partitions in accordance with 3-13 ~~walls and doors that are at least smoke resistant.~~ Door closing shall be regulated by 4-6.8.4. The provisions of 3-13.3.5 shall not apply.
Exception No. 2: ~~Corridor~~ This requirement shall not apply to corridor walls and doors that are smoke partitions in accordance with 3-13, ~~capable of resisting the passage of smoke~~ and that are protected by approved, automatic sprinklers on both sides of the wall and door ~~are exempted.~~ In such instances, there shall be no limitation on the type or size of glass panels. Door closing shall be regulated by 4-6.8.4. The provisions of 3-13.3.5 shall not apply.
Exception No. 3:* Sleeping arrangements that are not located in sleeping rooms shall be permitted for ~~nonresident~~ staff members, provided alarm audibility in the sleeping area is sufficient to awaken staff who might be sleeping.
A-4-6.8.1 Exception No. 3 It is the intent to prohibit the use of Exception No. 3 to 4-6.8.1 if the staff member is also a board and care occupancy resident who receives personal care services.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP53)

101B- 93 - (5-3.1.1.1.3.4): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 5-3-1.1.1.3.4 as follows:
5-3-1.1.1.3.4 Existing Corridor Doors in Large Residential Board and Care Facilities. In large residential board and care facility buildings that are protected throughout by an approved, automatic sprinkler system, existing corridor doors in renovations and conversions, from an existing residential or health care occupancy to a residential board and care occupancy, that are nonrated doors that resist the passage of smoke shall be permitted to continue to be used. ~~(See definition of Conversion in Section 2-2.)~~
**SUBSTANTIATION:** Correlation with NFPA 101-2000 and editorial clarification.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP52)

101B- 94 - (5-3.1.1.3): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Relocate 5-3-1.1.3 to 5-3-2.6.3 as follows:
5-3-2.6.3 ~~5-3-1.1.3~~ Exit Passageway Enclosure Openings. Existing fixed wired glass panels in steel sash and fire windows shall be permitted to be continued in use in existing exit passageway separations in a building protected throughout by an approved, automatic sprinkler system.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP54)

101B- 95 - (5-3.2.1.2 (New) ): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Add a 5-3-2.1.2 as follows:
5-3-2.1.2 Egress Capacity Width. In determining the width of any existing door installation for purposes of calculating capacity, only the clear width of the doorway when the door is in the full open position shall be measured. Clear width shall be determined in accordance with 3-3.2.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP55)

101B- 96 - (5-3.2.2.4.6.2): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 5-3-2.2.4.6.2 as follows:
5-3-2.2.4.6.2* Guard Minimum Height. Existing guards on existing stairs shall be at least 30 in. (76 cm) high. Existing guards, for other than stairs, within dwelling units shall be at least 36 in. (91 cm) high.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP57)

101B- 97 - (5-3.2.4.5.6): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 5-3-2.4.5.6 as follows:
5-3-2.4.5.6 Horizontal Exit Bridge and Balcony Exposure Protection. ~~In existing buildings, where bridges have solid sides that are at least 6 ft (183 cm) in height, the exposure protection provisions of 3-2.4.5.6 shall not be required.~~ Where approved by the authority having jurisdiction, existing bridges and balconies shall be exempt from the exposure protection provisions of 3-2.4.5.6.
**SUBSTANTIATION:** Correlation with NFPA 101-2000.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP56)

101B- 98 - (5-3.2.5.2): Accept
**SUBMITTER:** Technical Committee on Means of Egress
**RECOMMENDATION**: Revise 5-3-2.5.2 as follows:
New ramps built in existing buildings or facilities, where existing space limitations ~~slopes~~ necessitate a steepness greater than permitted for new construction, shall be permitted to have slopes not exceeding 1 in 10 for rises more than 3 in. (7.6 cm) but not more than 6 in. (15.2 cm); and shall be permitted to have slopes not exceeding 1 in 8 for rises not more than 3 in. (7.6 cm). Existing ramps shall be permitted to remain in use or be rebuilt if they meet the requirements shown in Table 5-3-2.5.2. Existing ramps with slopes not steeper than 1 in 6 shall be permitted to remain in use, where approved by the authority having jurisdiction.

