Report of the Committee on
Motor Vehicle and Highway Fire Protection

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Committee Scope: This Committee shall have primary responsibility for documents on motor vehicle fire prevention and protection measures to reduce loss of life and property damage in the operation and maintenance (repair) of such vehicles (except as specified herein); fire prevention and protection recommendations for motor freight terminals; protection for tunnels, air right structures and bridges; and to recommend protection facilities on limited-access highways. Included as motor vehicles are trucks, buses, taxicabs, limousines, and passenger cars; excluded are the design, fire protection, and operational procedures for fire apparatus, manufactured homes and recreational vehicles, tank vehicles of all kinds for handling flammable and combustible liquids and liquefied petroleum gases, and vehicles transporting explosives and other hazardous chemicals. The construction and protection of garages is handled by the NFPA Committee on Garages.

This list represents the membership at the time the 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.

This portion of the Technical Committee Report of the Committee on Motor Vehicle and Highway Protection is presented for adoption.


This Report on Comments has been submitted to letter ballot of the Technical Committee on Motor Vehicle and Highway Fire Protection, which consists of 13 voting members. The results of the balloting, after circulation of any negative votes, can be found in the report.
502-1 - (Entire Document): Accept

SUBMITTER: Technical Committee on Motor Vehicle and Highway Fire Protection

COMMENT ON PROPOSAL NO: 502-2

RECOMMENDATION: Due to editorial error the committee accepted technical changes as well as editorial changes to comply with the manual of style the intent of the committee was to accept the technical changes from the ROP and incorporate them into manual of style (Log #CC6).

SUBSTANTIATION: To clarify the committee actions in the ROP.

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 13

VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 11

NOT RETURNED: 2 Harvison, Smith

502-2 - (1-8): Accept

SUBMITTER: Technical Committee on Motor Vehicle and Highway Fire Protection

COMMENT ON PROPOSAL NO: 502-19

RECOMMENDATION: Reject Proposal 502-19 (Log #1).

SUBSTANTIATION: The Committee Action on Comment 502-8 (Log #CC5) has clarified the location of emergency lighting and the minimum lighting levels necessary. The definition of egress path is not necessary as this reference has been removed from the section by Comment 502-8 (Log #CC5).

This recommendation was generated as a result of a Task Group formed to address egress issues that were contained in Proposals 502-3 (Log #CC5), 502-19 (Log #1), 502-48 (Log #3), 502-91 (Log #4), 502-47 (Log #5), 502-114 (Log #19) and 502-46 (Log #23).

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 13

VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 11

NOT RETURNED: 2 Harvison, Smith

502-3 - (4-2): Accept

SUBMITTER: Technical Committee on Motor Vehicle and Highway Fire Protection

COMMENT ON PROPOSAL NO: 502-47

RECOMMENDATION: Accept Proposal 502-47 (Log #5).

SUBSTANTIATION: See Committee Action on Comment 502-5 (Log #CC6).

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 13

VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 11

NOT RETURNED: 2 Harvison, Smith

502-4 - (4-2): Accept

SUBMITTER: Technical Committee on Motor Vehicle and Highway Fire Protection

COMMENT ON PROPOSAL NO: 502-48

RECOMMENDATION: Reject Proposal 502-48 (Log #3).

SUBSTANTIATION: See Committee Action on Comment 502-5 (Log #CC6).

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 13

VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 11

NOT RETURNED: 2 Harvison, Smith

502-5 - (4-2 (New)): Accept

SUBMITTER: Technical Committee on Motor Vehicle and Highway Fire Protection

COMMENT ON PROPOSAL NO: 502-46

RECOMMENDATION: Accept Proposal 502-46 (Log #23) with the following changes:

Modify (c) to read as follows:

(c) Where tunnel length equals or exceeds 240 m (800 ft) and where the maximum distance from any point within the tunnel to an area of safety exceeds 120 m (400 ft), all provisions of this standard shall apply.

(d) Where the tunnel length equals or exceeds 300 m (1000 ft) all provisions of this standard shall apply.

SUBSTANTIATION: The committee agrees with the submitter regarding the provisions for shorter tunnels. However tunnels that exceed 240 m (800 ft) but have access to an area of safety within 120 m (400 ft) provide a sufficient level of safety for tunnel users. The committee further wanted to ensure that tunnels over 300 m (1000 ft) are ventilated under any conditions.

This recommendation was generated as a result of a Task Group formed to address egress issues that were contained in Proposals 502-3 (Log #CC5), 502-19 (Log #1), 502-48 (Log #3), 502-91 (Log #4), 502-47 (Log #5), 502-114 (Log #19) and 502-46 (Log #23).

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 13

VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 11

NOT RETURNED: 2 Harvison, Smith

502-6 - (4-15 (New)): Accept

SUBMITTER: Technical Committee on Motor Vehicle and Highway Fire Protection

COMMENT ON PROPOSAL NO: 502-3

RECOMMENDATION: New Section 4.15. Emergency Egress as follows:

4.15.1 General. Emergency egress requirements for all road tunnels and those roadways beneath air-right structures that the authority having jurisdiction determines are similar to a road tunnel shall be in accordance with 4.15.2 through 4.15.7.

