A17.1-201X, Safety Code for Elevators and Escalators

(Proposed Revisions of ASME A17.1-2013)
TN 03-1806

Description:
TN 03-1806 (Rack& Pinion): Update of A17.1 Section 4.1 on RACK & PINION that addresses negative comments received on LB #13-1396.

Explanation:
To harmonize the Rack and Pinion section to code language developed in other sections of ASME A17.1-2013/CSA B44-13; to update the structure of section 4.1 in following the same requirement numbering of Part 2; and to update the requirements of Rack and Pinion Drives with the appropriate areas of the new MRL requirements.

<table>
<thead>
<tr>
<th>Definition</th>
<th>Add definition to define a term used on rack and pinion machine types.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SECTION 4.1 RACK AND PINION ELEVATORS</strong></td>
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<tr>
<td>This Section applies to an elevator with a car raised and lowered by a pinion(s) on a rack(s).</td>
<td>Editorial to indicate that more than one rack is possible.</td>
</tr>
<tr>
<td>NOTE: See also Part 8 for additional requirements that apply to rack-and-pinion elevators.</td>
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</tr>
<tr>
<td><strong>4.1.1 Hoistways, Hoistway Enclosures, and Related Construction of Hoistways and Hoistway Enclosures</strong></td>
<td>Rename heading to coincide with section 2.1.</td>
</tr>
<tr>
<td>Hoistways, hoistway enclosures, and related construction Shall conform to Part 2, except 2.7 (see 4.1.2) and 2.8 (see 4.1.3), 2.1.1, 2.1.2, 2.1.4, 2.1.5, and 2.1.6. When a floor is provided over a hoistway it shall conform to 2.1.3.</td>
<td>Limit the reference to part 2 with requirements specific to Construction of Hoistways and Hoistway Enclosures</td>
</tr>
<tr>
<td><strong>4.1.2 Pits</strong>&lt;br&gt;Shall conform to Section 2.2</td>
<td>To add specific reference to Pits.</td>
</tr>
<tr>
<td>Note: requirements for machine rooms and machinery spaces moved to 4.1.7</td>
<td></td>
</tr>
<tr>
<td><strong>4.1.3 Location and Guard of Counterweights</strong>&lt;br&gt;When provided counterweights shall conform to the requirements of Section 2.3</td>
<td>To add specific reference to Location and Guard of Counterweights.</td>
</tr>
<tr>
<td>Note: requirements for equipment in Hoistways or machine rooms moved to 4.1.8</td>
<td></td>
</tr>
<tr>
<td><strong>4.1.4 Vertical Clearances and Runbys for Cars and Counterweights</strong>&lt;br&gt;Shall conform to Section 2.4</td>
<td>To add specific reference to Vertical Clearances and Runbys for Cars and Counterweights.</td>
</tr>
<tr>
<td>Note: requirements for supports and foundations moved to 4.1.9</td>
<td></td>
</tr>
<tr>
<td><strong>4.1.5 Horizontal Car and Counterweight Clearances</strong>&lt;br&gt;Shall conform to Section 2.5</td>
<td>To add specific reference to Horizontal Car and Counterweight Clearances.</td>
</tr>
</tbody>
</table>

**Backup roller(s)**, a roller that limits the separation of a pinion from a rack.
4.1.6 Protection of Space Below Hoistways
Where a hoistway does not extend to the lowest floor of the building or structure and there is space below the hoistway that is accessible, requirements of 4.1.6.1 and 4.1.6.2 shall apply.

4.1.6.1 Where the Space Is Underneath the Counterweight and/or its Guides
The following shall apply:
(a) The counterweight shall be provided with a counterweight safety conforming to 4.1.17; and
(b) When Spring buffers are used, they shall conform to 4.1.22, except that they shall not be fully compressed when struck by the counterweight at the following speeds:
   (1) at governor tripping speed (see Table 4.1.9.1) where the counterweight safety is governor operated or
   (2) 125% of the rated speed where the counterweight safety is not governor operated.

4.1.6.2 Where the Space Is Underneath the Car and/or its Guides
The following shall apply:
(a) When spring buffers are used, they shall be so designed and installed that they will not be fully compressed solid or to a fixed stop when struck by the car with its rated load at the governor tripping speed (see Table 4.1.18.1).

4.1.7 Machinery Rooms and Machinery Spaces, Control Spaces, and Control Rooms

4.1.7.1 Location of Machinery Spaces, Control Spaces, and Control Rooms
4.1.7.1.1 Location of Control Rooms. Rack and Pinion elevator control rooms where provided shall conform to 2.7.6.1.
4.1.7.1.2 Location of Machinery Spaces and Control Spaces. Shall conform to 2.7.6.2.
   NOTE: For Rack and Pinion Elevators inside the hoistway is limited to on or in the car.
4.1.7.1.3 Location of Equipment. The location of equipment used directly in connection with the rack and pinion elevator shall conform to the requirements of 2.7.6.3.1 through 2.7.6.3.4.
4.1.7.1.4 Means necessary for test. Where a rack and pinion elevator driving-machine brake or an emergency brake, or an elevator brake, or an elevator motion controller or motor controller is located in the hoistway, means necessary for tests that require movement of the car or release of the driving-
machine brake or emergency brake, shall be provided and arranged so that they can be operated from outside the hoistway.

4.1.7.1.5 Equipment Exposure to Weather. Shall conform to 2.7.6.6.

4.1.2.1 Motors, electrical control equipment, and other equipment used in conjunction with the elevators shall be permitted to be located within the hoistway and/or on the car. If it is in a separate machine room and/or machinery space, it shall conform to 2.7.

4.1.7.2 Control Rooms
Shall conform to the following:
(a) Be separated from the remainder of the building where the building code requires fire-resistive construction.
(b) Shall be enclosed with noncombustible material to a height not less than 2000 mm (79") where the building code does not require fire-resistive construction of the control room. The enclosure, if of openwork material, shall reject a ball 50 mm (2 in.) in diameter.
(c) Provide a clear maintenance path of not less than 450 mm (18 in.) to all components that require maintenance.
(d) Have clear headroom of not less than 2130 mm (84 in.).
(e) Be provided with natural or mechanical means to keep the ambient air temperature and humidity in the range specified by the elevator equipment manufacturer.
(f) Be provided with permanent lighting providing minimum illumination of 200 lx (19 fc) at the floor level. The lighting control switch shall be located within easy reach of the access door.
(g) Be provided with an access door having a minimum width of 750 mm (29.5 in.) and a minimum height 2030 mm (80 in.). The door shall be self closing and self locking; provided with a spring-type lock arranged to permit the door to be opened from the inside without a key; and be kept closed and locked.
(h) Provision shall be made for permanent means of communication shall be provided between the elevator car and a remote control room.
(i) Keys to unlock the access door shall be of Group 2 security see section 8.1.

4.1.7.3 4.1.2.3 Machinery Spaces and Control Spaces on The Car Top
Shall conform to the following:
(a) A rack and pinion machine and its controls, if located on the car, shall be protected by a noncombustible enclosure(s) to prevent accidental contact. Openwork noncombustible enclosure material shall be permitted to be used for rack and pinion machines located on top of the car, provided the openwork material will reject a ball 50-mm (2 in.) in diameter.
(b) Access to the machinery space and/or control space located on the car top shall be permitted by means of the top emergency exit and shall be subject to the following:
1. Conform to the requirements of 2.14.1.5; and
2. All edges of the top emergency exit shall be smooth and free of burrs; and
3. Means shall be provided to ascend and descend safely between the floor of the elevator and the car top; and
4. Keyed to Group 1 security, see section 8.
(c) Be provided with permanent lighting providing minimum illumination of 200 lx (19 fc) at the standing surface on the car top. The lighting control switch shall be located at the point of entry.
### 4.1.7.4 Machinery Spaces and Control Spaces in The Car

Shall conform to the following:

(a) Be protected by noncombustible solid enclosure(s) to prevent accidental contact.

(b) Provided with an access panel shall be provided to the rack and pinion machine for maintenance, subject to the following:

   1. The access panels to rack and pinion control equipment located in the car shall be provided with an electric contact and lock.
   2. Shall not be self closing and shall be self locking.
   3. The access panel shall be kept closed and locked.
   4. The electric contact shall be designed to prevent operation of the rack and pinion machine when the access panel is open.
   5. The lock shall not be operable by a key that will operate locks or devices for other purposes in the building. The keys shall be available to and used only by inspectors, maintenance personnel, and repair personnel (see 8.1). Keys keyed to access control equipment shall be of Group 21 security, see section 8.1.

(c) Provided with permanent lighting having a minimum illumination of 200 lx (19 fc) at the floor level. The lighting control switch shall be located at the point of entry.

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### 4.1.7.5 Machinery Space Beneath the Car

Shall conform to 4.1.7.5(a) through 4.1.7.5(d).

(a) The rack and pinion machine shall be protected by noncombustible enclosure(s) to prevent accidental contact. Openwork noncombustible enclosure material shall be permitted to be used for rack and pinion machines located beneath the car, provided the openwork material will reject a ball 50-mm (2 in.) in diameter.

(b) Access to the machinery space shall be permitted by means of the pit access and shall comply with 2.2.4.

(c) A retractable stop shall be permanently installed and shall be subject to the following:

   1. Maintain the car no less than 2100 mm (83 in.) from the pit floor position when in its extended position.
   2. Means shall be provided to secure the retractable stop in its fully extended position.
   3. Hoistway access operation or pit inspection operation shall be provided to position the car at the retractable stop.
   4. A retractable stop electric device, see 4.1.26.2.37, shall be provided and shall comply with 2.7.5.5(a).

(d) Provided with permanent lighting having a minimum illumination of 200 lx (19 fc) at the level of the standing surface when the car is in the blocked position. The lighting control switch shall be located at the point of entry.

NOTE: For Rack and Pinion Elevators beneath the car is limited to on the car.

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### 4.1.7.6 Control Spaces Exterior to the Hoistway

Shall conform to 4.1.7.6(a) through 4.1.7.6(b).

(a) Be protected by noncombustible solid enclosure(s) to prevent accidental contact.

(b) Access shall be provided to the control space and shall be subject to the following:

   1. Access panels to control equipment shall be provided with an electric contact and lock.
(2) The access panel door(s) shall not be self closing and shall be self locking.
(3) The access panel shall be kept closed and locked.
(4) An electric contact shall be provided to remove power from the rack and pinion machine when the access panel is open. A means shall be provided to permit operation of the rack and pinion machine while performing testing and troubleshooting.
(5) Keys to access control equipment shall be of Group 1 security, see section 8.1.

In jurisdictions not enforcing NBCC, the controller shall be permitted to be located on the exterior of the hoistway wall or other approved location apart from the hoistway, elevator machine room, or elevator machinery space. A controller so located shall be available to and used only by inspectors, maintenance personnel, and repair personnel.

In jurisdictions enforcing NBCC, the controller shall be permitted to be located on the exterior of the hoistway wall or other approved location apart from the hoistway, elevator machine room, or elevator machinery space. If the controller is located outside the hoistway, machine room, and machinery spaces, it shall be made accessible only to elevator personnel.

(c) Provided with permanent lighting having a minimum illumination of 200 lx (19 fc) at the floor level. The lighting control switch shall be located within easy reach of the access door.

### 4.1.8 4.1.4.3 Equipment in Hoistways or Machine Machinery Spaces, Control Spaces and Control Rooms

Electrical equipment, wiring, pipes, and ducts in the hoistway or machinery spaces, control spaces and control rooms shall conform to 2.8, except that the main feeder of a rack and pinion machine located on the car shall be permitted to be installed in the hoistway.

### 4.1.9 4.1.4.4 Supports and Foundations

Shall be designed to support all loads imposed by the elevator (including impact loading in the event of a safety application, stop by speed limiting device, drive nut failure the car striking the car buffers in accordance with 4.1.22, or counterweight striking the counterweight buffers in accordance with 4.1.22) in accordance with the applicable building code. Allowable stresses for machinery and sheave beams or floors and their supports shall be in accordance with 2.9.4.

### 4.1.10 Guarding of Equipment and Standard Railing

In machinery spaces, control spaces and control rooms the following shall be guarded to protect against accidental contact:
(a) sheaves;
(b) exposed gears, sprockets, or drums of selectors, floor controllers, or signal machines, and their driving ropes, chains, or tapes;
(c) keys, keyways, and screws in projecting shafts.

To bring into focus the kinetic energy of rack and pinion machines.

Deleted drive nut failure since it is not applicable to rack and pinion machines.

To add specific reference to guarding of equipment and standard railings.

Note: requirements for counterweights moved to 4.1.21
<table>
<thead>
<tr>
<th><strong>4.1.10.2 Standard Railing</strong></th>
<th>Provide clarity to standard railing requirement in 4.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>When required in Section 4.1 the railing shall conform to 2.10.2</td>
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**4.1.11 4.1.5 Emergency Doors Protection of Hoistway Openings**

Emergency doors meeting the requirements of 2.11.1 shall be installed in the blind portion of the hoistway. Shall conform to Section 2.11 except in that emergency doors in 2.11.1.2 are not required when the elevator is restricted to access only by authorized personnel and is equipped with a manually operated device that permits lowering the car at an automatically controlled speed to the nearest landing.

