

II.2 Principle of Operation

The _____ allows movement of freight from one level to another within the _____ trunk. The lift system includes controls to operate the lift, move freight safely, and automatically control the speed of the platform as it moves, up and down, within the trunk. Employing a programmable logic circuit (PLC), the _____ can be called for or sent from either floor level, provided a permissive electrical circuit is ready. When the permissive circuit is ready, the lift is operational.

Limit and proximity switches, located at the upper and lower limits of lift travel, prevent damage to the lift in the event it goes beyond its normal working limits. An overspeed governor system stops descent of the lift (by gripping the rope and cutting electrical power) in the event of an overspeed condition.

The _____ consists of three subsystems: mechanical, hydraulic, and electrical. This section describes the principles of operation of each.

II.2.1 Mechanical System

The _____ mechanical subsystem provides power to raise and lower the lift platform and its freight from one level to another. It consists of a platform assembly, overspeed governor, overspeed governor rope and sheave assembly, guide rail system, and overtravel buffers.

II.2.1.1 Platform Assembly

The platform, a fabricated steel structure with rollers, supports the freight as it is transferred from one level to another. It travels up and down within the trunk on four sets of attached guide rollers which ride on T-shaped guide rails. Each roller set consists of four rollers, two riding the sides of a guide rail and two riding the inside face of the guide rail. In this way, lateral movement of the platform is restricted and there is free movement of the platform up and down within the trunk.

As the platform moves up and down within the trunk, proximity and limit switches attached to the trunk walls are tripped by rectangular actuators, attached to the back side of the platform. When actuated, the switches signal the PLC to control platform movement.

II.2.1.2 Overspeed Governor, Rope and Sheave Assembly

The Overspeed Governor will actuate if the downward speed of the platform exceeds 90 feet per minute. The overspeed governor consists of a frame, sheave, counterweights, stop block and tripping switch. As the platform moves up and down within the trunk, a wire rope, attached to the top of the platform, moves with it. The rope also moves over a grooved wheel called a "sheave", located on the South wall of the trunk at elevation 135' 0.75". The sheave assembly includes lubricated roller bearings, providing mechanical advantage and efficient transfer of energy from the hydraulic cylinder as the platform moves up and down.

During an overspeed condition, the sheave moves faster than usual. Centrifugal force causes counterweights to move outward, against a spring load, and contact the stop block. The stop block roller grips the overspeed governor rope, causing the "brake" to set, stopping downward movement of the platform.

II.2.1.3 Guide Rail System

Four sets of T-shaped guide rails, mounted about 428' vertically to the trunk walls, provide three flat surfaces for platform rollers to ride on. They also restrict lateral movement of the platform as it moves, up and down, within the trunk. Each set of guide rail consists of steel rail sections of various lengths, bolted together with fish plates.

II.2.1.4 Overtravel Buffers

Overtravel buffers consist primarily of large springs secured to a housing. Each unit is mounted to the sides of the trunk wall, just below the point where the platform normally comes to rest. If the platform travels downward, beyond its normal resting position, it will meet the overtravel buffer assemblies. The springs absorb the impact of the downward moving platform as they compress. Mechanical energy, stored in the compressed springs, is transferred back to the platform. This prevents damage to the platform and stops it from traveling further downward.
