Functional Safety in Elevator Applications

In recent years, one of the most dramatic changes in safety relating to new elevator designs has been the migration from mechanical and electro-mechanical components to electronic components — for reliability reasons.

These new components can be safer and more reliable than their predecessors if designed correctly. (There are also commercial reasons compelling this shift: programmable electronics are lighter, smaller, and quieter — all attractive qualities to the design engineer). However, the prevailing safety codes for elevator applications in North America — ASME A17.1 and CSA B44 — neglected to, prior to 2007, address specific requirements for failure modes associated with these newer technologies. These codes lacked a uniform process for validating the compliance of Programmable Electronic Systems (PES) technologies with the system safety requirements, making their adoption difficult, inefficient, and very expensive. The unintended effect of the codes was to impede progress in the industry.

As of 2007, there are new requirements in ASME A.17.1/CSA B 44 that specifically addresses functional safety. Now, if Programmable Electronic Systems (PES) are specified, these subsystems can be assigned an appropriate safety integrity levels (SIL). Table 2.26.4.3.2 of ASME A.17.1/CSA B 44 lists out the majority of electrical protective devices (EPDs) and functions needing SIL ratings in elevator applications.

Most of A17.1 is self-regulated, and, historically, elevator manufacturers have attended to compliance issues for the standard on their own. But because of the new PES requirements, the code has been opened up to third-party certification because, when these functional safety issues are addressed, it's appreciably different from examining the rest of the code — it's like looking into a black box. Concerns were raised about the ability of manufacturers using off the shelf parts and Authorities Having Jurisdiction (AHJs) looking at the elevator system globally to see inside such black boxes that would be responsible for functional safety. The introduction of Third Party oversight alleviated these concerns by providing a common level of assurance that what is inside the box was evaluated in accordance with what was intended by the code.

Why UL Is the Logical Choice

Even before the revised safety code was published, UL was already participating in the ASME A17.1 technical committees on the North American level, as well as the ISO TC 178 committee on the international level — putting it on the frontline in terms of exploring how risk management was going to be handled relative to safety issues in the industry.

UL is the world's most recognized independent product safety organization. It has been testing products and writing standards for safety for more than a century. The company's impeccable record of independence and objectivity in the application of safety principles is an asset to a process where UL and the manufacturer work closely in establishing the integrity of functional safety adherence in elevator applications.

Further, even when elevator manufacturers design in programmable electronic systems that deviate from what is prescribed under ASME A17.1/ CSA B44, UL has the capability — and credibility as one of the three accredited elevator/escalator certification organizations (AECOs) in the world — to get those components approved using the ASME A17.7/CSA B44.7 performance-based safety code.

For more information on how UL can help you meet functional safety requirements for elevators, please contact:

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