<table>
<thead>
<tr>
<th><strong>4.1.12 Hoistway-Door Locking Devices and Electric Contacts and Hoistway Access Switches</strong></th>
<th>To add specific reference to hoistway-door locking devices and electric contacts and hoistway access switches. Note: requirement for guide rails, guide-rail supports, and fastenings moved to 4.1.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shall conform to Section 2.12</td>
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</tbody>
</table>

**4.1.13 Power Operation of Hoistway Doors and Car Doors**

Shall conform to Section 2.13.

<table>
<thead>
<tr>
<th><strong>4.1.14 4.1.6 Car Enclosures, Car Doors and Gates, and Car Illumination</strong></th>
<th>Editorial-Renumber requirement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The car enclosures, car doors and gates, and car illumination shall conform to Section 2.14</td>
<td></td>
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</tbody>
</table>

**4.1.15 4.1.7 Car Frames and Platforms**

The car frames and platforms shall conform to the design and performance requirements of Section 2.15 except for 2.15.12, and 2.15.13

<table>
<thead>
<tr>
<th><strong>4.1.16 4.1.8 Capacity and Loading</strong></th>
<th>Editorial-Renumber requirement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The elevator shall conform to the capacity and loading requirements of Section 2.16.</td>
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</tbody>
</table>

**4.1.17 4.1.9 Car Safeties and Speed Governor and Counterweight Safeties**

The car shall be provided with a safety identified in 2.17.5 or a rack and pinion safety one of the following safeties:

(a) A rack and pinion safety. The safety shall be attached to the car frame or supporting structure. All rack and pinion car safeties shall be mounted on a single car frame and shall operate on one pair of guide members or on one more vertical rack(s). The safety shall be located as required by 2.17.1, or if...
A rack and pinion safety, shall be permitted to be located above, below or in the car, provided that the members to which they are fixed are part of the car frame and are designed to withstand the forces imposed. Rack and pinion safeties are safeties in which a freely rotating safety pinion, a governor, and a safety device shall be permitted to form an integral unit mounted in the car. The freely rotating pinion travels on a stationary rack mounted vertically on a supporting the hoist-structure. The rotating pinion drives the governor. When the speed of the car reaches the tripping value, the rotating governor actuates the safety device that, in turn, brings the car to a gradual stop. A safety complying with Section 2.17.

### 4.1.17.1 Stopping Distances

In jurisdictions not enforcing NBCC, The stopping distances for rack-and-pinion safeties and the travel of the car measured from the governor tripping time to the full stop time shall not exceed the values based on rated speed given in Table 4.1.18.1. In jurisdictions enforcing NBCC, stopping distances for rack-and-pinion safeties and the travel of the car measured from the governor tripping time to the full stop time shall not exceed the values based on rated speed given in Table 4.1.9.1. When calculating stopping distances, the kinetic energy from the driving unit shall be taken into account.

### 4.1.17.2 Minimum Factors of Safety and Stresses of Safety Parts

Parts of rack and pinion safeties complying with 4.1.17(a), except springs shall have a factor of safety of not less than 3.5, and the materials used shall have an elongation of not less than 15% in a length of 50 mm (2 in.) when tested in accordance with ASTM E 8. Forged, cast, or welded parts shall be stress relieved.

### 4.1.17.3 Marking Plates for Rack and Pinion Safeties

A metal plate shall be securely attached to each safety so as to be readily visible, and shall be marked in a legible and permanent manner with letters and figures not less than 6 mm (0.25 in.) in height indicating the following:

- (a) the maximum tripping speed in m/s (ft/ min) for which the safety is permitted;
- (b) the maximum weight in kg (lb) which the safety is designed and installed to stop and sustain;
- (c) the manufacturer’s date of expiration (see 8.6.6.1), if applicable;
- (d) the manufacturer’s name or trademark.

### 4.1.18 Speed Governors

Shall conform to 4.1.18.1 or 4.1.18.2.

### 4.1.18.1 Rack and Pinion Speed Governors

Shall conform to the following:

- (a) tripping speeds shall conform to Table 4.1.18.1.
- (b) shall be provided with a-the governor overspeed switch that shall open trip at 100% of the governor tripping speed in the down direction and shall be actuated by the action of the integral rack and pinion speed governor.
- (c) the actuation of the governor overspeed switch shall cause remove power to be removed from the rack and pinion drive motor(s) and brake(s).
- (d) the overspeed switch shall be positively opened, be of the manually reset type, and shall comply with 4.1.26.2.10.
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>4.1.18.2 Speed Governors</td>
<td>Shall conform to Section 2.18.</td>
</tr>
<tr>
<td>4.1.19 Ascending Car Overspeed And Unintended Car Movement Protection</td>
<td>When required by Section 2.19 shall conform to 2.19.1, 2.19.2, and 2.19.3-4, as applicable to rack and pinion elevators or on a multiple drive system where each drive system brake is capable of holding the car at a stationary position and where such brake shall conforms to 2.19.3.2(e)-(h) through (g)(i).</td>
</tr>
<tr>
<td>4.1.20 Suspension Ropes and Their Connections</td>
<td>When provided, they shall conform to Section 2.20.</td>
</tr>
<tr>
<td>4.1.21 Counterweights</td>
<td>When provided, shall conform to Section 2.21 and 4.1.21.1.</td>
</tr>
<tr>
<td>4.1.21.1 Where a hoisting sheave or sheaves are mounted in the frame, the requirements for sheaves in 2.24.2 and 2.24.3 shall apply.</td>
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<tr>
<td>4.1.22 Car Buffers and Bumpers</td>
<td>Shall conform to Section 2.22 except as follows:</td>
</tr>
<tr>
<td>(a)</td>
<td>For car buffer springs spring buffers where used, they shall be so designed and installed that they will not be fully compressed when struck by the car with its rated load at the governor tripping speed. Kinetic energy from the drive unit shall be taken into account in the design calculations. The effect of the counterweight, where used, shall also be taken into account in the design calculations.</td>
</tr>
<tr>
<td>(b)</td>
<td>The requirements of 2.22.3.2 do not apply to car buffers.</td>
</tr>
<tr>
<td>4.1.23 Car and Counterweight Guide Rails, Guide Rail Supports, and Fastenings</td>
<td>Shall conform to Section 2.23.</td>
</tr>
<tr>
<td>4.1.24.1 Rack and Pinion Drive Machine</td>
<td>The rack and pinion drive machine shall:</td>
</tr>
<tr>
<td>(a)</td>
<td>The rack and pinion drive machine shall consist of one or more power-driven rotating pinions mounted on the car and arranged to travel on a stationary rack mounted on the supporting structure.</td>
</tr>
<tr>
<td>4.1.10 Counterweights</td>
<td>When provided, shall conform to Section 2.21 and 4.1.21.1.</td>
</tr>
<tr>
<td>4.1.11 Where a hoisting sheave or sheaves are mounted in the frame, the requirements for sheaves in 2.24.2 and 2.24.3 shall apply.</td>
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</tbody>
</table>
(b) The drive shall have at least one pinion, one rack, and two backup rollers, which at least one pinion, one rack, and one backup roller shall act on the same section of rack as the drive pinion. Driving machines utilizing a two-sided rack, where two drive pinions are located so that they are opposite each other and act as backup rollers, shall be deemed to have met this requirement.

(c) All moving parts of the driving machine shall be properly protected from accidental contact with solid or perforated metal that will reject a ball of 13 mm (0.5 in.) diameter and shall be securely fastened.

(d) The rack and pinion shall be so designed that to limit the separation of the pinion from the rack in all directions in excess of to 25% of the tooth depth of or 6 mm (0.25 in.), whichever is the lesser, cannot occur.

(e) A guard shall be provided to prevent foreign material from falling onto and lodging between the teeth of the pinion and rack, and the clearance between the moving parts and the guard shall not exceed 5 mm (0.1875 in.).

(f) The manufacturer shall be provided with a sign conforming to the following:
1) include information on the measurement for checking tooth wear on of the pinion and rack.
2) The measuring instruction show the maximum allowable wear limits for the rack and the pinion.
3) shall be indicated on a be of metal plate securely fastened and conspicuously displayed on top of the car with permanent lettering not less than 3 mm (0.125 in.).

4.1.24.2 Factor of Safety
(a) Pinions and racks shall be of steel or of material having equivalent mechanical properties or better with a minimum factor of safety of 8 based on ultimate stress for the pinion and the rack. They shall be designed to conform to AGMA 218.01, including surface hardening and an assumption of a minimum of 200 000 life cycles.
(b) Rack sections shall be fastened to the supporting structure with a factor of safety of 5 based on ultimate stress, and with dowels at each joint.

4.1.24.3 Fasteners Transmitting Load
Shall conform to 4.1.24.3.1 and 4.1.24.3.2.

4.1.24.3.1 Fasteners and Rigid Connections.
Set screws or threaded portions located in the shear plane of bolts and screws shall not be used to transmit load. Means shall be provided to ensure that there is no relative motion between rigidly joined components transmitting load. The factors of safety to be used in the design of fasteners transmitting load in driving machines and sheaves shall be not less than those specified in 4.1.24.2.

4.1.24.3.2 Flexible Connections
Where flexible couplings are used to transmit load, means shall be provided to prevent disengagement of the coupling components in the event of the failure of or excessive motion in the flexible connection.

4.1.24.4 Shaft Fillets and Keys
A fillet shall be provided at any point of change in the diameter of driving-machine shafts and sheave shafts to prevent excessive stress concentrations in the shafts (see 4.1.24.3.1). Shafts that support gears, couplings, and other members, and that transmit torque, shall be provided with tight-fitting keys.