4.15.2.2 Identification. Emergency exits and cross passageways shall be marked in accordance with 7.10 of NFPA 101.

4.15.3 Walking Surfaces. The walking surfaces of the emergency exits, cross passageways and walkways shall be slip resistant.

4.15.3.2 Changes in elevation, ramps, and stairs shall meet the requirements of NFPA 101, Chapter 7.

4.15.3.3 Tenable Environment*. A tenable environment shall be provided in those portions of the tunnel that are not involved in an emergency and in all emergency exits and cross passageways.

A.4.15.3.3 Some factors that should be considered in maintaining a tenable environment for periods of short duration can be defined as follows.

(a) Air temperatures as follows: maximum of 60°C (140°F) for a few seconds, averaging 49°C (120°F) or less for the first 6 minutes of the exposure and decreasing thereafter.

(b) Air carbon monoxide (CO) content as follows: maximum of 2000 ppm for a few seconds, averaging 1500 ppm or less for the first 6 minutes of the exposure, averaging 800 ppm or less for the first 15 minutes of the exposure, averaging 50 ppm or less for the remainder of the exposure. These values should be adjusted for altitudes above 984 m (3000 ft).

(c) CO generated during smoke conditions that does not exceed 800 ppm based on a 30-minute evacuation period. CO concentrations should decrease as the evacuation period increases.

(d) Smoke obscuration levels that are continuously maintained below the point at which a sign illuminated at 80 lx (7.5 fcandlces) or equivalent brightness for internally illuminated signs, is discernible at 30 m (100 ft), and doors and walls that are discernible at 10 m (35 ft).

(e) Radiation heat flux as follows: maximum of 6305 W/m² (2000 Btu/ft²/hr) for a few seconds, averaging 1576 W/m² (500 Btu/ft²/hr) or less for the first 6 minutes of the exposure, averaging 946 W/m² (300 Btu/ft²/hr) or less for the remainder of the exposure.

(f) Air velocities in the enclosed tunnel should be greater than or equal to 0.82 m/s (150 fpm) and less than or equal to 12 m/s (2900 fpm).

(g) Noise levels as follows: maximum of 115 dba for a few seconds, maximum of 92 dba for the remainder of the exposure.

4.15.4.1 Doors. 4.15.4.1.1 Doors to the emergency exits shall open in the direction of exit travel.

4.15.4.2 Doors to cross passageways shall be permitted to open in either direction.

4.15.4.3 Doors shall be listed fire doors with a minimum 1-hour rating and shall be installed in accordance with NFPA 80, Standard for Fire Doors and Fire Windows.
4.15.4.4. Doors shall be equipped with hardware in accordance with NFPA 101, Life Safety Code®.
4.15.4.5. The force required to open the doors fully when applied to the latch side shall be as low as possible, but shall not exceed 220N (50 lb).
4.15.4.6. Doors and hardware shall be designed to withstand positive and negative pressures created by passing vehicles.
4.15.5. Maintenance. Emergency exits, cross passageways and walkways shall be maintained to allow for their intended use.
4.15.6. Emergency Exits. A.4.15.2 Emergency Exits. Only the exit design and construction requirements from NFPA 101®, Life Safety Code® should be applied to tunnels. It is not the intent of these requirements to have the travel distances required within NFPA 101®, Life Safety Code® to be applied to tunnels.
4.15.6.3. The emergency exits shall be enclosed in a minimum 2 hour fire rated enclosure having a Class A interior finish as defined in NFPA 101®, Life Safety Code®.
4.15.7. Cross Passageways. Where tunnels are divided by a minimum of 2 hour fire rated construction or where tunnels are in two bores, cross passageways between the tunnels shall be permitted to be utilized in lieu of emergency exits. The following requirements shall be met:
   a. Cross passageways shall not be farther than 200 m (656 ft) apart.
   b. Openings in cross passageways shall be protected with self closing fire door assemblies having a minimum of a 1-hour rating and shall be installed in accordance with NFPA 80, Standard for Fire Doors and Fire Windows.
   c. An emergency egress walkway with a minimum clear width of 1 m (3.6 ft) shall be provided on each side of the cross passageways.
   1. Walkways shall be protected from oncoming traffic by either a curb, change in elevation or barrier.
   2. Walkways shall be continuous the entire length of the tunnel, terminating at surface grade.
   3. Raised walkways in tunnels shall have guards in accordance with Section 7.2.2.2 of NFPA 101®, Life Safety Code®.
   4. Intermediate rails shall not be required for walkway guards.
   d. Where portals of the tunnel are below surface grade, surface grade shall be made accessible by a stair, vehicle ramp or pedestrian ramp.

