carriages, and misunderstanding of signals

No attempt should be made to carry on work directly underneath the conveyor except, of course, at the loading and unloading stations where exceptional precautions should be taken Wherever workmen must pass underneath the conveyor, a covered passageway should be provided

Another form of protection against material that falls from buckets over roadways and working spaces consists of heavy wire screens suspended under the conveyor from pole to pole and wide enough to catch the material

The equipment should be inspected regularly and frequently with special attention to the sheave wheels and bearings, the rope fastening, the bucket latch and trunnions, and all load-sustaining parts

All ropes should be kept well oiled, both for efficiency of operation and for protection against the weather. Lubrication of the hauling rope should be done continuously by means of a controlled drop feed from an oil reservoir at the point (one or both ends of the line) where the rope leaves the drive sheave and passes over a support sheave.

In one plant, to oil a tramway rope used for conveying coal, the workman had to ride a trolley carriage An automatic lubrication system was devised to eliminate this dangerous practice

Suitable lighting should be provided at critical points for night operation and repairs

Every aerial cableway must have a suitable signaling system A telephone or electric pushbutton system is advisable On large construction jobs, a portable telephone system is often needed so that a signalman can direct the operation of raising and lowering loads that are out of the operator's sight

For a tramway, at least three control systems are recommended

1 Pushbutton stations and a bell signal code that indicates stop, start, slow speed, high speed, and reverse

2 An all-metallic aerial wire circuit telephone with instruments at certain points along the line in addition to terminal sets

3 A second telephone circuit, which may be grounded if desired

The U S Army Corps of Engineers suggests the following precautions be taken.

1 The control console compartment should be kept locked when the cableway is in use No one should be permitted in the compartment with the operator while he is operating a cableway

2. At least two systems of communication and control should be continuously maintained between the signalman and the cableway operator This dual system should include voice communication by telephone and radio Lights or bells may be included with or substituted for one of the voice systems

3 Only authorized inspection and maintenance personnel should be permitted to ride cableway carriages

4 Riding of cableway load blocks should not be permitted.

Portable conveyors

Belt, flight, apron, and fixed bucket conveyors are made also as inclined portable units on a pair of large wheels, for loading railroad cars and trucks with bulk materials and for raising construction material from one elevation to another (Fig 25–34)

The various types of portable conveyors should be provided with guards as specified for the corresponding types of fixed conveyors

Weatherproof electrical equipment should be used With three-phase power, the flexible cord that is connected to the power outlet should be a four-conductor, the fourth wire being grounded in all plugs and receptacles The cable should be so arranged that it cannot be run over by trucks or other machines If the cable must cross a driveway, it should be hung on poles at a minimum height of 14 ft If two or more sections of cable are required, the connectors should be kept above the ground, since these machines are used most in the worst weather

Portable conveyors should have skirtboards or sideboards (not less than 10 in high) to keep heavy material from falling over the sides and light or loose material from blowing off This safety feature applies to belt conveyors, as well as to the other types, because troughing of the belt gives insufficient