Since the vertical rack is installed in sections made to standard lengths, it is not probable that two backup rollers will occupy the same section of rack at all times.
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1.24.5</td>
<td>Cast Iron Gears</td>
<td>Gears made of cast iron shall not be used in rack and pinion driving machines.</td>
</tr>
<tr>
<td>4.1.24.6</td>
<td>Friction Gearing and Clutches</td>
<td>Friction gearing or a clutch mechanism shall not be used to connect a driving-machine pinion(s) to the main driving mechanism.</td>
</tr>
<tr>
<td>4.1.24.7</td>
<td>Braking System and Rack and pinion Driving-Machine Brakes</td>
<td>Shall conform to Section 2.24.8</td>
</tr>
<tr>
<td>4.1.24.8</td>
<td>Means of inspection of Gears</td>
<td>Each gear case of geared machines shall have access to permit inspection of the contact surfaces of the gears. Such access need not provide a direct view of all gears, but shall be located and sized adequately to allow access by fiber optic or similar visual inspection instrumentation.</td>
</tr>
<tr>
<td>4.1.25</td>
<td>4.1.14 Terminal Stopping Devices</td>
<td>Renumber requirement</td>
</tr>
<tr>
<td>4.1.25.1</td>
<td>Normal and Final Terminal Stopping Devices General</td>
<td>Renumber and name requirement.</td>
</tr>
<tr>
<td>4.1.25.2</td>
<td>Emergency Terminal Speed Limiting Devices</td>
<td>Remove referenced requirements to traction and winding drum machines.</td>
</tr>
<tr>
<td>4.1.26</td>
<td>Operating Devices and Control</td>
<td>Editorial-Renumber requirement</td>
</tr>
<tr>
<td>4.1.26.1</td>
<td>Types of operating devices</td>
<td>Remove requirement references that solely apply to traction and/or machine rooms.</td>
</tr>
<tr>
<td>4.1.26.2</td>
<td>Electrical Protective Devices</td>
<td>Car top inspection operation provides equivalent function for machinery spaces located on the car.</td>
</tr>
<tr>
<td>4.1.26.2.1</td>
<td>Slack-ropswitch shall conform to 2.26.2.1.</td>
<td>Remove requirement references that solely apply to traction and/or machine rooms.</td>
</tr>
<tr>
<td>4.1.26.2.2</td>
<td>Motor generator running switch shall conform to 2.26.2.2.</td>
<td>Remove requirement references that solely apply to traction and/or machine rooms.</td>
</tr>
<tr>
<td>4.1.26.2.3</td>
<td>Compensating-rope sheave switches shall conform to 2.26.2.3.</td>
<td>Remove requirement references that solely apply to traction and/or machine rooms.</td>
</tr>
<tr>
<td>4.1.26.2.4</td>
<td>Motor field sensing means shall conform to 2.26.2.4.</td>
<td>Remove requirement references that solely apply to traction and/or machine rooms.</td>
</tr>
<tr>
<td>4.1.26.2.5</td>
<td>Emergency stop switch shall conform to 2.26.2.5.</td>
<td>Remove requirement references that solely apply to traction and/or machine rooms.</td>
</tr>
<tr>
<td>4.1.26.2.6</td>
<td>Broken rope, tape, or chain switches shall conform to 2.26.2.6.</td>
<td>Remove requirement references that solely apply to traction and/or machine rooms.</td>
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<td>4.1.26.2.7</td>
<td>Stop switch in pit shall conform to 2.26.2.7.</td>
<td>Remove requirement references that solely apply to traction and/or machine rooms.</td>
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<td>-----------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>4.1.26.2.8</td>
<td>Stop switch on top-of-car shall conform to 2.26.2.8.</td>
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<td>4.1.26.2.9</td>
<td>Car-safety mechanism switch, conforming to 2.26.2.9 shall be required where a car safety is provided conforming to 4.1.17 (b).</td>
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<td>4.1.26.2.10</td>
<td>Speed-governor overspeed switch when required by 4.1.18 shall conform to 4.1.18.1.</td>
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<td>4.1.26.2.11</td>
<td>Final Terminal-stopping devices conforming to 4.1.25.</td>
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<td>4.1.26.2.13</td>
<td>Buffer switches for oil buffers used with type C car safeties conform to 4.1.17.</td>
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<td>4.1.26.2.14</td>
<td>Hoistway-door interlocks and hoistway-door electric contacts conforming to 4.1.12.</td>
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<td>Car-door and gate electric contacts shall conform to 2.26.2.15.</td>
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<td>4.1.26.2.16</td>
<td>Emergency terminal stopping devices shall conform to 2.26.2.16.</td>
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<td>4.1.26.2.17</td>
<td>Car top emergency-exit electrical device shall conform to 2.26.2.18.</td>
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<td>4.1.26.2.18</td>
<td>Motor-generator overspeed protection shall conform to 2.26.2.19.</td>
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<td>Electrical contacts for hinged car platform sills shall conform to 2.26.2.20.</td>
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<td>In-car stop switch shall conform to 2.26.2.21.</td>
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<td>Stop switch in remote control rooms shall conform to 2.26.2.23.</td>
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<td>Stop switch in overhead machinery space in the hoistway shall conform to 2.26.2.24.</td>
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<td>4.1.26.2.23</td>
<td>Blind hoistway emergency door locking device shall conform to 2.26.2.25.</td>
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<td>4.1.26.2.24</td>
<td>Pit access door electric contact shall conform to 2.26.2.26.</td>
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<td>Stop switch in remote counterweight hoistways shall conform to 2.26.2.27.</td>
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<td>4.1.26.2.26</td>
<td>Car-door interlock shall conform to 2.26.2.28.</td>
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<td>4.1.26.2.27</td>
<td>Ascending car overspeed protection device shall conform to 2.26.2.29.</td>
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<td>4.1.26.2.28</td>
<td>Unintended car movement device shall conform to 2.26.2.30.</td>
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<tr>
<td>4.1.26.2.29</td>
<td>Car access panel locking device shall conform to 2.26.2.31.</td>
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<td>4.1.26.2.30</td>
<td>Hoistway access opening locking device shall conform to 2.26.2.32.</td>
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<td>A firefighter’s stop switch that conforms to the requirements of 2.26.2.33.</td>
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<tr>
<td>4.1.26.2.32</td>
<td>An unexpected car movement device that conforms to the requirements of 2.26.2.34.</td>
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<tr>
<td>4.1.26.2.33</td>
<td>An electric contact on equipment access panels in the car that conforms to 2.26.2.35.</td>
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<tr>
<td>4.1.26.2.34</td>
<td>An electric contact used on a working platform shall conform to the requirements of 2.26.2.36.</td>
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<tr>
<td>4.1.26.2.35</td>
<td>An electric contact used on a retractable stop shall conform to the requirements of 2.26.2.37.</td>
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<tr>
<td>4.1.26.2.36</td>
<td>An electric contact used on a retractable ladder shall conform to the requirements of 2.26.2.38.</td>
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<tr>
<td>4.1.26.2.37</td>
<td>A sway control guide slack suspension detection means when provided shall conform to 2.26.2.39.</td>
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4.1.26.2.39 is shown optional due to rack and pinion drives are a direct drive system utilizing a vertical stationary rack.

A Firefighter’s stop switch that conforms to the requirements of 2.26.2.33.

An unexpected car movement device that conforms to the requirements of 2.26.2.34.

An electric contact on equipment access panels in the car that conforms to 2.26.2.35.

An electric contact used on a working platform shall conform to the requirements of 2.26.2.36.

An electric contact used on a retractable stop shall conform to the requirements of 2.26.2.37.

An electric contact used on a retractable ladder shall conform to the requirements of 2.26.2.38.

A sway control guide slack suspension detection means when provided shall conform to 2.26.2.39.

4.1.15.1 Applicable Requirements. Operating devices and control equipment shall conform to 2.26.2 and to the following:

Where the rack-and-pinion machine and its controller are located on the car, the disconnecting means shall be located adjacent to the controller. Auxiliary operating devices and control equipment to rack and pinion elevators.
disconnect means shall be provided at the main landing whenever the main power supply disconnect means (required by NFPA 70 or CSA-C22.1, as applicable; see Part 9) is mounted adjacent to the controller on the car. Auxiliary disconnect means shall be accessible to authorized personnel only in order to be available for their protection and emergency use.

4.1.26.3 Contactors and Relays for Use in Critical Operating Circuits
Shall conform to Section 2.26.3.

4.1.26.4 Electrical Equipment and Wiring
Shall conform to 2.26.4.1 through 2.26.4.5 and the following.
(a) A disconnecting means shall be provided conforming to NFPA 70 or CSA-C22.1; whichever is applicable (see Part 9). The disconnecting means shall be located in a control room or a machinery space or control space located outside the hoistway.
(b) When the controller is located on the car, an auxiliary disconnecting means conforming to NFPA 70 or CSA-C22.1; whichever is applicable (see Part 9) shall be located adjacent to and within sight of the controller.

4.1.26.5 System to Monitor and Prevent Automatic Operation of the Elevator with Faulty Door Contact Circuits
System to monitor and prevent automatic operation of the elevator with faulty door contact circuits shall conform to 2.26.5.

4.1.26.6 Phase Protection of Motors
Shall conform to 2.26.6.

4.1.26.7 Installation of Capacitors or Other Devices to Make Electrical Protective Devices Ineffective
Installation of capacitors or other devices to make electrical protective devices ineffective are prohibited in accordance with 2.26.7.

4.1.26.8 Release and Application of Driving Machine Brakes
Shall conform to 2.26.8.

4.1.26.9 Control and Operating Circuits
Shall conform to 2.26.9.

4.1.26.10 Absorption of Regenerated Power
Shall conform to 2.26.10.

4.1.26.11 Car Platform to Hoistway Door Sills Vertical Distances
Shall conform to 2.26.11.

4.1.26.12 Symbols
Shall conform to 2.26.12.

4.1.26.13 Emergency Operation and Signal Devices
Emergency operation and signal service shall conform to Section 2.27.

4.1.26.14 Elevator Layout Drawings
Elevator layout drawings shall, in addition to the other data required by 2.28.1, indicate the following:
(a) the dimensions of the rack and location with respect to the guide rail; and

Remove reference to permitted voltage, this falls under the applicable electrical codes as referenced.

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<tr>
<th>Row</th>
<th>Paragraph</th>
<th>Description</th>
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<td>Electrical Equipment and Wiring</td>
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<td>System to Monitor and Prevent Automatic Operation of the Elevator with Faulty Door Contact Circuits</td>
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<td>4.1.26.7</td>
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<td>4.1.26.8</td>
<td>Release and Application of Driving Machine Brakes</td>
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<tr>
<td>8</td>
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<td>Absorption of Regenerated Power</td>
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<td>9</td>
<td>4.1.26.11</td>
<td>Car Platform to Hoistway Door Sills Vertical Distances</td>
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<td>10</td>
<td>4.1.26.12</td>
<td>Symbols</td>
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<td>Emergency Operation and Signal Devices</td>
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<td>12</td>
<td>4.1.26.14</td>
<td>Elevator Layout Drawings</td>
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</table>

Editorial: Renumber requirement
(b) the magnitude of the loads from the rack imposed on the building structure.

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<tr>
<th>4.1.29 Identification</th>
<th>Added to bring into rack and pinion identification requirements.</th>
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<th>8.1.2 Group 1: Restricted</th>
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<tr>
<td>(x) Requirement 4.1.7.3 (b) 4, machinery spaces and control spaces on the car top.</td>
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</tr>
<tr>
<td>(y) Requirement 4.1.7.6 (b) 5, machinery spaces and control spaces in the car</td>
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<th>8.1.3 Group 2: Authorized Personnel</th>
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<td>(l) Requirement 4.1.7.2 (i), control rooms</td>
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<td>(m) Requirement 4.1.7.4 (b) 5 control spaces exterior to the hoistway</td>
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<tr>
<th>8.6.6.1 Rack-and-Pinion Elevators.</th>
<th>To provide clarity to the meaning of “date of expiration”.</th>
</tr>
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<td>The maintenance of rack-and-pinion elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6. Where the car and/or counterweight safeties are sealed to prevent field adjustment and examination, they shall be returned to the manufacturer for replacement of components and calibration at the interval recommended by the manufacturer. A data plate shall be installed to show the date of expiration which is the date that indicates when the next manufacturer’s maintenance-calibration is due. The date of expiration shall be shown on the safety device data plate required in 4.1.17.3(c).</td>
<td></td>
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</table>


### TABLE 4.1.918.1 MAXIMUM AND MINIMUM STOPPING DISTANCES FOR RACK AND PINION TYPE SAFETIES WITH RATED LOAD

<table>
<thead>
<tr>
<th>Rated Speed m/s</th>
<th>Maximum Governor Speed m/s</th>
<th>Stopping Distance mm</th>
<th>Rated Speed ft/min</th>
<th>Maximum Governor Speed ft/min</th>
<th>Stopping Distance in.</th>
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<td>0.69</td>
<td>Min. 80.60</td>
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<td>0.125</td>
<td>Min. 3.47</td>
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<td>0.943</td>
<td>1.3725</td>
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<td>1.73.50.0</td>
<td>1.75</td>
<td>2.50</td>
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<td>1.86.20.0</td>
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<td>2.90</td>
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Rational: The table has been updated to a hard metric format. Renumber the table to 4.1.18.1. An edited version is shown below to help provide clarity to the revision.
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<th>Imperial Units</th>
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<td>7 420.0</td>
<td>2 0500.0</td>
</tr>
<tr>
<td>7.50</td>
<td>9.00</td>
<td>8 070.0</td>
<td>2 1900.0</td>
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<tr>
<td>8.00</td>
<td>9.60</td>
<td>9 640.0</td>
<td>2 3300.0</td>
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<tr>
<td>8.50</td>
<td>10.20</td>
<td>10 940.0</td>
<td>2 4700.0</td>
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<tr>
<td>9.00</td>
<td>10.80</td>
<td>12 260.0</td>
<td>2 6100.0</td>
</tr>
<tr>
<td>9.50</td>
<td>11.40</td>
<td>13 670.0</td>
<td>2 7500.0</td>
</tr>
<tr>
<td>10.00</td>
<td>12.00</td>
<td>15 145.0</td>
<td>2 8900.0</td>
</tr>
</tbody>
</table>
**TN 03-1807**

**Description:**
TN 03-1807 (SPPE): Update of A17.1 SECTION 5.7 SPECIAL PURPOSE PERSONNEL ELEVATORS that addresses negative comments received on LB #13-1396.

**Explanation:**
To harmonize the Rack and Pinion section to code language developed in other sections of ASME A17.1-2013/CSA B44-13; to update the structure of section 5.7 in following the same requirement numbering of Part 2; and to update the requirements of Rack and Pinion Drives with the appropriate areas of the new MRL requirements.

