

NOTES
 (1) Recognition that AHJ may directly evaluate CCD
 (2) Regulatory process outside of this Code

PBC Process Flow Chart

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New product design

When an elevator designer proposes a new elevator system, that system must be reviewed and approved by the Authorities Having Jurisdiction (AHJs) for compliance with the elevator safety code. Using the 2007 version of ASME A17.1/CSA B44 an elevator system can take two different paths to approval by the AHJs.

Entire system satisfies ASME A17.1/CSA B44 requirements?

The first step in the approval process is to determine if the system satisfies the elevator safety requirements as prescribed by the 2007 version of ASME A17.1/CSA B44. If the entire system is in compliance with the ASME A17.1/CSA B44 code then the elevator can be installed following current practices. If all or part of the system uses technology that does not meet the prescribed requirements of ASME A17.1/CSA B44 (new technology) then the elevator design must be approved using the process set forth in ASME A17.7/CSA B44.7, the Performance Based Code for Elevator Safety (PBC).

Partly satisfies ASME A17.1/CSA B44 requirements?

Elevators are sophisticated systems that use a wide range of mechanical and electrical components. Because of this, many systems will have some components that utilize new technology and some components that are based on current technology. Current technology which is already covered under the 2007 version of ASME A17.1/CSA B44 continues to be acceptable as it complies with the requirements in this code, while new technology will be required to comply with the requirements in the PBC.

Identify ASME A17.1/CSA B44 compliance

Systems which are partly compliant with ASME A17.1/CSA B44 must be reviewed to determine which specific components are compliant with that safety code and which components must comply with the PBC.

Identify applicable GESRs

Once it has been determined which of the elevator system components need to be reviewed under the PBC, then the next step is to identify which of the Global Essential Safety Requirements (GESRs) apply to those components. Each GESR states only the safety objective, or "what" must be done or accomplished but not "how" to accomplish the objective. When identifying applicable GESRs, the elevator designer reviews the design and installation of the elevator system and considers all possible safety exposures in order to identify which GESRs are applicable to the design. Once the GESRs are identified, compliance must be assessed.

Perform Risk Assessment (RA)

To assess compliance with GESRs and to establish the ability of an elevator system to eliminate or sufficiently mitigate a risk, a risk assessment of all of the possible risk scenarios related to the relevant GESRs is performed. A balanced, qualified risk assessment team is then established to evaluate events that could lead to harm. Risk scenarios are formulated by describing possible hazardous situations and determining their causes and effects, including any possible degree of harm. The risk assessment of a scenario is followed by the process of risk estimation and evaluation. The estimated risk determines whether further protective measures must be taken.

Identify Safety Parameters (SPs) & other protective measures

As long as a risk reduction measure is assessed as not acceptable, the designer is required to continue to improve the design to eliminate the risk or to implement other protective measures to sufficiently mitigate the risk until all the applicable GESRs have been fully complied with.

Mitigate risks

The determination that a risk has been sufficiently mitigated sometimes requires that specific Safety Parameter (SP) values established by the PBC are achieved. These SPs include measurable qualities such as reliability, strength, and durability. Where an SP is different than specified, the risk analysis must demonstrate that an equivalent safety level has been achieved.

Code Compliance Documentation (CCD)

Once the GESRs have been identified, the risk assessments performed, and the safety principles and protective measures have been applied to eliminate or mitigate the risks of the elevator design; a CCD must be produced for each elevator system or component. The CCD includes a description of the elevator system and identifies those components of the system which are compliant with ASME A17.1/CSA B44 and those which are being addressed by the PBC. For the components being assessed under the PBC, the CCD includes all technical documentation necessary to demonstrate conformity; a list of applicable GESRs; the risk assessment report; and all procedures for inspections, tests, maintenance, and repairs for the system.

AECO reviews application

In order to receive a Certificate of Conformance the elevator designs must be reviewed and approved by Accredited Elevator/Escalator Certification Organizations (AECOs). An AECO is an independent organization concerned with product safety evaluation. AECOs must be accredited by the American National Standards Institute (ANSI) or the Standards Council of Canada (SCC).

AECO verifies conformance?

Before certifying an elevator system, the AECO examines all technical documentation provided by the designer, including the risk analysis and CCD, to verify that the system meets all applicable GESRs. The AECO will then perform tests as necessary to determine that the elevator meets all of the requirements of the safety code as specified in the CCD. If the AECO finds that the elevator design is not acceptable and refuses to issue a Certificate of Conformance, it is required to state detailed grounds for refusal. The elevator design would then return to the beginning of the process to correct the issues identified by the AECO.

Certificate of Conformance Issued


When the AECO confirms that the elevator system conforms to the applicable requirements of the PBC, the AECO issues a Certificate of Conformance to the elevator designer. The Certificate of Conformance and all related documents are then forwarded to the AHJ for final acceptance. The AECO is required to keep records of all Certificates of Conformance which have been issued or withdrawn.

Authority Having Jurisdiction (AHJ)

Final approval of all elevator systems remains the responsibility of the appropriate AHJ for each location in which the elevator is being proposed for installation. The AHJ will review all elevator systems that conform to ASME A17.1/CSA B44 entirely as well as all systems that have received a Certificate of Conformance from an AECO under the PBC. When reviewing new elevator systems, the AHJ may choose to review all documentation from the AECO review process, including the CCD for the elevator design. The AHJ has no obligation to accept the Certificate of Conformance or any of the recommendations from the AECO. Please note that the exact regulatory review process is outside the scope of ASME A17.1/CSA B44.

Installation

With the completion of the review process, the elevator design is approved for installation by the AHJ. This structured review process ensures that new, safe, and efficient technology can be applied to elevator designs in new buildings as well as existing structures to provide safe, fast, and efficient transportation.

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