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Urban Mobility in Istanbul

thyssenkrupp Elevator provides equipment for vast and growing metro system.

Focus on Maintenance

An exploration of remote monitoring, hoist rope longevity, vertical sliding door maintenance and more

A Modern Approach

KONE upgrades escalators in St. Louis' Enterprise Center.

Preventive Maintenance

This Readers' Platform tackles the question, "Is technology a complement or substitute for the technician?"

by Craig Zomchek

Remote monitoring today could create the need for a more intensive modernization tomorrow.

As technology advances, there seems to be a misconception that skilled technicians have become less relevant. In reality, they are more vital than ever. Though there's no doubt that automation can reduce human error, regular preventive maintenance is not a commodity that is easily replaced. It is a fundamental component in the business relationship between contractor and building owner/manager.

Labor

Years ago, the industry standard was to give each hydraulic elevator 1 h per month for maintenance, with traction elevators receiving at least two. The elevator mechanic was a familiar face and developed a relationship with those at the building. This relationship, along with the frequency of visits, enabled the mechanic to understand the characteristics of each elevator system.

Today, some companies believe they can cut costs by simply visiting a building less and proceed to overload a technician's route with more units. This drives the sales team to push for quarterly or even "as-needed" or "systematic" maintenance agreements. Without specifically stating in writing what these terms mean, companies neglect the equipment.

Equipment

Relay logic used to be the norm, with motor-generators installed on traction elevators. The mechanical nature of the equipment required a hands-on approach, which was an art form. Elevator controls were electromechanical, as opposed to the solid-state format of today and did not require all the life safety devices now standard. Their pits and hoistways were simpler, as well.

Today's elevators are equipped with phones, phone line monitoring, emergency lights and Firefighters' Emergency Operation (FEO) Phases I and II, and have more non-elevator devices, such as sump pumps and fire recall detectors, in the pit or hoistway. Most of the older relay-logic structures have been replaced with solid-state systems. On the surface, these advanced systems do not require as much maintenance as their predecessors.

Consequences

Desired quarterly goals have led to the rise of the "super route." This attempts to control labor costs by instituting a team maintenance model. A "super route" typically consists of two mechanics with a portfolio of 400-500 elevators to maintain, service, respond to service calls for, complete testing for and answer other requests. Simple math shows that the traditional 400-500 h per month previously required, even if all the elevators are assumed hydraulic, is impossible. Assume 8 h of work per day per mechanic with an average of 20 working days in a month. For a team of two, this adds up to only 320 h total.

The answer to this disconnect has been to market remote-monitoring devices. In extremely simplistic terms, a remote-monitoring device can detect subtle differences in electrical signals or noises to identify current or potential issues. Similar

Photos from a walkthrough of a building with "monthly maintenance"

Without regular visits, the elevator does not have its rails or door equipment lubricated, belts checked, floor stop accuracy verified, signals renewed and an overall check to ensure it is performing properly.

systems have been deployed in the manufacturing sector with extreme success. There is no question that a computer can detect faults imperceptible to a human. Equally, it can employ predictive-modeling algorithms that design standard deviation curves from normal usage and flag items when they fall outside the first or second deviation.

However, problems arise when remote monitoring is implemented to eliminate all human interactions. For instance, Colley Elevator surveyed a building that had a maintenance contract with a large company that had installed its elevator 15 years ago. Construction dust was still in the pit, and there was a question as to whether the packing was leaking, or if the oil pan had simply not been cleaned. If an elevator company had been billing in the last 15 years but never took the time to clean the pits or hoistways, it speaks volumes about the other potential neglected maintenance items.

A Silver Bullet?

Remote monitoring today could create the need for a more intensive modernization tomorrow. As code continues to evolve, elevator equipment will become more sophisticated to manage any added life safety devices. Remote monitoring will need to keep pace to ensure compatibility with these new features.

Remote monitoring also fails in achieving compliance with monthly code-required testing. At this point, it cannot turn an FEO Phase I key switch, capture the elevator at the main landing, then turn the FEO Phase II key switch to the on position and take the elevator to a landing. Nor can it cycle the doors to make sure all FEO functions are working correctly before returning the car to the main landing.

The technology is also unable to perform monthly emergency phone tests for elevators installed before phone line

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Construction dust from an elevator's installation 15 years prior

monitoring. Though newer elevators have this feature, which checks the line at established intervals, there are countless installations across the country without it. A human is needed to push the button each month and verify if it is operating correctly.

Remote monitoring also fails to alert the elevator company to the simple things not caught by regular visits. Preventive maintenance from a technician familiar with the building's equipment can replace nonfunctioning signaling equipment like bulbs or LEDs. Without regular visits, the elevator does not have its rails or door equipment lubricated, belts checked, floor stop accuracy verified, signals renewed and an overall check to ensure it is performing properly. Can remote monitoring predict when a non-vision wing has become loose and is ready to separate from a hoistway door? Addressing these items, which are unique to each building and its set of circumstances, would ultimately prolong equipment life.

Nonquantifiable Results

Any technology that makes our industry safer and more efficient is a welcome addition. However, using technology as a substitute for regular maintenance degrades the quality of our work. Reviewing the schedule of monthly visits versus quarterly, and assuming 1 h per elevator, we go from 12 to 4 h per year, a 75% reduction in time. When a mechanic can only dedicate 4 h per year to an elevator, housekeeping, attention to detail and familiarity with the equipment will ultimately suffer. The mechanic is only as good as the tools he or she is given; a critical tool is time. We are seeing more pits full of oil pads and trash, more car tops coated with layers of dust, and door operators not lubricated, among other deferred maintenance items.

An overall drop in customer service has occurred. A technician has become the frontline and, often, de facto salesperson for a building. Removing the technician from the equation takes a piece of hands-on customer service away from the facility. It also removes a set of eyes that can spot issues in door operation, the pit, the hoistway and the car top.

Moving Forward

It is impossible to make broad statements about any elevator. Each is housed in a building that has unique requirements based on usage, age, traffic patterns, environment and several other factors. A six-story condominium with 60 units requires a different maintenance control plan than a three-story building with 12 units. There is no one program that fits all. Equally important, there is no piece of technology that completely does away with the need for regular visits by a skilled technician.

Big names, flashy products and a salesperson's promises do not necessarily translate into better maintenance and a longer system lifecycle. If we don't perform examinations in a building because we have "systematic" or "regular" visits that are electronically monitored, or routes are too large, an elevator company/technician will have a difficult time properly caring for the equipment.

Ultimately, the best defense is a good offense. Regular visits from a skilled technician can spot potential troubles before they become costly repairs. That is the advantage of regular visits, and something electronic monitoring cannot replace. Though its efficiency is welcome, it should be a feature to complement, not replace, the dedicated technicians at the heart of our trade.

Craig Zomchek is managing partner at Colley Elevator Co. and has been in the industry for 25 years. He holds a double major in Marketing and Management from DePaul University, as well as an MS in Business in Strategy, Execution and Valuation. He is a licensed elevator inspector in the State of Illinois and has formal training in electrical engineering, electrical construction, electrical code and ASME A17. He has worked his way up through all phases of the business and is actively involved in the industry. From 2008 to 2009, he served as president of CEA, and from 2016 to 2018 served a three-year term on the NAEC Board of Directors (2017 as vice president and 2018 as president).