<table>
<thead>
<tr>
<th>5.7.1.2 Floor Over Hoistway. Where a floor conforming to 2.1.3.1 and through 2.1.3.4 shall be provided at the top of the hoistway.</th>
<th>The type of structures served by SPPE’s are not practical and necessary to provide a floor over the hoistway; harmonized with CSA B311-02.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.7.2 Pits A pit conforming to 2.2 5.7.2.1 through 5.7.2.8 shall be provided for every elevator.</td>
<td>To provide specific SPPE requirements for pits.</td>
</tr>
<tr>
<td>5.7.2.1 General A pit shall be provided for every Special Purpose Personnel Elevator.</td>
<td></td>
</tr>
<tr>
<td>5.7.2.2 Design and Construction of pits The design and construction of pits shall comply with 2.2.2.</td>
<td></td>
</tr>
<tr>
<td>5.7.2.3 Guards Between Adjacent Pits Guards between adjacent pits shall comply with 2.2.3.</td>
<td></td>
</tr>
<tr>
<td>5.7.2.4 Access to Pits Access to pits shall comply with 2.2.4.</td>
<td>Horizontal refuge space requirements removed to conform with inquiry #96-67</td>
</tr>
<tr>
<td>5.7.2.5 Illumination of Pits Illumination of pits shall comply with 2.2.5.</td>
<td></td>
</tr>
<tr>
<td>5.7.2.6 Stop Switch In Pits Stop switch in the pit shall comply with 2.2.6.</td>
<td></td>
</tr>
<tr>
<td>5.7.2.7 Minimum Pit Depth Required The pit depth shall not be less than is required for the installation of the buffers, compensating sheaves, if any, all other special purpose personnel elevator equipment located therein, and vertical clearances and bottom runby conforming to 5.7.4.1.</td>
<td></td>
</tr>
<tr>
<td>5.7.2.8 Access to Underside of Car Access to underside of car shall comply with 2.2.8.</td>
<td></td>
</tr>
<tr>
<td>5.7.3.2 Access to Enclosed Counterweights and Ropes. Access shall be provided for inspection, maintenance, and repair of an enclosed counterweight and its ropes. Doors in the counterweight enclosures shall be self-closing, self locking and shall be provided with (a) an electric contact, the opening of which will remove power from the elevator driving machine motor and brake; and (b) a self-locking keyed to tumbler lock, Group 1 security.</td>
<td>To establish security requirements.</td>
</tr>
<tr>
<td>5.7.4.2 Top of Car Clearance. There shall be a clearance of not less than 762 mm (30 in.) from the highest projection of the car top or, the car crosshead or and the equipment mounted on the car top and the nearest part of the overhead structure, when the counterweight is resting on its fully compressed buffer as required in 2.4.6 car has reached its uppermost limit of travel. For rack and pinion special purpose personnel elevators without counterweights, there shall be a clearance of not less than 762 mm (30 in.) from</td>
<td>To simplify and to encompass all accepted drive types.</td>
</tr>
</tbody>
</table>
the highest projection of the car top and the nearest part of the overhead structure, when the car has reached the uppermost limit of its travel. The top car clearance shall conform to 2.4.6 and 2.4.7.

### 5.7.4.3 Top Counterweight Clearances

The top counterweight clearance shall be not less than the sum of the following items:

- a. the bottom car runby (see 5.7.4.1);
- b. the stroke of the car buffer used, or the remaining stroke when the buffer is compressed with the car at the bottom terminal landing (see 2.4.2 and 2.22.4.8); and
- c. 150 mm (6 in.)

Gravity stopping affect not considered due to car speed limitation of 0.76 m/s (150 FPM).

### 5.7.10.4.1

The exit opening shall have an area of not less than 0.2627 m² (352400 in²), and shall not measure less than 4006 mm (16 in.) on any side.

### 5.7.13.1 Car Safeties and Governors for Traction and Winding Drum Type Elevators.

Cars suspended by wire ropes shall be provided with a car safety capable of stopping and sustaining the car with rated load. The safeties shall be Type A and shall conform to 2.17.5.1. The car safety shall be actuated by a speed governor. The governor shall be operated to set the safety in accordance with Table 2.18.2.1 with the when the car has attained a maximum permissible speed allowed being of 0.9 - 1.05 m/s (325 - 210 ft/min). The operation of the safety shall conform to 2.17.8.1. The speed governor shall be located where it cannot be struck by the car or counterweight in case of overtravel and where there is sufficient space for full movement of the governor parts. Governor ropes shall conform to 2.18.5.1 through 2.18.5.3.

### 5.7.13.2 Car Safeties and Governors for Rack and Pinion Type Elevators.

The car shall be provided with one or more safeties identified in 2.17.5 4.1.17. The safeties shall be attached to the car frame or supporting structure. All car safeties shall be mounted on a single car frame and shall operate on one pair of guide members or on one vertical rack.

Rack and pinion machines have safeties consisting of a freely rotating safety pinion, a governor, and a safety device, that shall be permitted to form an integral unit mounted on the car. The freely rotating pinion travels on a stationary rack mounted vertically in the hoistway. The rotating pinion drives the governor. When the downward speed of the car reaches the tripping value, the rotating governor actuates the safety device, which in turn, brings the car to a gradual stop.

### 5.7.16.1 Car and counterweight buffers shall;

- (a) be provided and shall conform to the applicable requirements of 2.22.1.1.1, 2.22.1.2, 2.22.2 through 2.22.3 or
- (b) 5.7.16.2 For rack and pinion elevators, spring buffers, where used, shall be so designed and installed that they will not be fully compressed when struck by the car with its rated load at governor tripping speed where the safety is

### 5.7.16.2 Marking Plates

A metal plate shall be securely attached to each safety so as to be readily visible, and shall be marked in a legible and permanent manner with letters and figures not less than 6.4 mm (0.25 in.) in height indicating the following:
- (a) the maximum tripping speed in m/s (ft/min) for which the safety may be used
- (b) the maximum weight in kg (lb), which the safety, as installed, is designed to stop and sustain

The requirement was made redundant as a result of the reference change in 5.7.13.2 to requirement 4.1.17.

### 5.7.16.3 Car and counterweight buffers shall;

(a) be provided and shall conform to the applicable requirements of 2.22.1.1.1, 2.22.1.2, 2.22.2 through 2.22.3 or

(b) 5.7.16.2 For rack and pinion elevators, spring buffers, where used, shall be so designed and installed that they will not be fully compressed when struck by the car with its rated load at governor tripping speed where the safety is

Separate requirements of car buffers for rack and pinion drives.
governor operated, or at 125% of rated speed where the safety is not governor operated. Kinetic energy from the drive unit shall be taken into account in the design calculations. The effect of the counterweight, where used, may also be taken into account in the design calculations. shall be so designed and installed that they will not be fully compressed when struck by the car with its rated load at the governor tripping speed. Kinetic energy from the drive unit and the effect of the counterweight shall be taken into account in the design calculations. The effect of the counterweight, where used, shall also be taken into account in the design calculations. (c) The requirements of 2.22.3.2 do not apply to car buffers.

<table>
<thead>
<tr>
<th>5.7.17 Car Guide Rails and Guide-Rail Fastenings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car guide rails shall be provided, and conform to 5.7.17.1 to 5.7.17.3.</td>
</tr>
</tbody>
</table>

To remove requirement that does not take into consideration the kinetic energy of the rack and pinion machine.

<table>
<thead>
<tr>
<th>5.7.17.2 Fastenings, Deflections, and Joints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guide rails shall be securely fastened, shall not deflect more than 6 mm (0.25 in.) under normal operation, and shall have their joints well-fitted and strongly secured. Guide rails and their joints and fastenings shall withstand without failure the application of the car safety when stopping the car with its rated load.</td>
</tr>
</tbody>
</table>

Editorial correction

<table>
<thead>
<tr>
<th>5.7.18.1.2 Rack and Pinion Machines</th>
</tr>
</thead>
<tbody>
<tr>
<td>The rack and pinion drive shall comply with 4.1.24, consist of one or more power-driven rotating pinions mounted on the car and arranged to travel on a stationary vertical rack mounted in the hoistway. The drive shall have at least one pinion, one rack, and two backup rollers. The pinions and rack shall be of steel with a minimum safety factor of 8 for the pinion and the rack. Driving machines located within the car shall be fully enclosed with solid or openwork metal, which shall reject a ball 13 mm (0.5 in.) in diameter and which shall be locked.</td>
</tr>
</tbody>
</table>

To create a link to the rack and pinion machine requirements in section 4.1.

<table>
<thead>
<tr>
<th>5.7.18.1.3 Traction Machines</th>
</tr>
</thead>
<tbody>
<tr>
<td>The traction drive shall comply with 2.24.</td>
</tr>
</tbody>
</table>

To add requirement special to traction type drives.

<table>
<thead>
<tr>
<th>5.7.18.1.4 Winding Drum Machines</th>
</tr>
</thead>
<tbody>
<tr>
<td>The winding drum drive shall comply with 2.24.</td>
</tr>
</tbody>
</table>

To add requirement special to winding drum type drives.

<table>
<thead>
<tr>
<th>5.7.18.3 Factor of Safety for Driving Machines and Sheaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>The factor of safety for driving machines and sheaves shall conform to 2.24.3.1 through 2.24.3.2, and 4.1.24.2 for rack and pinion machines.</td>
</tr>
</tbody>
</table>

Add requirements for rack and pinion machines.

<table>
<thead>
<tr>
<th>5.7.19 Operating Devices and Control Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating devices and control equipment shall conform to 2.26 5.7.19.1 to 5.7.19.9, except for the following, which do not apply: 2.26.1.2 For Car-Switch Operation Elevators 2.26.1.3 Additional Operating Devices for Elevators Equipped to Carry One-Piece Loads Greater Than the Rated Load 2.26.1.4 Inspection Operation (NOTE: A top-of-car operating station may be provided, and if provided, shall conform to 2.26.1.4) 2.26.1.6 Operation in Leveling or Truck Zone 2.26.2.12 Emergency Terminal-Speed Limiting Devices 2.26.2.13 Buffer Switches for Oil Buffers Used With Type C Car Safeties 2.26.2.14 Hoistway-Door Interlocks and Hoistway-Door Electric Contacts 2.26.2.17 Car Side-Emergency Exit Door Contact Switches 2.26.2.20 Electric Contacts for Hinged Car Platform Sills 2.26.10 Absorption of Regenerated Power</td>
</tr>
</tbody>
</table>

Converted Section 5.7.19 into positive code language by removing exceptions and reformatted 5.7.19.1 to 5.7.19.9 to bring forward into Section 5.7.19 applicable code language in requirement 2.26 that applies to SPPE’s.

<table>
<thead>
<tr>
<th>5.7.19.1 Operating Devices and Operating Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial to use similar wording used in 2.26.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5.7.19.1 Types of Operating Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shall conform to 5.7.19.1 and 5.7.19.2.</td>
</tr>
</tbody>
</table>

See rational stated in 5.7.19.
5.7.19.1.1 Types of Operating Devices; Types of operating devices shall conform to 2.26.1.1.

5.7.19.1.2 Inspection Operation; Inspection Operation if provided shall conform to 2.26.1.4.

5.7.19.1.3 Inspection with Open Door Circuits; if inspection operation is provided (see 5.7.19.1.2), Inspection Operation with Open Door Circuits shall be provided and shall conform to 2.26.1.5.4 through 2.26.1.5.8.

5.7.19.2 Electric Protective Devices

When an electrical protective device is activated (operated, opened), it shall cause the electric power to be removed from the elevator driving machine motor and brake. Electrical protective devices shall be provided as specified in 5.7.19.2.1 through 5.7.19.2.2738.

5.7.19.2.1 Slack rope switch. Winding drum machines shall be provided with a slack-rope device equipped with a slack-rope switch of the enclosed manually reset type. This switch shall operate whenever the ropes are slack.

5.7.19.2.2 Motor-generator running switch. Where motor generator field control is used it shall conform to 2.26.2.2.

5.7.19.2.3 Compensating-rope sheave switches when provided shall conform to 2.26.2.3.

5.7.19.2.4 Motor field-sensing means shall conform to 2.26.2.4.

5.7.19.2.5 Emergency stop switch shall conform to 2.26.2.5(a), (b) and (c).

5.7.19.2.6 Broken rope, tape, or chain switches shall be provided when required by 2.25.2.3.2 or 2.25.4.1.8(b).

5.7.19.2.7 Stop Switch in Pit. A stop switch conforming to 2.26.2.5(a), (b), and (c) shall be provided in the pit of every elevator (see 2.2.6).

5.7.19.2.8 Stop Switch on Top of Car. A stop switch conforming to 2.26.2.5(a), (b), and (c) shall be provided on the top of every elevator car.

5.7.19.2.9 Car-safety mechanism switch. A switch, conforming to 2.17.7.1 through 2.17.7.4 or 4.1.18.1 for rack and pinion safety with integral speed governors, shall be required where a car safety is provided.

5.7.19.2.10 Speed-governor overspeed switch. A speed-governor overspeed switch shall be provided and shall conform to 2.18.4.1.1, 2.18.4.1.2, and 2.18.4.2.3, or 4.1.18.1 for integral rack and pinion speed governors.

5.7.19.2.11 Final Terminal stopping devices conforming to 2.25.3.1, 2.25.3.2, 2.25.3.3.1, 2.25.3.3.2, 2.25.3.3.4, 2.25.3.5, 2.25.3.5.1, 2.25.3.5.2, and 2.25.3.5.3.

5.7.19.2.12 Not Used

5.7.19.2.13 Not Used

5.7.19.2.14 Hoistway-Door Interlocks and Hoistway-Door Electric Contacts. Hoistway-door interlocks or hoistway-door electric contacts conforming to 2.12.1 through 2.12.4 and 2.12.6 5.7.9.2 and 5.7.9.3 shall be provided for all elevators.

See rational stated in 5.7.19.

For rack and pinion safety devices the 5.7.19.2.9 car-safety overspeed switch and the 5.7.19.2.10 speed-governor switch are the same switch serving the dual function.