SUBSTANTIATION: Instead of a new chapter this information would be more appropriately placed as a section of Chapter 4. As per the proposal references to NFPA 101 have been added in the appropriate places. Additional information on cross passageways was also added because this issue is unique to tunnels.

This recommendation was generated as a result of a Task Group formed to address egress issues that were contained in Proposals 502-3 (Log #CC2), 502-19 (Log #1), 502-48 (Log #3), 502-91 (Log #4), 502-47 (Log #5), 502-114 (Log #19) and 502-46 (Log #23).

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 13

VOTE ON COMMITTEE ACTION: AFFIRMATIVE: 11
NOT RETURNED: 2 Harvison, Smith

502-8 - (8-6): Accept

SUBMITTER: Technical Committee on Motor Vehicle and Highway Fire Protection

COMMENT ON PROPOSAL NO: 502-114

RECOMMENDATION: Revise 8.6 Lighting as follows:
8.6 Emergency Lighting
8.6.1 Emergency lighting systems shall be installed and maintained in accordance with NFPA 70, National Electrical Code; NFPA 110, Standard for Emergency and Standby Power and NFPA 70B.
8.6.2 Emergency lights, exit lights and essential signs shall be included in the emergency lighting system and shall be powered by an emergency power supply.
8.6.3 Emergency fixtures, exit lights and signs shall be wired separately from emergency distribution panels.
8.6.4 Emergency lighting levels for roadways and walkways shall be maintained in those portions of the tunnel that are not involved in an emergency.
8.6.5* There shall be no interruption of the lighting levels for greater than 0.5 seconds.
8.6.6 Lighting may be maintained without interruption by duplicate independent power systems, uninterruptible power supplies and standby generators.
8.6.7 The illumination levels of tunnel roadways, walkways and walking surfaces shall not be less than 3 lx (0.38 footcandles) at the walking surface.
8.6.8 Lighting shall be provided to highlight special emergency features including but not limited to fire alarm boxes, extinguishers and telephones and special feature instructional signage.

SUBSTANTIATION: This section addresses emergency lighting provisions and is more appropriately titled as such. The committee agrees with the submitter that minimum lag time for emergency lighting operation should be stated. However, the committee feels that 0-25 seconds is too great a window to reduce the possibility of accidents, and that the emergency lighting should be provided immediately. The Task Group also recommended further details regarding the location and installation of the equipment. This recommendation was generated as a result of a Task Group formed to address egress issues that were contained in Proposals 502-3 (Log #CC2), 502-19 (Log #1), 502-48 (Log #3), 502-91 (Log #4), 502-47 (Log #5), 502-114 (Log #19) and 502-46 (Log #23).

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 13

VOTE ON COMMITTEE ACTION: AFFIRMATIVE: 11
NOT RETURNED: 2 Harvison, Smith

502-9 - (8-7): Accept

SUBMITTER: Technical Committee on Motor Vehicle and Highway Fire Protection

COMMENT ON PROPOSAL NO: 502-116

RECOMMENDATION: Reject Proposal 502-116

SUBSTANTIATION: According to the National Electrical Code each grounded system originating from either an electrical service or separately derived system is required to be grounded at one and only one place. At the present time the NEC does not allow any additional re-grounding of the grounded (neutral) conductor. Nor does the NEC permit random electrical connections between the grounded conductor and the equipment grounding conductor at other than the origin. the inclusion of separate grounding points of a grounded conductor in addition to the one required at the service or at a separately derived system will create parallel paths for normal load currents as well as fault currents. Code Making Panel 5 strongly believes that parallel paths for ordinary line current and in some cases, fault level return currents can be a most dangerous situation.

The grounding provisions of Article 250 of NFPA 70 were designed for buildings and structures of any size. The reference to high impedance is actually an NEC violation. High impedances in return fault current paths have never been permitted by the NEC.

The inclusion of this recommendation would be in direct conflict with the NEC.

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 13

VOTE ON COMMITTEE ACTION: AFFIRMATIVE: 11
NOT RETURNED: 2 Harvison, Smith
502-10 - (A-6.1.5 (New) ); Accept

SUBMITTER: Technical Committee on Motor Vehicle and Highway Fire Protection

COMMENT ON PROPOSAL NO: 502-82

RECOMMENDATION: Add new paragraph to A.6.1.5 to refer to ASME document.

Further assistance is provided in "A Basis for Determining Fill Times for Dry Fire Lines in Highway Tunnels"

Add ASME reference to Annex B.

A Basis for Determining Fill Times for Dry Fire Lines in Highway Tunnels; Kenneth J. Harris; SERA-Vol.6, Safety Engineering and Risk Analysis; Editor FJ Mintz, Book No G01083-1996; ASME International, 345 East 47th Street, New York, NY 10017

SUBSTANTIATION: To further assist in predesign calculation of the fill time of a long horizontal standpipe system.

COMMITTEE ACTION: Accept

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 13

VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 11
NOT RETURNED: 2 Harvison, Smith