the core, which may be sisal rope, a metallic strand, or independent wire rope core

The size, number, and arrangement of wires, the number of strands, the lay, and the type of core in a rope are determined largely by the service for which the rope is to be used

In general, the greater the number of wires in a strand and the greater the number of strands, the more flexible the rope Hoisting ropes require flexibility and are usually made up of six strands of 19 (16 to 26 wires per strand) and six strands of 37 (27 to 49 wires per strand) wire rope classifications Eight-strand ropes are usually 19 wire rope classification, regular lay, fiber core (See Fig 23-2)

Depending upon the service conditions, six-strand ropes may have a fiber core (FC), a wire strand core (WSC), or an independent wire rope core (IWRC) and may be either regular lay (wires in the strands are laid in the opposite direction from that of the strands in the rope) or lang lay (wires in the strands are laid in the same direction as that of the strands in the rope)

Flexibility is not a requirement for guy wires, highway guards, and similar services Therefore, wire rope of six by seven construction (six strands with seven or eight wires per strand) is suitable When rope for a particular service is to be selected, it is recommended that engineers of reliable wire rope manufacturers be consulted for the most suitable type

Some service conditions require rope with special qualities Fiber cores are affected by temperatures above 212 F, under such conditions, a metallic core provides greater efficiency and safety A zinc-coated or stainless steel wire rope effectively resists some types of corrosion Specific corrosion problems should be referred to a wire rope manufacturer

Since preformed wire rope does not unravel, it has advantages for certain services, such as for slings and on construction and similar heavy equipment Preformed rope is less likely to set or kink, and broken wires do not protrude to create a hazard to the hands of workmen However, closer inspection is necessary to detect broken wires

It is recommended that hoisting rope have at least the strength of "improved plow steel" grade For many applications "extra improved plow steel" grade, which is greatest in strength, should be used to provide an adequate factor of safety, and better service It resists abrasion, shock, vibration, and fatigue (Table 23-D)

Safety factor for hoisting ropes

The safety factor for hoisting ropes is calculated by dividing the breaking strength of the rope (rated by the manufacturer, or determined by testing) by the sum of the maximum weights to be hoisted (static load)

In the case of mine hoisting rope, the maximum weights to be hoisted include the weight of the skip or car and cage, plus the weight of the material, plus the weight of the rope when it is extended to the bottom of the shaft

The minimum safety factor for mine hoisting rope should not be less than that shown in Table 23-E

TABLE 23-E

SAFETY FACTORS FOR MINE HOISTING ROPES WHEN HANDLING MEN

Length of rope (ft)	*Minimum safety factor for new rope*	*Minimum safety factor for used rope**
500 or less	8	6 4
500 to 1,000	7	5 8
1,000 to 2,000	6	5 0
2,000 to 3,000	5	4 3
3,000 or more	4	3 6

*Hoisting rope must be discarded when these minimum factors of safety are reached

Recommended minimum safety factors for other types of services are 6 for haulage ropes and overhead cranes and derricks, 7 for small electric and air hoists, and 8 for hot-ladle cranes

The safety factors for different types of elevators and other rope requirements are specified in ASI Standard A17 1, *Safety Code for Elevators, Dumbwaiters, and Escalators*

The factor of safety for wire rope should be determined by consideration of all pertinent data, which include type of load, acceleration, deceleration, rope speed, rope attachments, the number, size, and arrangement of sheaves