To carry forward exceptions taken to Part 2 requirements within the current code edition that include the following that are shown as Not Used, 5.7.19.2.12 (2.26.2.12), 5.7.19.2.13 (2.26.2.13), 5.7.19.2.17 (2.26.2.17), and 5.7.19.2.20 (2.26.2.20).
5.7.19.2.15 Car-door and gate electric contacts conforming to 2.14.4.2.1 through 2.14.4.2.5 shall be provided for all elevators except when car door interlocks conforming to 5.7.19.2.28 are provided.

5.7.19.2.16 Not Used

5.7.19.2.17 Not Used

5.7.19.2.18 Car Top Emergency-Exit Electrical Device when provided shall conform to 5.7.10.4.4

5.7.19.2.19 Motor-generator overspeed protection. When a motor-generator set is provided means shall be provided to cause the electric power to be removed automatically from the elevator driving-machine motor and brake should a motor-generator set, driven by a direct-current motor, overspeed excessively.

5.7.19.2.20 Not Used

5.7.19.2.21 Not Used

5.7.19.2.22 Not Used

5.7.19.2.23 Stop Switch in Remote Machine Rooms and Control Rooms. A stop switch conforming to 2.26.2.5(a), (b), and (c) shall be provided in remote machine and control rooms where required by 2.7.8.

5.7.19.2.24 Stop Switch in Overhead Machinery Space in the Hoistway. A stop switch conforming to 2.26.2.5(a), (b), and (c) shall be provided in the overhead machinery space in the hoistway where required by 2.7.3.5.

5.7.19.2.25 Not Used

5.7.19.2.26 Pit Access Door Electric Contact. An electric contact shall be provided on each pit access door where required by 2.2.4.5.

5.7.19.2.27 Stop Switch in Remote Counterweight Hoistways. A stop switch conforming to 2.26.2.5(a), (b), and (c) shall be provided in the remote counterweight hoistway where required by 2.3.3.3.

5.7.19.2.28 A car door interlock conforming to 5.7.9.1.4 shall be provided where required by 2.14.4.2.1.

5.7.19.2.29 An ascending car overspeed device shall be provided on counterweighted elevators, where the counterweight is heavier than the empty car. The ascending car overspeed device when provided shall meet the requirements of 2.19.1.2(a).

5.7.19.2.30 An unintended car movement device when provided shall meet the requirements of 2.26.2.30.
<table>
<thead>
<tr>
<th>5.7.19.2.31</th>
<th>Not Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.7.19.2.32</td>
<td>Not Used</td>
</tr>
</tbody>
</table>

- **5.7.19.2.33** A firefighter’s stop switch where provided shall conform to the requirements of 2.26.2.33.
- **5.7.19.2.34** An unexpected car movement device where provided shall conform to 2.26.2.34.
- **5.7.19.2.35** An electric contact on equipment access panels where provided shall conform to 2.26.2.35.
- **5.7.19.2.36** A working platform electrical contact where provided shall conform to 2.26.2.36.
- **5.7.19.2.37** A retractable stop electrical device contact where provided shall conform to 2.26.2.37.
- **5.7.19.2.38** A retractable ladder electrical device contact where provided shall conform to 2.26.2.38.
- **5.7.19.2.39** A sway control guide slack suspension detection means when provided shall meet the requirements of 2.26.2.39.

5.7.19.3 **Contactors and Relays for Use in Critical Operating Circuits**
Where electromechanical contactors or relays are provided they shall conform to 2.26.3.

5.7.19.4 **Electrical Equipment and Wiring**
All electrical equipment and wiring shall conform to 2.26.4.

5.7.19.5 **System to Monitor and Prevent Automatic Operation of the Elevator With Faulty Door Contact Circuits**
When power-operated car doors that are mechanically coupled with the landing doors are provide they shall conform to 2.26.5.

5.7.19.6 **Phase Protection of Motors**
Elevators having a polyphase AC power supply shall conform to 2.26.6.

5.7.19.7 **Installation of Capacitors or Other Devices to Make Electrical Protective Devices Ineffective**
The installation of capacitors or other devices to make electrical protective devices ineffective shall conform to 2.26.7.

5.7.19.8 **Release and Application of Driving Machine Brakes**
The release and application of driving machine brakes shall conform to 2.26.8.

5.7.19.9 **Control and Operating Circuits**
The design and installation of the control and operating circuits shall conform to 2.26.9.

5.7.19.10 **Absorption of Regenerated Power**
The absorption of regenerated power shall conform to 2.26.10.

5.7.19.11 **Car Platform to Hoistway Door Sills Vertical Distance Not Used**
Not Used: SPPE’s are not accessible by the general public and do not comply with ANSI/ICC A117.1 or ADAAG.

5.7.19.12 **Symbols**
Not Used: SPPE’s are not accessible by the general public.

5.7.19.2.31(2.26.2.31) and 5.7.19.2.32 (2.26.2.32) not used due to the limitations of SPPE’s
5.7.19.2.33 (2.26.2.33); 5.7.19.2.34 (2.26.2.34); 5.7.19.2.35 (2.26.2.35); 5.7.19.2.36 (2.26.2.36); 5.7.19.2.37 (2.26.2.37); and 5.7.19.2.38 (2.26.2.38) are not required due to the limitations of SPPE’s however where provided they shall conform to the referenced requirements in 2.26.

5.7.19.2.39 (2.26.2.39) are not required due to the limitations of SPPE’s however where provided they shall conform to the referenced requirements in 2.26.
| 5.7.22 Layout Drawings | Information provided on layout drawings shall conform to 2.28.1 or for rack and pinion elevators, 4.1.28. | To bring in rack and pinion requirements. |
Revise 17.1 as follows:

2.27.3.1.6 When a “FIRE RECALL” switch is in the “ON” position all cars controlled by the switch shall operate as follows:

(a) A car traveling towards the designated level shall continue nonstop to the designated level and power operated doors shall open and remain open. On cars with two entrances, if both entrances can be opened at the designated level, only the doors serving the lobby where the “FIRE RECALL” switch is located shall open and remain open.

(b) A car traveling away from the designated level shall reverse at or before the next available landing without opening its doors and proceed to designated level.

(c) A stopped car shall have the in-car stop switch (see 2.26.2.21) and the emergency stop switch in the car (see 2.26.2.5) when provided, rendered inoperative as soon as the car moves away from the landing. A moving car shall have the in-car stop switch and the emergency stop switch in the car when provided, rendered inoperative without delay. Once the emergency stop switch in the car and the in-car stop switch have been rendered inoperative, they shall remain inoperative while the car is on Phase I Emergency Recall Operation. All other stop switches required by 2.26.2 shall remain operative during Phase I recall.

When provided, the in-car stop switch (see 2.26.2.21) or the emergency stop switch in the car (see 2.26.2.5) shall not be made ineffective.

2.26.7 Installation of Capacitors or Other Devices to Make Electrical Protective Devices Ineffective

The installation of capacitors or other devices, the operation or failure of which will cause an unsafe operation of the elevator, is prohibited. No permanent device that will make the traction-loss detection means or any required electrical protective device ineffective shall be installed except as provided in 2.7.6.5.2(h), 2.12.7.1, 2.26.1.4.2(g), 2.26.1.5, and 2.26.1.6, and 2.27.3.1.6(c) (see 8.6.1.6.1).

2.27.3.2.4

(c) the requirements of 2.27.3.1.6(a), (b), (c), (d), (e), (g), (h), (i), (k), and (l), except that all references to the “designated level” shall be replaced with “alternate level”

Rationale:

1. The In-Car Stop Switch is only accessible to elevator personnel. It is either behind a group 1 locked panel, or it is a group 1 key switch. Other examples of stop switches available to elevator personnel include Pit Stop Switch, Machine Room Stop Switch, and Car Top Stop Switch all of which remain operative during Phase I and Phase II Fire Recall Service. If a mechanic actuates the In-Car Stop Switch it must be assumed there is a valid reason to stop the car immediately. In this case the power should be removed from the driving machine motor and brake as intended. Per 2.27.3.1.6 (l), Means used to remove elevators from normal operation shall not prevent Phase I Emergency Recall Operation, except

(1) as specified in this Code

(2) as controlled by elevator personnel

2. The Emergency Stop Switch on freight elevators is required for use by the elevator operator for the purpose of managing safe movement of freight. This switch is an EPD required to be readily accessible, red and conspicuously marked allowing quick actuation by the operator. If the operator actuates the Emergency Stop Switch it must be assumed there is a valid reason to stop the car immediately. Any car movement can result in the need for the operator to stop the car immediately therefore this EPD should remain functional during all car movement. Misuse of the Emergency Stop Switch during Phase I Fire Recall can be quickly assessed by the firefighters with the Emergency Communication means of 2.27.1.1.4 requiring direct communication with the elevator operator in the car. The analysis shows having an operational EPD outweigh the concerns for insuring the car recall on Phase I.
5.2.2.5 CAR SAFETIES, COUNTERWEIGHT SAFETIES, PLUNGER GRIPPER, AND GOVERNORS

Alternative to Speed Governor for Roped-Hydraulic Elevators. Car and counterweight safeties and plunger gripper shall conform to 3.17, except as modified by 5.2.2.5.1 and 5.2.2.5.2.

NOTE: See also 5.2.1.18.

5.2.2.5.1 The safeties on roped-hydraulic elevators shall be operated by a speed governor or where an overspeed valve conforming to 3.19.4.7 is provided, the safeties shall be permitted to be operated by inertia where an overspeed valve conforming to 3.19.4.7 is provided.

5.2.2.5.2 Upon the parting of the suspension ropes, the safeties shall apply without appreciable delay and their application shall be independent of the location of the break in the ropes and shall be permitted to be accomplished by the use of restrained compression springs or by the action of gravity, or by both, or by positive mechanical means.

Rationale: Title was updated to clarify the requirements covered by this section to include all types of hydraulic LULA elevators. Changes were also included to clarify that safeties operated by inertia are an alternative to speed governors on roped-hydraulic LULA elevators that have an overspeed valve conforming to 3.19.4.7.
Proposed Revisions to A17.1, Part 7:

Scope: Require Type B Material Lifts to be equipped with interlocks to enhance the safety at hoistway doors. Mechanical lock and contacts will not be permitted. Increase the travel permitted for Type B Material Lifts. Note that requiring interlocks reduces the fall hazard risk that may be perceived due to the increase in travel. Revise the landing station stop button requirements to allow constant-pressure stop buttons with the latching nature maintained in the control system.

7.4.2.2 Type B Material Lifts shall be permitted to carry one operator and be provided with in-car mounted operating devices, subject to the following limitations:
(a) Access to and usage of Type B Material Lifts is restricted to authorized personnel.
(b) The rated speed is not to exceed 0.15 m/s (30 ft/min).
(c) There is penetration of only one floor.
(d) Travel does not exceed 5000 m (200 ft).
(e) They are operated only by continuous-pressure control devices.
(f) They shall not be accessible to the general public.
(g) The upper limit of travel shall be
   (1) level with the top penetrated floor; or
   (2) level with the top landing where no floor is penetrated.
(h) They are permitted to serve one or more intermediate landings, provided that these landings have doors as required in 7.4.14.

Rationale: 7.6m provides a practical limit for the operation of a device at 0.15m/s as it would require holding the operating button for 50 seconds. Jurisdictions in Canada have permitted type ‘B’ Material Lifts to have a travel greater than 5m for many years with no adverse consequences. Type ‘B’ material lifts have access and usage restricted to authorized personnel and are commonly found in industrial buildings. These types of buildings can have floor spacing greater than 5m as a result of the type of processing, storage or manufacturing being performed. Also, these buildings industrial buildings are typically slab on grade construction without provisions for elevators pits. Removing the one floor penetration restriction allows greater application of this type of device when travel is increase to 7.6m. These devices can already stop at intermediate landings and have fire rated hoistway requirements when required by the building code. No additional hazards are foreseen by removing the floor penetration restriction. The additional requirement of an interlock for this device reduce the risk of a fall that could result from increased travel as it ensures the doors are positively locked before the car leaves the landing zone.

7.4.14.7 For Type B Material Lifts, the interlock or mechanical lock and electric contact shall not be readily accessible from inside the platform.

7.4.14.8 Requirement 2.12.3 applies only to Type A Material Lifts. Combination mechanical lock and contacts are not permitted for Type B Material Lifts.

NOTE [7.4.14]: Type B Material Lifts must have full interlocks.

Rationale: Limit the Type B Material Lifts to full interlocks only. Lock and contacts will only be permitted for Type A Material Lifts. This enhances the safety of Type B material lifts by ensuring that hoistway doors are locked before the car leaves the landing. Since persons are permitted to ride, removing the mechanical lock and contact ensures that someone cannot accidentally enter a hoistway without the car present should the mechanical lock fail.
7.5.12.2.6 Requirement 2.26.2.5 does not apply. Each control station shall be provided with an emergency stop switch (switches) conforming to 2.26.2.5(a), (b), and (c). And it which shall cause the power to be removed from the driving machine when operated. Requirement 2.26.2.5(a) does not apply to the emergency stop switch located at each landing. When a constant-pressure type emergency stop switch at a landing is released the car shall not move, except for anticreep operation, until all operating devices in the car and at the landings have been returned to their non-actuated state. The car shall continue to remain stationary, except for levelling, until an operating device in the car or at the landing is actuated.

