inside a cylindrical cartridge having packing on its outer surface to seal it inside the smooth tubing. Compressed air injected into the tubing system pushes the cylinder forward at a relatively high velocity.

To convey bulk material, compressed air is injected into the piping through a nozzle below the loading chute The air mixes with the material and makes it flow rather like a fluid through the piping

A constant volume, variable pressure (positive type) blower should have a relief valve on or adjacent to it Doors of blower conveyors should be interlocked so that they cannot be opened if there is positive internal pressure Gaskets holding the line pressures should be shielded so that if a gasket leaks, the conveyed material will not be thrown against workmen or into the working area

Where suction pipes are large enough to draw in a man, employees should be instructed to stay a safe distance away and supervised to see that they do so

Receivers and storage bins should have full-bin indicators or controls to prevent overfilling

A pneumatic conveyor serving an area containing contaminated air must be so arranged that none of the contaminated air can enter the conveyor tube and through it be carried to other areas

When material that has a dust explosion hazard is being transported, the air velocity should exceed the critical velocity for flame propagation of the material to prevent propagation of an explosion from one point to another within the system

Equipment should be bonded electrically and grounded to prevent static electricity being an ignition source Details are given in "General Precautions" section, earlier in this chapter

Aerial conveyors

The Conveyor Code distinguishes between two types of aerial cable systems a *cableway* is a cable-supported system in which the material handling carriers are not detached from the operating span and the travel is wholly within the span, a *tramway is a cable-supported system in which* the travel of the material handling carriers is continuous over the supports of one or more spans

Aerial conveyors frequently are used in industrial plants and particularly on large construction work to carry material from point to point. They are used also to some extent for handling coal and ore The principal hazards in their use are falling material, injury to workmen inspecting and oiling the cables and 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 falling from buckets over roadways and working spaces consists of heavy wire screen 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 cable fastening, the bucket latch and trunnions, and all load-sustaining parts

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

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

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, the Conveyor Code recommends at least three control systems

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