

Introduction

For “elevator personnel,”¹ the installation and maintenance of new designs, novel replacement components and unique alterations may present a challenge to standard maintenance and inspection practices because of the drastic departure from traditional, familiar conveyance designs. Specifically, the advent of machine-room-less (MRL) elevators has changed the expectations and experience of elevator personnel. When entering a traditional machine room, it is common to see the major components mounted on the floor, in a lighted room, with a mainline disconnect near the door and the controller and hoist machine taking center stage. In this book we refer to that as “legacy equipment.” Today’s compact MRL units often locate all the major components in the hoistway. This has the advantage of saving space, but it means that the equipment, and its location, are radically different from past practice. Those differences have created new hazards for elevator personnel working on them.

Recognizing these differences in equipment locations and risks, the ASME A17 Standards Committee published the ASME A17.1S-2005 supplement considering new conditions of working spaces. The code previously required a minimum amount of maintenance and safety-related information to always be available on the jobsite, and it has modified those requirements, when the equipment significantly departs from legacy equipment. This book provides an overview of this new language, what documentation is required by the code, a general overview of the major manufacturers’ traction equipment, and when maintenance, inspection, testing, adjustment, repair and replacement procedures must be provided. Future editions will address hydraulic elevators. Hands-on experience and documented technician training are fundamental requirements in the elevator and escalator maintenance practice. More so, a general understanding of the importance of good maintenance is necessary to provide the best maintenance possible. Not every technician understands the details and obligations of the contract they are working under. Knowing the minimum standard of care should guide elevator personnel.

Some people take public transportation, a regulated industry with common carrier² requirements to protect the health and safety of their riders. Others drive to work in cars, or commute in vehicles designed and manufactured to minimum safety standards to ensure the health and safety of the drivers and their passengers. Some might take an airplane. All travel on systems designed and built according to typically conservative engineering principles of inertia and momentum. These travel paths have signage, signals and rules that operators must learn in order to safely maneuver and ensure accident-free travel.

All of these vehicles travel on streets, over rails or through the air, and are regulated by local, state or federal authorities to ensure safety. Access and use is governed by enforcing rules and requiring common features. All who use them are trained to recognize the features and obey the rules under penalty of law. Under-maintained conveyances are pulled from service either voluntarily, or by the authorities to ensure safe passage. Potholes are repaired, curbs rebuilt, striping repainted, radar upgraded, and light bulbs replaced to ensure safe travel. Railroad tracks are tested and replaced so trains won’t derail. In populated areas, crossing gates are tested to ensure that drivers are warned and made aware that a train is approaching. All these mandatory tasks (and thousands more) are maintenance requirements to ensure a minimum level of safety when traveling on roads, rails or airways.

Elevators and escalators are not different from the aforementioned conveyances in a broad sense. They also convey people and goods on regulated travel paths, though without an operator. With a responsibility to ensure that their conveyances are safe, building owners have their own responsibility. In some states, legislatures have enacted laws that elevators and escalators have the same level of care and responsibility as common carrier such as trains, buses, etc.

Meeting this responsibility is a tall order. Building owners usually only know about owning buildings, not how to maintain conveyances. However, not knowing how does not relieve them of the duty to provide a safe system in their building. They are providing the conveyances to move their customers and goods from the street to their respective landing and back. Maintenance must be performed to ensure that the conveyance remains at a minimum level of safety at all times -- or,

put another way, at a level of code compliance that ensures it is safe and operating within the tolerances of the original system design. Since building owners are not elevator maintainers, they typically contract the work to an elevator maintenance company that enables them to fulfill their duty.

By contracting with a maintenance company, owners effectively delegate some of their responsibility to experts in conveyance maintenance. As a result, the maintenance technician becomes the living, breathing expression of the terms of that maintenance contract. The technician's actions or inactions directly affect the safety of the conveyance and compliance to the applicable code. Work should be accomplished according to the code (in effect, at the time maintenance is performed). Since 2000, requirements have provided specific maintenance procedures, and in 2002, the requirements were formed into the Maintenance Control Program (MCP). While the technician may never see the actual maintenance contract, he or she must be aware of and have a copy of the MCP in order to properly care for the equipment and maintain it in compliance. This book provides a clear explanation of the requirements, in addition to its primary purpose: to explain the differences new technology is making to maintenance.

What is maintenance? Is it different on new equipment? It is not just fixing the equipment when it fails; it is doing the tasks that prevent failure and extend the useful life of the equipment at the highest possible performance with existing technology. It is also defined in the code as a process.³ Any time an elevator has passengers and potential passengers; a hazard is created, no different from those created when getting into an automobile that enters the roadway. The goal of maintenance is to prevent the hazards from becoming injuries. Are the new designs as "easy" to maintain as older legacy designs? What are the critical elements that need attention and maintenance? What are the least-important elements to maintain in a time of limited resources, competitive contract bidding, evolving equipment, new space configurations (i.e., MRL) and new technologies that the ASME A17.7/CSA B44.7 Performance Based Safety Code (PBC) may allow?

Two types of maintenance practices exist that can provide the goal of uptime and safe operation: preventative maintenance and predictive maintenance -- prevention of failure and prediction of failure. Experience with all equipment over time demonstrates which components will fail, providing an opportunity to replace these critical components prior to their failure. Maintenance companies are encouraged to use these proven methods to achieve the goals of the maintenance section.

Is there a list of the minimum things to "maintain"? Yes. Since 1921, the ASME A17.1 Safety Code for Elevators and Escalators has recognized the necessity for maintenance and its critical role in the continued safety of conveyances by publishing rules and requirements.⁴ Over the years, the rules and requirements have evolved to illustrate this intent by providing detailed requirements. Since 2000 (and up to the current code, ASME A17.1a-2008/CSA B44a-08), they are found in Section 8.6. This section also incorporates the escalator step/skirt index requirements for escalators – a critical safety requirement. These requirements were made retroactive in the scope of A17.15 to ensure that maintenance requirements apply to all conveyances.

This language is a culmination of years of dedicated work by many great engineers, inspectors, consultants and other volunteers of the ASME committees. Three come to mind without hesitation; Al Saxer, Zack McCain and Doug Labrecque. With their leadership and dedication, these concepts are now reality. Written and approved with the expressed purpose of providing safety for the elevator personnel who work on the equipment and keep the conveyances operating safely for users. What's left to understand is what the maintenance section is asking for, how to implement its requirements and how to apply them to new technologies.

Endnotes:

1] **ASME A17.1-2007/CSA B44-07, Section 1.3, Definitions, elevator personnel:** persons who have been trained in the construction, maintenance, repair, inspection, or testing of equipment.

2] **common carrier** n. -an individual, a company, or a public utility (like municipal buses) which is in the regular business of transporting people and/or freight. This is distinguished from a private carrier which only transports occasionally or as a one-time-only event. The People's Law Dictionary Copyright © 1981-2005 by Gerald N. Hill and Kathleen T. Hill.

3] **ASME A17.1a-2008/CSA B44-08, Section 1.3, Definitions, maintenance:** a process of routine examination, lubrication, cleaning, and adjustment of parts, components, and/or subsystems for the purpose of ensuring performance in accordance with the applicable code requirements.

4] Prior to 2000, these were called "rules"; after the 2000 edition was published, "rules" officially became "requirements".

5] **ASME A17.1a-2008/CSA B44a-08 – 1.1.3 Application of Parts:** this code applies to new installations only, except Part 1, and 5.10, 8.1, 8.6, 8.7, 8.8, 8.9, 8.10 and 8.11, which apply to both new and existing installations.

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