Rationale: Provide permission to use a non-latching emergency stop switch at the landings for Type B Material Lifts. This is intended to prevent operator entrapment which can occur if someone activates a latching landing emergency stop switch while the device is in use. Requiring release of all operating devices at the landing and in the car before allowing operation of the car ensures that an operator in the car can regain control of the car by releasing and actuating an operating device. Labelling requirements of 2.26.2.5(c) will still apply to the continuous pressure emergency stop switch. Operation of constant pressure emergency stop switch still requires removal of power from the driving machine while it is operated.
Proposed Revision to A17.1 Requirements 6.1.5.3.2 Main Drive Shaft Brake and 6.1.6.3.4 Drive Chain Device:

6.1.5.3.2 Main Drive Shaft Brake. If the escalator driving-machine brake is separated from the main drive shaft by a chain used to connect the driving machine to the main drive shaft, either

a) a mechanically or magnetically permanent magnet applied brake capable of stopping and holding a down-running escalator with brake rated load (see 6.1.3.9.3) shall be provided on the main drive shaft. If the brake is magnetically applied, a ceramic permanent magnet shall be used.

or

b) multiple and separate chains, each with an individual drive-chain device in accordance with 6.1.6.3.4 and each with connection to the Escalator Driving-Machine Brake(s) and/or other brake(s) with capacity capable of stopping and holding a down-running escalator with brake rated load (see 6.1.3.9.3) shall be provided.

6.1.6.3.4 Drive-Chain Device. When the driving machine is connected to the main drive shaft by a chain, a device shall be provided that will cause the application of the brake on the main drive shaft, if so equipped (see 6.1.5.3.2 a)), and will also cause the electric power to be removed from the driving machine motor and brake if any drive chain between the machine and the main drive shaft becomes disengaged from the sprockets. The device shall be of the manual reset type.

Rationale: Duplication of a system, component, or part with monitoring of the function of each is a fundamental and long accepted practice to ensure reliability and safety. It is reasonable to allow this approach to ensure the level of safety in escalator drive systems that utilize power transmission chain between the main shaft and the driving machine and brake. In addition to ensuring the braking function in case of disengagement of a drive chain, potential improvements in emergency braking can be realized with this rule revision if the function of the machine brake is maintained in lieu of a main shaft brake. This includes possible utilization of the machine brake that is type tested, which would be checked and monitored on a periodic basis, and that is operated/exercised on a regular basis demonstrating proper function. Inquiry 92-58 further supporting this TN is attached. 6.1.5.3.2 and 6.1.6.3.4 are revised to reflect the Inquiry answer to permit duplicate and monitored power transmission chains in lieu of a main shaft brake to ensure brake function.
Proposed Revision to A17.1:

2.26.8.2 Two means shall be provided to independently remove power from the brake. The electrical protective devices required by 2.26.2 shall control both means, except that leveling shall be permitted to take place with power opening of doors and gates in conformance with 2.13.2.1.1 and 2.13.2.2.1.

One of the means shall be either a contactor, or SIL rated device(s) with a SIL of not less than the highest SIL of the function for the electrical protective devices involved with removing power from the brake and shall be listed/certified in accordance with the applicable requirements of IEC 61508-2 and IEC 61508-3. SIL rated devices shall be identifiable on wiring diagrams (see 8.6.1.6.3 8.6.1.2.2(a)) with part identification, SIL, and certification identification information that shall be in accordance with the certifying organization’s requirements. This means is not required to remove power from the driving-machine motor.

If the brake circuit is ungrounded, power shall be interrupted at all power feed lines to the brake.

Assemblies containing SIL rated devices shall be labeled or tagged with the statement: “Assembly contains SIL rated devices. Refer to the Maintenance Control Program and wiring diagrams prior to performing work.”

2.26.9.3.2

(b) the software system and related circuits are listed/certified to a SIL rating that is in accordance with the applicable requirements of IEC 61508-2 and IEC 61508-3. This software system and its related circuits shall have a SIL of not less than the highest SIL value of the safety function(s) in Table 2.26.4.3.2 used in the circuit. The software system and related circuits shall be identifiable on wiring diagrams (see 8.6.1.6.3 8.6.1.2.2(a)) with part identification, SIL, and certification identification information that shall be in accordance with the certifying organization’s requirements.

Assemblies containing SIL Rated Devices shall be labeled or tagged with the statement: “Assembly contains SIL Rated Devices. Refer to Maintenance Control Program and wiring diagrams prior to performing work”.

Rationale
To correct the references for 8.6.1.2.2 (a).
Proposed Revision to A17.1:

2.14.1.7.2 When the car has reached its maximum upward movement (2.4.6.1), the following minimum clearances shall be provided from the top rail and intermediate rail of the standard railing, as specified in 2.10.2, to the building structure or elevator equipment in relative motion to the standard railing not attached to the car:

(a) when the car has reached its maximum upward movement (2.4.6.1):
   (a1) 100 mm (4 in.) vertically
   (a2) 300 mm (12 in.) horizontally towards the centerline of the car enclosure top

(b) throughout the hoistway, (b) 100 mm (4 in.) horizontally in the direction towards the hoistway enclosure.

(c) 300 mm (12 in.) horizontally towards the centerline of the car enclosure top.

NOTE: (2.14.1.7.2): See Nonmandatory Appendix G.

Rationale: Revised to ensure protection of elevator personnel against shearing hazards throughout the hoistway between the top rail and intermediate rail of the standard railing and fixed equipment passed or approached by the standard railing as the car moves throughout the hoistway.

NONMANDATORY APPENDIX G
TOP OF CAR CLEARANCE

![Diagram of top of car clearance requirements](image-url)
Proposed additional language for A17.1:

8.4.10.1.3 Elevator Operation
(b) When the counterweight displacement switch is activated, the elevator, if in motion, shall initiate an emergency stop by the immediate removal of power from the driving machine motor and brake, and then the elevator shall proceed away from the counterweight at a speed of not more than 0.75 m/s (150 ft/min) to the nearest available floor, open the doors, and shut down; except that where Phase II Emergency In-Car Operation is in effect, door operation shall conform to 2.27.3.3.

Rationale: The definition for an Emergency Stop was not well defined and needed clarification.
Revise A17.1, LULA Folding Car Doors

5.2.1.13 Power Operation of Hoistway Doors and Car Doors. When provided, power operation, power opening, and power closing of hoistway doors and car doors shall conform to 2.13, except as modified by 5.2.1.13, except that

(a) Requirement 2.13.1 does not apply. Both car and hoistway doors shall be of the horizontally sliding type or a power-operated swinging hoistway door with a power-operated horizontally sliding car door shall be permitted. Power operation of accordion or bifold type folding car doors shall be permitted.

(b) Vertically sliding doors shall not be permitted.

5.2.1.14(f) Requirement 2.14.4.3 does not apply. Doors shall be of the horizontally sliding or folding, accordion, or bifold type and so arranged to reduce the possibility of pinching. Material shall conform to 2.14.2.1.

(gf) Requirement 2.14.4.4 does not apply.

(bg) Requirement 2.14.4.7 does not apply.

(gh) Requirement 2.14.4.9 does not apply.

(jj) Requirement 2.14.4.11(b) does not apply.

(kj) Requirement 2.14.5.1 does not apply. There shall not be more than two entrances to the car.

(lk) Requirements 2.14.5.2 and 2.14.5.3 does not apply.

(ml) Requirement 2.14.5.7. The dimension for the unlocking zone shall be not more than the straight vertical face of the platform guard minus 75 mm (3 in.).

(m) Requirement 2.14.5.10 does not apply. Folding doors are not permitted.

Rationale: Requirements were modified to eliminate folding car doors on LULA applications based on a hazard analysis and current commercial industry practice. The new language closely aligns with the current requirements of part 2.
Proposed Revision to A17.1:

Proposal:
controller, motor: the operative units of a motion control system comprising the starter devices and/or power conversion equipment required to drive an electric motor.

Rationale:
To align the definition of “motor controller” with listing/certification requirements because not all “motor controllers” include power conversion equipment.
Revise A17.1-2013 as follows:

5.3.1.7 Protection of Hoistway Openings

5.3.1.7.1 Where Required—Hoistway Enclosure Provided. Where a hoistway enclosure is required provided, landing openings shall be protected by swinging or horizontally sliding doors or gates. Landing openings in solid hoistway enclosures shall be protected the full height by solid swinging or horizontally sliding doors. Their fire-protection rating shall be not less than required by the building code (see 1.3). The doors or gates shall be designed to withstand a force of 670 N (150 lbf) applied horizontally over an area 100 mm x 100 mm (4 in x 4 in.) in the center of the doors or gates without permanent displacement or deformation.

Rationale: Updated proposal to include hoistway doors whenever an enclosure is provided, not just when they are required. Removed hoistway gates to be consistent with other sections of the Standard.

5.3.1.7.2 Clearance Between Hoistway Doors or Gates and Landing Sills and Car Doors or Gates. The clearance distance between the hoistway face of the hoistway doors or gates and the hoistway edge of the landing sill shall not exceed 75 mm (3 in.) 19 mm (0.75 in) for swinging doors and 57 mm (2.25 in.) for sliding doors. The distance between the hoistway face of the landing door or gate and the car door or gate shall not exceed 125 mm (5 in.)

Rationale: Reduced clearance between hoistway door and edge of landing sill based on Hazard Analysis. Moved hoistway door to car door clearance to new section 5.3.1.8.3.

5.3.1.8.2 Car Doors and Gates. A car door or gate that, when closed, will guard the opening to a height of at least 1675 mm (66 in.) shall be provided at each entrance to the car. Car doors shall be permitted to be of solid or openwork construction that will reject a ball 75 mm (3 in.) in diameter. Collapsible car gates shall be of a design that, when fully closed (extended position), will reject a ball 75 mm (3 in.) in diameter.

a) Power Operation of Car Doors and Gates. Power opening shall be permitted for car doors and gates, and shall conform to 2.13.2.1 and 2.13.6. Power closing shall be permitted for car doors and gates, and shall conform to 2.13.3 through 2.13.6.

b) Car Door or Gate Locking Devices. Where the hoistway enclosure is not continuous for the full travel of the car, the car door or gate shall be provided with a mechanical lock that will lock the car door or gate if the car is more than 150 mm (6 in.) vertically away from a landing.

c) Car Door or Gate Electric Contacts. Every car door or gate shall be provided with an electric contact conforming to 2.14.4.2.3 and 2.14.4.2.5. The design of the car door or gate electric contacts shall be such that for a sliding door or gate, the car cannot move unless the door or gate is within 50 mm (2 in.) of the closed position. If the door or gate swings outward to open, the car door or gate must be closed and locked before the car can move.

d) Strength and Deflection of Doors, Gates, and Their Guides, Guide Shoes, Track, and Hangers.

1) Horizontal sliding car doors and gates shall be designed and installed to withstand a force of 335 N (75 lbf) applied horizontally on an area 100 mm by 100 mm (4 in. by 4 in.) at right angles to and at any location on the car door without permanent deformation. The deflection shall not exceed 19 mm (0.75 in.) and shall not displace the door from its guides or tracks. The force shall be applied while the door is in the fully closed position.

2) Folding car doors shall be designed and installed to withstand a force of 335 N (75 lbf) applied horizontally using a 100 mm (4 in.) diameter sphere at any location within the folds on the car door without permanent deformation. The deflection shall not exceed
19 mm (0.75 in.) and shall not displace the door from its guides or tracks. The force shall be applied while the door is in the fully closed position.

Rationale: To add strength and deflection requirements for car doors and gates on private residence elevators.

5.3.1.8.3 Clearance Between Hoistway Doors and Car Doors or Gates. The distance between the hoistway face of the landing door and the hoistway face of car door or gate shall conform to one of the following:

(a) **Power Operated Horizontally Sliding Hoistway and Car Doors.** Where power operated horizontally sliding hoistway and car doors are used, the measurement between the leading edge of the doors or sight guard, if provided, shall not exceed 100 mm (4 inches). If it is possible for a user to detach or disconnect either door from the operator (such as in the event of operator failure) and such detachment or disconnection allows the user to operate the door manually, requirement 5.3.1.8.3(e) shall apply.

(b) **Swinging Hoistway Doors and Folding Car Doors.** Where swinging hoistway doors and folding car doors are used and both doors are in the fully closed position, the space between the Hoistway door and the folding door shall reject a 100 mm (4 inch) diameter ball at all points.

(c) **Swinging Hoistway Doors and Car Gates.** Where swinging hoistway doors and car gates are used, the space between the Hoistway door and the car gate shall reject a 100 mm (4 inch) diameter ball at all points.

