The Importance of Training and Experience in Elevator Installation

by PVN Marar

Normally, we speak about the safety of elevator passengers, which is most important in an elevator system. These safety precautions are taken by suppliers and mandated by statutory rules and regulations. There are people, however, working behind the façades of these systems to maintain their uninterrupted functionality. These people are the invisible passengers. In initial stages, this group consists of erection crews and other agencies working on the project. Later, the group is made up of the maintenance team.

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The Indian industry is facing worker shortages. This is especially true for the elevator industry, which requires trained workers to fulfill the industry's commitment to the fast-growing market. Here, unfortunately, there are no professional courses on elevator engineering. I started my career with a reputable lift company, where we had a five-year training program involving both classroom and on-the-job training. However, this education was discontinued after some years, though it was very useful and constructive. Those who underwent the training are an asset to the elevator industry, and some of them are heading reputable lift companies today. In contrast, today, workers are just put on an installation job without any basic training or technical background.

The point here is that the workers should be given training on the theory and practical aspects of elevator principle, safety and quality to the extent that they understand the consequence of their actions. For example, a technician does not necessarily need to know the makeup of babbitt but should know the melting point of the metal and the required temperature it should be when poured into a rope socket. An imperfect socket filling can result in ropes coming out, leading to disaster.

The other problem that faces the industry today is the exodus of trained people to Gulf countries and other regions that cannot be stopped unless the economic advantage is neutralized. I believe that the best option is for the industry to set up a training school. Alternatively, other institutions can be encouraged to start elevator-oriented technical courses for the mutual benefit to both industry and institutions. A minimum training and experience level has to be set before a person is authorized to work independently on a job or supervise others.

Due to the boom in the building industry and competition among elevator manufacturers, the need to reduce the execution and handing-over cycle time become very important. The erection time for an elevator in a 15-story building once took a minimum of 12-16 weeks (and sometimes even 24 weeks when the elevator was the last part of the building to be installed). Now, people want to use the lifts before construction is completed and different ways and means are being implemented by which to achieve the quick erection of elevators.

As the demand increases, processes and guidelines are disregarded. People work various levels in a single shaft, one above another, inviting accidents from falling tools or materials. This practice is against safety norms, where most people perceive that only one activity can be carried out at a time, either in the machine room or in the shaft. It is true that when people are working in the shaft, nobody is allowed to work in the machine room, where the openings for main and governor ropes are not fully blocked, for example. When the openings are covered, a separate crew can work in the machine room also. Apart from these two activities, one or more activities can be carried out, like working on hall fixtures and preassembling some part in the storeroom or outside the shaft. People have begun deviating from the conventional sequence of installation procedures and adapting various technologies to speed up installation and cut costs.

I was involved in the modernization of two 30-stop lifts with a speed of 150 mpm. This took 45 days without scaffolding. The only components retained from the old elevator were guide rails and a counterweight frame with fillers. When we were discussing the method of installation, different options were suggested to minimize inconvenience to the occupants and reduce time and cost. It was decided to do away with scaffolding, keep the counterweight frame with fillers at pit, suspend the car with a chain pulley block and work from car top. It was time consuming to work in this way, and there was concern for safety and efficiency of the chain block. It was then decided to have two platforms at the top floor. There was one each near the top and bottom of the counterweight frame, respectively, when the car stopped at the bottom terminal landing.

The idea was not to use scaffolding and a chain block. We parked the car at the bottom landing with adequate support underneath it. The fillers were removed from the counterweight frame to reduce the weight, and the frame was suspended with slings at the top. All the ropes were removed. Everything except the rail and landing doors were removed. A new car sling fixed with a platform, roping machine-room equipment completed the setup. The one temporary platform at the top came in handy for hitching rope at the counterweight, and the second platform was useful to stack the fillers in the counterweight frame. The lift was started slowly, taking care of all necessary safety precautions including providing a balustrade on the car platform. Removal of the existing landing doors and affixing new doors was done by safely working on the lift platform.

It is obvious that parallel activities are to be carried out to achieve fast elevator installation. So, if more people are to be employed at different levels in the shaft, there ought to be a seamless partition to enable different crews to work at different levels. While working on the scaffolding in the shaft, it is mandatory to wear personal protective equipment. Any violation of this requirement may lead to disaster. Some manufacturers use nylon nets every 10-15 meters as fall protection. This method is one of the many good safety practices to prevent any untoward incidents. It is important to educate people to think, visualize, plan and execute every activity with safety, quality and knowledge in mind.

I witnessed a near-miss incident where a lift overshot the top floor, the safety gear actuated and its crosshead touched underside of machine-room slab. The lift settled about 2 meters from the level of the top floor. When I reached the site, I found the technician working under the lift, standing on a temporary platform trying to deactivate

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the safety-gear unit, not knowing that the counterweight was resting on the buffer and the rope was slack on its side. If the safety mechanism deactivated, the car would have dropped suddenly, resulting in a very bad accident. The action required was to instruct the technician to come out of the shaft and suspend the car before deactivating the safety gear.

People should be given training on the following precautions to be taken before the elevator starts up in inspection speed: the car and counterweight should be approximately balanced, a compensation chain should be installed, the buffer should be in place and the length of the run should not exceed more than 100 millimeters of what is specified (otherwise, use a reducer under the counterweight frame). Check for any unwanted projections, the function of the governor and safety gear, proper grounding of equipment, brake slip and functioning of the safety circuit. Regulations for car-top runby, guards for moving parts, toe boards, etc. are to be complied with.

I was asked to investigate two recent incidents in which the lift moved without control and hit the machine room's bottom slab. Fortunately, the people working on car top escaped with minor bruises as they decked themselves under the crosshead. The impact of the collision was so severe that the platform detached from the sound-isolation frame and tilted, in addition to the damage done to car-top equipment. The probable cause was identified as follows:

- Excess brake slip
- Overloading of counterweight without complete car accessories installed
- Counterweight runby was more than 1 meter.
- The safety circuit failed.
- A compensating chain was not installed.

Except for excess brake slip, the other points were agreed with by those onsite, confirming the lack of training and supervision.

The second incident was the collapse of an entire rail column of both counterweight rails, damaging and bending a couple of rails and fishplates. Fortunately, the workers escaped unhurt. Here, the counterweight rails of a 30-plus-story building were hoisted without securing fishplate bolts and palm clips properly, due to which the entire column of rail zigzagged at the joints. When rail alignment began from the bottom and the rails were hammered to shift them, the vibration caused the rails to come out of their clips and collapse. This could have been avoided if the fishplate and palm clips had been tightened properly.

I strongly believe that these incidents could have been avoided if the workers at these jobs had been properly trained.