**Table 5-3-2.5.2 Existing and Rebuilt Ramps**

| Element | Dimension |
|---|---|
| Minimum width | 30 in. (76 cm) |
| Maximum slope | 1 in 8 |
| Maximum height between landings | 12 ft (3.7 m) |

**SUBSTANTIATION:** Clarification of intent.
**COMMITTEE ACTION:** Accept.
**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28
**VOTE ON COMMITTEE ACTION:**
AFFIRMATIVE: 28

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(Log #CP58)

101B- 99 - (5-3.10.2.1, 5-3-10.2.2, 5-3-10.3.3, 5-3-10.4.1.2, and 5-3-10.4.2): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Revise the 5-3-10's as follows:

~~5-3-10.2.1 Exit Sign Dimensional Criteria. Existing signs that have the required wording in legible letters not less than 4 in. (10.2 cm) high shall be exempt from the dimensional criteria of 3-10.2.1. Existing signs, subject to approval of the authority having jurisdiction, shall be exempt from the dimensional criteria of 3-10.2.1.~~

~~5-3-10.2.2 Exit Sign Legibility and Laboratory Listing. Existing signs that have the required wording in legible letters not less than 4 in. (10.2 cm) high shall be exempt from the legibility minimum distance and listing criteria of 3-10.2.2. Existing signs, subject to approval of the authority having jurisdiction, shall be exempt from the legibility minimum distance and listing criteria of 3-10.2.2.~~

~~5-3-10.3.3 Internally Illuminated Exit Sign Visibility. Existing signs, subject to the approval of the authority having jurisdiction, shall be exempt from the visibility equivalence criterion of 3-10.3.3.~~

~~5-3-10.4.1.2 Exit Sign Directional Indicator. Subject to the approval of the authority having jurisdiction, existing directional exit signs shall be exempt from the criteria of 3-10.4.1.~~

~~5-3-10.4.2 "NO EXIT" Signs. Existing signs, subject to the approval of the authority having jurisdiction, shall be exempt from the "NO EXIT" sign criteria of 3-10.4.2.~~

5-3-10 Where compliance with the headroom requirements of 3-1.2 does not permit the use of signs with 6-in. (15.2-cm) letters, smaller letters shall be permitted subject to approval of the authority having jurisdiction.

**SUBSTANTIATION:** The installation of exit signs complying with the requirements for new construction is not an undue burden during renovations of existing buildings. The proposed new 5-3-10 recognizes that in existing buildings it is often difficult, and in some instances nearly impossible, to comply with both the minimum headroom requirement and the minimum letter size for signs. The authority having jurisdiction will be permitted to approve exit signs with smaller letters. This allowance is reasonable.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #CP14)

101B- 100 - (A-3-2.1.6.3 (New) ): Accept

**SUBMITTER:** Technical Committee on Means of Egress

**RECOMMENDATION**: Add annex text to 3-2.1.6.3 to read:

A-3-2.1.6.3 The locking provisions applicable to detention and correctional occupancies were written assuming that detention and correctional facilities, or those portions of facilities having such occupancy, are provided with 24-hour staffing. In areas where all locks cannot be unlocked remotely in compliance with 3-2.1.6.3.2, staff needs to be within three floors or a 300-ft (91-m) horizontal distance of the access door of each resident housing area.

In addition, for Use Condition III, Use Condition IV, and Use Condition V, the arrangement needs to be such that the staff involved starts the release of locks necessary for emergency evacuation or rescue and initiates other necessary emergency actions within 2 minutes of alarm.

**SUBSTANTIATION:** Correlation with NFPA 101-2000.

**COMMITTEE ACTION:** Accept.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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(Log #1)

101B- 101 - (A-3-6): Reject

**SUBMITTER:** William P. Bresnan, Lakewood, NJ

**RECOMMENDATION**: Add new text:

The cove base molding common in hi-rise buildings and other large commercial and residential occupancies, may incorporate the use of an embossed directional system to direct occupants to a means of egress.

**SUBSTANTIATION:** This system aids in finding exit door in heavy smoke alleviating the problem of disorientation even for fire fighters. If evacuee can get to a wall, he or she will have a life-line to the exit door. They can crawl whereby the heat is less intense and breathing is easier at floor level.

Note: Supporting material is available for review at NFPA Headquarters.

**COMMITTEE ACTION:** Reject.

**COMMITTEE STATEMENT:** The system recommended by the submitter would not be prohibited by current code text. The proposed wording makes no real change to the document. It is not the committee's intent to recommend the use of proprietery devices for which there is no proven need.

**NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE:** 28

**VOTE ON COMMITTEE ACTION:**

AFFIRMATIVE: 28

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