(d) **Swinging Hoistway Doors and Power Operated Horizontally Sliding Car Doors.** Where car door(s) are powered, and arranged so that the car door(s) cannot be closed until after the hoistway door is closed, and car door(s) automatically open when the car is at a landing and the hoistway door is opened, the measurement between the hoistway face of the hoistway door and the hoistway face of the car door at its leading edge shall not exceed 100 mm (4 inches). If it is possible for a user to detach or disconnect either door from the operator (such as in the event of operator failure) and such detachment or disconnection allows the user to operate the door manually, requirement 5.3.1.8.3(e) shall apply.

(e) **Swinging or Horizontally Sliding Hoistway Doors and Manually Operated Horizontally Sliding Car Doors.** Where swinging or horizontally sliding hoistway doors and manual horizontally sliding car doors are used and both doors are in the fully closed position, the space between the swinging or horizontally sliding hoistway door and the manual horizontally sliding car doors shall reject a 100 mm (4 inch) diameter ball at all points.

Renumber remaining Sections in 5.3.1.8.

Rationale: Moved requirements for clearance between hoistway door and car door or gate. Reduced clearances based on Hazard Analysis and provided additional detail to define the clearance requirement for various door or gate combinations.
3.27.2 Phase I Emergency Recall Operation Prior to Device Actuation
(a) If any of the devices specified in 3.27.1(a), (b), (c), or (d) is activated, while Phase I Emergency Recall Operation is in effect, but before the car reaches the recall level, the car shall do one of the following:

1. Complete Phase I Emergency Recall Operation, if the car is above the recall level.
2. Descend to an available floor, if the car is below the recall level.

(b) Upon arrival, automatic power-operated doors shall open, and then reclose within 15 s. The door open button(s) shall remain operative. The visual signal [2.27.3.1.6(h)] shall extinguish.

Rationale: Clarification of language.
TN 14-0614

Revise A17.1-2013 as follows:

8.7.2.10.1 General Requirements
(a) Where all new hoistway entrances are installed, they shall conform to 2.11, 2.12, 2.13, 2.14.5.7, and 2.29.2.
(b) Where one or more, but not all, new hoistway entrances are installed, they shall conform to 2.11.2 through 2.11.8 and 8.7.2.10.5. The entire installation shall also conform to 2.11.6, 2.12, 2.13, 2.14.5.7, and 2.29.2.
(c) Where an alteration is made to any hoistway entrance, it shall conform to 2.11.3, 2.11.5, 2.11.7, 2.11.8, and 8.7.2.10.5. The entire installation shall also conform to 2.12, 2.13, 2.14.5.7, and 2.29.2.

8.7.2.11.1 Interlocks. Where the alteration consists of the installation of hoistway door interlocks, the installation shall conform to 2.12.1, 2.12.2, 2.12.4 through 2.12.7, 2.14.5.7, and 2.24.8.3.

8.7.2.14.1 Where an alteration consists of the installation of a new car, the installation shall conform to 2.14, except 2.14.5.7, 2.15, and 2.17 (see also 8.7.2.15.1).

8.7.2.14.2 .....

(i) Where an alteration consists of the installation of a car door or gate on an existing elevator car, the installation shall conform to 2.14.4, 2.14.5, except 2.14.5.7, and 2.14.6.

8.7.2.16.4 Increase in Rated Load. Where an alteration involves an increase in the rated load, the installation shall conform to the following:
(a) Car doors or gates shall be provided at all car entrances. Where new car doors or gates are installed, they shall conform to 2.14.4, 2.14.5, except 2.14.5.7, and 2.14.6.

8.7.2.17.2 Increase in Rated Speed
(a) Increase in the rated speed of a winding-drum machine is prohibited, except as permitted in 8.7.2.17.2(c).
(b) Where the alteration involves an increase in the rated speed, except as specified in 8.7.2.17.2(c), the following requirements shall be conformed to:
(1) The bottom runbys and the top clearances for cars and counterweights shall conform to 2.4.2 through 2.4.11.
(2) Horizontal clearances shall conform to 2.5.
(3) The car and counterweight buffers shall conform to 2.22, except that existing buffers, where retained, are not required to conform to 2.22.4.5(b), 2.22.4.7, 2.22.4.10, and 2.22.4.11.
(4) Car doors or gates shall be provided at all car entrances. Where new car doors or gates are installed, they shall conform to 2.14, except 2.14.5.7.

8.7.2.27.5 Change in Type of Motion Control.

... 

(f) Car enclosures and car doors or gates shall conform to 2.14, except that where existing car enclosures and/or car doors or gates are retained, conformance with the following requirements is not required:
(2) Requirement 2.14.2.1, and 2.14.2.3 through 2.14.2.5
(3) Requirements 2.14.2.6(d) and 2.14.2.6(f)
(4) Requirement 2.14.3
(5) Requirements 2.14.4.2.5 if existing interlocks or contacts are retained, 2.14.4.3 and 2.14.4.6
8.7.3.31.6 Change in Type of Motion Control.

(f) Car enclosures and car doors or gates shall conform to 3.14, except that where existing car enclosures and/or car doors or gates are retained, conformance with the following requirements is not required:

2. Requirements 2.14.2.1, 2.14.2.3 through 2.14.2.5
3. Requirements 2.14.2.6(d) and 2.14.2.6(f)
4. Requirement 2.14.3
5. Requirement 2.14.4.2.5 if existing interlocks or contacts are retained, 2.14.4.3, and 2.14.4.6
6. Requirement 2.14.5.1, and 2.14.5.6, through and 2.14.5.8
7. Requirement 2.14.6.2.2, except 2.14.5 shall be as amended in (6)

Rationale: To correct requirements in the Alterations Section that was implemented in TN02-3046, where Restricted Opening of Hoistway Doors was moved from requirement 2.12.5 to 2.14.5.7. These modifications will reinstate the requirements to be consistent with A17.1-2010 status (adding or removing):

- 8.7.2.10.1: Require Restricted Opening requirement
- 8.7.2.11.1: Require Restricted Opening requirement
- 8.7.2.14.1: Remove the addition of Restricted Opening Requirement
- 8.7.2.14.2: Remove the addition of Restricted Opening Requirement
- 8.7.2.16.4: Remove the addition of Restricted Opening Requirement
- 8.7.2.17.2: Remove the addition of Restricted Opening Requirement
- 8.7.2.27.5: Require Restricted Opening requirement
- 8.7.3.31.6: Require Restricted Opening requirement
Proposed Revisions to A17.1, Requirement 7.1.7.10 Dumbwaiter Controllers Door Locking:

Scope: Add requirement for Dumbwaiter controllers not located in machine rooms, machinery spaces, control rooms or control spaces

7.1.7.10 Requirement 2.7.6 does not apply except as follows: Controllers located outside the hoistway and not in machine rooms, control rooms, machine spaces or control spaces shall be enclosed in a locked cabinet. The locked cabinet shall comply with requirements 2.7.6.3.2.

Rationale: Require dumbwaiter controllers to be locked and accessible to only elevator personnel. The requirement for a locked cabinet was contained in the B44-94 code but was not carried through at harmonization. Additionally, this provides consistency with NFPA 70 requirement 620.71(A)). Requiring a lock on the door prevents public exposure to hazards that could result if unauthorized persons access the controller. This could include operation of the dumbwaiter with the hoistway doors open.
Proposed Revisions to A17.1:

Requirement 2.27.3.3.8: Additional visual signal
2.27.3.3.8 An additional visual signal shall be provided and located as required by 2.27.3.3.7. The additional visual signal shall be one of the symbols shown in Fig. 2.27.3.1.6(h). The entire circular or square area shown in Fig. 2.27.3.1.6(h) shall be illuminated. This additional visual signal shall be activated and deactivated whenever the visual signal in 2.27.3.1.6(h) is activated and deactivated.

Rationale: Editorial clarification that both visual signals will have the exact same operation.
SECTION 8.4
ELEVATOR SEISMIC REQUIREMENTS

(a) Section 8.4 applies to all electric elevators with counterweights, and direct-acting or roped-hydraulic elevators where applicable, where such elevators are installed in buildings assigned to one of the following:

1. Seismic Design Category C with Component Importance Factor, Ip, of 1.5 as defined by IBC (see 1.3, building code)
2. Seismic Design Category D or greater as defined by IBC (see 1.3, building code)
3. Design Spectral Response Acceleration for a 0.2 s time period [Sa(0.2)] greater than 0.12 and building designated as post-disaster building or IEFaSa(0.2) is equal to or greater than 0.35 as defined by NBCC-2010 (see 1.3, building code)
4. Seismic Performance Category C with Seismic Hazard Exposure Group II or higher as defined by earlier model building codes (see Note)
5. Seismic Risk Zone 2 or greater as defined by earlier building codes (see Note)

NOTE: For example, SBC 1982; SBC 1994; etc.

(b) The appropriate Elevator Component Seismic Force Level is determined by the applicable building code (see Guide for Elevator Seismic Design Part 1 and Part 2, Sample Calculations 1a–g)

1. where the applicable building code references Seismic Design Categories or Design Spectral Response Acceleration [Sa(0.2)], force levels as referenced by 8.4.14 shall be used (see 1.3, building code)
2. where the applicable building code makes reference to ground motion parameters (such as Av or Zv), 8.4.13 shall be used
3. where the applicable building code makes reference to Seismic Risk Zones, or Seismic Risk Zones and component force level equations, force levels for the appropriate zone, as listed throughout Section 8.4, or the calculated component force level shall be used, whichever is greater

(c) The elevator seismic requirements contained in 8.4 shall be in addition to the requirements in the other parts of the Code unless otherwise specified.

Rationale: To be able to harmonize the elevator & escalator & moving walk rules with 8.5(b).

8.4.2.3.3 Maximum combined stresses in connections due to the specified seismic forces shall conform to the following applicable standards (see also Part 9 8.4.14.1.4):

Rationale: Correct the reference made as there is no Requirement 8.4.14.1.4.

Fig. 8.4.8.2-8 Notes
EXAMPLE (Per 15lb Guide Rail):

(SI Units)

For Ratio L/t = 0.15, and actual weight of counterweight = 3630 kg
\[ Q = 1.35 \]
\[ W_a = 1.35 \times 3630 = 4900 \text{ kg} \]
From Fig. 8.4.8.2-4 zone 3 or greater
Required bracket spacing = 3200 mm (no tie bracket)
Or = up to 4215 mm (one tie bracket)
Or = up to 4675 mm (two tie brackets)

(Imperial Units)

For Ratio L/t = 0.15, and actual weight of counterweight = 8,000 lb
\[ Q = 1.35 \]
\[ W_a = 1.35 \times 8000 = 10800 \text{ kg} \]
From Fig. 8.4.8.2-4 zone 3 or greater
Required bracket spacing = 10 ft 6 in. (no tie bracket)
Or = up to 13 ft 10 in. (one tie bracket)
Or = up to 15 ft 4 in. (two tie brackets)

8.4.2.3.4 For areas not utilizing seismic zones, the Nonstructural Component Anchorage, as defined by IBC/ASCE 7, shall be in conformance with the requirements of the governing building code.

Rationale: “IBC” is the designation used in the introduction of 8.4. After the 2000 printing IBC moves and references the seismic application to ASCE 7.

8.4.10.1 Operation of Elevators Under Earthquake Emergency Conditions. Earthquake emergency operation shall be provided and conform to 8.4.10. Earthquake emergency operation is not required for risk zone 2, or $F_p \leq 0.25 W_p$ with $z/h = 1$ (for IBC/ASCE 7) or $hx/hn = 1$ (for NBCC) (see 8.4.14.21), provided the car and counterweight guide-rail systems, guiding members, and position restraints conform to the requirements and force levels for zone 3 or greater or $F_p \geq 0.5 W_p$ in 8.4.5, 8.4.7, and 8.4.8 where

$W_p = \text{component operating weight as defined by 8.4.15}$

Rationale: “IBC” is the designation used in the introduction of 8.4. After the 2000 printing IBC moves and references the seismic application to ASCE 7. Correct the reference made since the component seismic force level is not located in 8.4.14.1.2 but rather in 8.4.14.1.1. To provide IBC/NBCC equivalences for the exception(s).

8.4.10.1.1 Earthquake Equipment (See Also Fig. 8.4.10.1.1)

(a) All traction elevators operating at a rated speed of 0.75 m/s (150 ft/min) or more and having counterweights located in the same hoistway shall be provided with the following:

(1) For seismic zone 3 or greater, or $F_p \gg 0.25 W_p$ with $z/h_p = 1$ (for IBC/ASCE 7) or $hx/hn_p = 1$ (for NBCC): a minimum of one seismic switch per building.

Rationale: “IBC” is the designation used in the introduction of 8.4. After the 2000 printing, IBC moves and references the seismic application to ASCE 7.

8.4.14.1 Component Seismic Force Level (Strength Design).
The seismic force shall be computed per requirements of IBC/ASCE 7, or NBCC-2005 or later editions, in accordance with the applicable building code.

