

**Sec. 19-411-C25. Suspension means**

(a) **Types permitted.** Suspension means shall be any one of the following:

1. Steel or iron elevator wire rope
2. Steel aircraft cable
3. Roller chain
4. Direct plunger hydraulic
5. Roped hydraulic
6. Rack and pinion
7. Screw drive

(b) **Types prohibited.** Steel tapes or welded link chains shall not be used as suspension means.

(c) **Factors of safety of suspension means.** The suspension means shall have a safety factor of not less than seven (7) based on the tension in the rope, cable, chain or forces exerted on the hydraulic cylinder, screw drive or a rack and pinion when raising the rated load. When the car and counterweight are suspended by steel ropes and the driving means between the machine and the counterweight is an endless roller type chain, the factor of safety of such chain with rated load on the platform shall not be less than eight (8).

(d) **Arc of contact of suspension means on sheaves and sprockets.** The arc of contact of a wire rope on a traction sheave shall be sufficient to produce adequate traction under all load conditions. The arc of contact of a chain with a driving sprocket shall be not less than 140 degrees.

(e) **Idle turns of ropes on winding drums.** All wire ropes anchored to a winding drum shall have not less than one (1) full turn of rope on the drum when the car or counterweight has reached its limit of possible overtravel.

(f) **Lengthening, splicing, repairing, or replacing suspension means.** No suspension wire rope shall be lengthened or repaired by splicing. Broken or worn suspension chains shall not be repaired. If one wire rope or a chain set is worn or damaged and requires replacement, the entire set of ropes or chains shall be replaced. If a chain is replaced due to wear, all sprockets must be replaced.

(g) **Securing ends of suspension ropes in winding drums.** The winding drum ends of platform and/or counterweight wire ropes shall be secured by clamps on the inside of the drum or by one of the methods specified in rule 501.12i for fastening wire ropes to car platform. (American National Standard Institute A-17-1-1978).

(h) **Fastening or rope suspension means to platform.** The platform ends of wire ropes shall be fastened by return loop, by properly made individual tapered babbitted sockets or by properly attached fittings as recommended by wire rope manufacturers. Clamps of the u-bolt type shall not be used. Tapered babbitted rope sockets and the method of babbitting shall conform to the requirements of rules 212.9d and 212.9f. (American National Standard Institute A-17-1-1978). The diameter of the hold in the small end of the socket shall not exceed the nominal diameter of the rope by more than 3/32 of an inch.

(i) **All suspension means shall be guarded against accidental contact. Exception:** Suspension means which operate within a guide or track and travel at the same speed and in the same direction as the car or platform shall be considered suitably guarded.

(Effective October 28, 1980)