(a) For IBC/ASCE 7

$F_p = \text{Component Seismic Force Level (horizontal, Strength Design...}$

...$F_p$ is not required to be taken as greater than

$F_p = 1.6 S_{DSL} W_p$

And $F_p$ shall not be...

NOTES:

(1) For isolated components refer to ASCE 7-10, Table 13.6-1.

(2) $F_p$ shall be multiplied by a factor of 0.7 for stress calculations in order to convert from Strength Design (IBC/ASCE 7) to Allowable Stress Design (ASME A17.1). This factor is already included in the load combinations in 8.4.14.1.2 8.4.14.1.3.

(b) For NBCC-2005 or later editions...

NOTES:

(1) For isolated components, refer to NBCC-2010, Table 4.1.8.18.

(2) $F_p$ shall be multiplied by a factor of 0.7 for stress calculations in order to convert from Strength Design (NBCC-2010) to Allowable Stress Design (ASME A17.1). This factor is already included in the load combinations in 8.4.14.1.2 8.4.14.1.3.

Rationale: This is an editorial change to update references. “IBC” is the designation used in the introduction of 8.4. After the 2000 printing IBC moves and references the seismic application to ASCE
7. Correct the reference made since the load combinations are not located in 8.4.14.1.3 but rather in 8.4.14.1.2.

The seismic design force, $F_p$, shall be applied at the component’s center of gravity. In addition, the component shall be designed for concurrent vertical seismic force $F_v$ equal to
(a) $\pm 0.2 \text{ SDS } W_p$ (for IBC/ASCE 7)
(b) $\pm 0.2 \left[\frac{2}{3} Fa Sa(0.2)\right] W_p$ (for NBCC)
NOTES:
(1) Guide rail mounted machinery would be an example of vertical loads imposed on the guide rail in addition to the horizontal inertial loads (see 8.4.8.2.6 and 8.4.14.1.1).
(2) $F_v$ shall be multiplied by a factor of 0.7 for stress calculations in order to convert from Strength Design (NBCC-2010) to Allowable Stress Design (ASME A17.1). This factor is already included in the load combinations in 8.4.14.1.2 8.4.14.1.3.

Rationale: This is an editorial change to update references. “IBC” is the designation used in the introduction of 8.4. After the 2000 printing IBC moves and references the seismic application to ASCE 7. Correct the reference made since the load combinations are not located in 8.4.14.1.3 but rather in 8.4.14.1.2.

8.4.14.1.2 Load Combinations Using Allowable Stress Design. Components and portions thereof shall resist the most critical effects resulting from the following combinations of loads:
For IBC/ASCE 7/NBCC…

Rationale: “IBC” is the designation used in the introduction of 8.4. After the 2000 printing IBC moves and references the seismic application to ASCE 7.

Revise Figure 8.4.8.2-7 to have the “One intermediate tie bracket” point to the middle line
Revise Figure 8.4.8.2-3 to have the “One intermediate tie bracket” point to the middle line.
TN 14-1596

Revise A17.1 as follows:

2.20.2.2 Data Tag at Suspension-Means Fastening

2.20.2.2.1 Pertinent data located on the suspension means shall be provided by one of the following:

(a) A data tag securely attached to one of the suspension-means fastenings.

(b) Permanent marking of the required information on the suspension means and visible in the vicinity of the suspension-means fastening.

(c) A combination of (a) and (b) provided that all required information is furnished.

(d) If (a) or (c) applies, the material and marking of the tag shall conform to 2.16.3.3.3, except that the height of the letters and figures shall be not less than 1.5 mm (0.06 in.).

(e) If (a) or (c) applies, a new tag shall be installed at each suspension-means replacement.

2.18.5.3 Governor-Rope Tag. A metal data tag shall be securely attached to the governor-rope fastening. This data tag shall bear the following wire-rope data:

(a) the diameter (mm or in.)
(b) the manufacturer’s rated breaking strength
(c) the grade of material used
(d) the year and month the rope was installed
(e) whether nonpreformed or preformed
(f) construction classification
(g) name of the person or organization who installed the rope
(h) name or trademark by which the manufacturer of the rope can be identified

A new tag shall be installed at each rope renewal. The material and marking of the rope data tag shall conform to 2.16.3.3.3, except that the height of the letters and figures shall be not less than 1.5 mm (0.06 in.).

Rationale: Requirement 2.16.3.3 in the 2010 edition of A17.1 contained the requirements that now appear in 2.16.3.3.3 in the 2013 edition of the code, and is the only applicable to these types of tags. The proper requirement number was not updated for the 2013 edition.
Proposed Revision to A17.1, Requirements 7.2.6.3.1, 7.2.6.3.2, 7.2.6.5, 7.2.6.8.1 Tensile Strength:

7.2.6.3.1 The data plate required by 7.2.3.3 shall bear the following chain data:
(a) number of chains
(b) type of chains
(c) standard chain number
(d) the manufacturer's rated breaking strength Minimum Ultimate Tensile Strength (MUTS) per chain in pounds

7.2.6.3.2 A metal data tag shall be securely attached to one of the chain fastenings. This data tag shall bear the following chain data:
(a) type of chain
(b) standard chain number
(c) manufacturer's rated breaking strength Minimum Ultimate Tensile Strength (MUTS)
(d) month and year the chains were installed
(e) name of the person or firm who installed the chains
(f) name of the manufacturer of the chains

7.2.6.5 Number of Ropes or Chains Required.
Requirement 2.20.4 does not apply. The number of suspension ropes or chains shall be determined by multiplying the static load (weight of the car plus rated load plus the weight of the hoisting ropes or chains) by the required factor of safety, and dividing the result by the manufacturer's (a) rated ultimate strength of one of the ropes of the size and construction to be used
(b) average tensile strength Minimum Ultimate Tensile Strength (MUTS) of one of the chains of the size and construction to be used
Where 2:1 roping is used, one-half the static load shall be used in the formula.

7.2.6.8.1 Requirement 2.20.9.1 does not apply. Fastening of suspension means shall conform to the following:
(a) The car and counterweight ends of suspension wire ropes, or the stationary hitch-ends where multiple roping is used, shall be fastened in such a manner that all portions of the rope, except the portion inside the rope sockets, shall be readily visible. Fastenings shall be by individual tapered babbitted rope sockets conforming to 2.20.9.3 through 2.20.9.6; or by other types of rope fastening, provided that they develop at least 80% of the ultimate breaking strength of the strongest rope to be used in such fastenings.
(b) The fastening of car and counterweight ends of suspension chains shall be such as to develop at least 80% of the rated breaking strength Minimum Ultimate Tensile Strength (MUTS) of the strongest chain used in such fastenings.

Rationale: To improve safety and consistency in the A17.1 Safety Code for Elevators and Escalators by replacing the differing references to chain strength with the same terminology used in the B29 Code (Minimum Ultimate Tensile Strength).

The ASME B29 chain committee only publishes the Minimum Ultimate Tensile Strength (MUTS) in its chain standards. As defined in the B29 Code, MUTS is the minimum force at which an unused, undamaged chain could fail when subjected to a single tensile loading test. Other values of chain strength are not recognized by the B29 standards.

Average tensile strength is only a catalog value that is not defined in the B29 standards, varies from manufacturer to manufacturer, and should not be used in the design of drive or suspension systems using chain.

Rated breaking strength is not defined in the B29 standards, and is therefore not specific enough to use for design purposes.

Ultimate tensile strength, although well recognized terminology, is of little use in this case. For its use, the specific failure mode of the chain would have to be known (which component breaks in the
given situation), and the ultimate strength of that component would need to be provided by the chain manufacturer. This value would vary from manufacturer to manufacturer.

Note: In the above requirements that involve lifting people, it may be prudent to have the chain manufacturers certify the MUTS of their chain.

The next face-to-face meeting of the B29 Committee has been scheduled for Tuesday, October 7, 2014 at the Airport Hilton in Atlanta, Georgia in conjunction with the 2014 annual meeting of the Mechanical Power Transmission Association (MPTA). The meeting will begin at 9:30 AM. A web-teleconference will be held in conjunction with this meeting. The details of the web-teleconference will be sent to you in the event a representative of the A17 Committee would like to participate.

The B29 Committee, ask the A17 Committee to seriously consider these suggestions. We believe they could improve the usefulness of the code, and the safety of the general public. In any case, we look forward to receive the results of their deliberations. The date, time, and location of meetings where this matter will be presented and discussed would also be appreciated.
Revise A17.1-2013 as follows:

8.6.11.6.1
(a) Escalators and moving walks shall be started only by authorized personnel (see 1.3) trained in compliance with the procedures specified in 8.6.11.5.2 through 8.6.11.6.4 through 8.6.11.5.5.

Rationale:
Editorial change to indicate correct Section number.
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**Table N-1: Recommended Inspection and Test Intervals in "Months"**

**Periodic Inspections:**
- Requirement
- Interval

**Category 1:**
- Requirement
- Interval

**Category 2:**
- Requirement
- Interval

**Category 3:**
- Requirement
- Interval

**Periodic Tests:**
- Requirement
- Interval

**GENERAL NOTE:** Factors such as the environment, frequency of usage and type of usage, quality of maintenance, age and condition, remote monitoring (see Table N2), etc., related to the equipment should be taken into account by the authority having jurisdiction prior to establishing the inspection and test intervals. It is recommended that a risk analysis, using the methodology of ISO/TS 14179-1, be utilized to establish the intervals of inspections and tests for components and systems of the equipment. Where a risk analysis is not performed, the intervals specified in Table N1 are recommended for periodic tests (see 8.4) and periodic inspections (see 8.11).

**Rationale:** Add new testing requirements for Wind Turbine Elevators.
Revise A17.1-2013 as follows:

8.6.7.9 Mine Elevators. Except in jurisdictions enforcing NBCC, maintenance of mine elevators shall conform to 8.6.7.9.1 through 8.6.7.9.5, 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

8.6.7.9.1 Rails on mine elevators shall be kept free of rust and scale, that will prevent proper operation of the car (or counterweight) safety device.

8.6.7.9.2 Oil buffers that are installed on elevators where water can accumulate in the pit shall be checked every 60 days for accumulation of water.

8.6.7.9.3 The mine elevator hoistway shall be maintained to minimize the entry of water and formation of ice, that would interfere with the operation of the elevator.

8.6.7.9.4 Suspension, Compensating, and Governor Ropes. When elevator suspension, compensating, or governor ropes show deterioration caused by corrosion, the replacement wire ropes shall be constructed of electrogalvanized or other types of corrosion resistant material suitable for the environment and application. The installation shall conform to 8.7.2.21 for suspension ropes and 8.7.2.19 for governor ropes.

Where emergency replacement of wire ropes is required, noncorrosion resistant wire ropes shall be permitted to be installed for temporary use. These emergency replacement noncorrosion resistant wire ropes shall be replaced by corrosion resistant wire ropes within one year of installation.

8.6.7.9.5 Periodic Test. Mine elevators shall be subject to the applicable periodic tests specified in 8.6.4.19, and 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements of 5.9. Any additional requirements for this equipment shall also be checked during these tests.

*Rationale: Specify the appropriate maintenance and testing requirements applicable to mine elevators. Hydraulic mine elevators are not addressed in the Code.*
Revise A17.1-2013 as follows:

New Section 8.11.5.xx

8.11.5.xx Mine Elevators. Mine elevators shall be subject to the applicable periodic inspections specified in 8.11.2.

The inspection requirements shall apply to the corresponding requirements in 5.9. Any additional requirements for this equipment shall also be checked during these inspections.

Rationale: Specify the appropriate periodic inspection requirements applicable to mine elevators.
Revise A17.1-2013 as follows:

2.18.6.2 The means shall be set to allow the governor rope to slip through the speed governor at a rope tension (the governor pull-through tension) higher than required to activate the safety or to trip the releasing carrier as specified in 2.17.15. The maximum tension in the rope shall not exceed one-fifth of the rated ultimate strength of the rope. The factors of safety of the rope shall not be less than those required by 2.18.5.1.

Rationale: For consistency between 2.18.5.1 and 2.18.6.2.
TN 14-2115

Revise A17.1-2013 as follows:

*traction machine*: a direct driving machine in which the motion of a car is obtained through friction between the suspension ropes and a traction sheave.

*Rationale: For consistency with “suspension means” terminology used in the code.*
Revise Section 8.4 of A17.1-2013

8.4.9.1 Seismic Requirements for Driving Machine and Sheaves.
All integral parts of driving machines together with their supports shall be capable of withstanding the inertia effect of their masses without permanent deformation when subjected to seismic forces acting separately simultaneously as defined in 8.4.13 or 8.4.14, or equal to

(a) $W_p$ horizontally and $\frac{1}{2} W_p$ vertically (zone 3 or greater)
(b) $\frac{1}{2} W_p$ horizontally and $\frac{1}{4} W_p$ vertically (zone 2)

Rationale: To align current language with ASCE 7 requirements.