



## A Laymans Guide to Code Development

### Introduction

A sad reality is that most building and safety codes developed in North America are a reaction to some tragedy. The Triangle Shirtwaist Factory Fire in Manhattan took 146 lives in 1911 and led to restrictions in the city's code on locking employee exits. After 492 people died in the Cocoanut Grove Nightclub fire in 1942 in Boston, flammable decorations were prohibited and revolving doors could no longer be counted as exits.

The same is true of building transportation safety. The 1980 MGM Grand fire in Las Vegas resulted in 85 deaths, many occurring on the upper levels of the hotel even though the fire was limited to the lower floors. A lack of sprinklers throughout the building coupled with improper hoistway construction and ventilation of the elevator shafts that permitted toxic fumes to migrate up the hotel towers led to this loss. Step/skirt entrapments on escalators compelled the industry to develop and codify the step/skirt performance index. The tragic September 11th attack on the World Trade Center not only led to new ways to design buildings, but also new ways to think about using elevators to evacuate their occupants in an emergency situation.

### Model Codes

The safe design and construction of today's built environment is regulated by the adoption and enforcement of building and safety codes by state, provincial and municipal entities. Much like criminal or traffic safety codes, they are unique to their jurisdictions. For example, New York police can't ticket someone for violating a California speed limit, and Colorado can't enforce the Alabama drug laws.

Still, building conditions and construction practices are more similar than different across North America, so it would make no sense for each jurisdiction to develop its own building and safety codes from scratch. Flood concerns are the same in Missouri on the east side of the Mississippi as those of Kansas on the west side. The structural integrity of concrete or steel is the same in Ohio as it is in Michigan. For elevators, gravity is the same across the country, so suspension means, brakes and elevator car load limitations should be the same in New York State and Washington State.

Because of these similarities, model building and safety codes and standards were developed throughout the 20th century to allow local jurisdictions to adopt general safety requirements that have been developed by a national (and now international) consensus of experts. Covering everything from the construction of a nuclear power plant to the size of a dot on a braille sign, model codes and standards dictate how our world is built.

In the world of building transportation there are a handful of nonprofit organizations that create model codes and standards:

[American Society of Mechanical Engineers \(ASME\)](#)  
[Canadian Standards Association \(CSA\)](#)

These organizations develop and maintain a number of codes and standards related to the building transportation industry, the three most important of which are:

- ASME A17.1/CSA B44 Safety Code for Elevators and Escalators
- ASME A17.3 Safety Code for Existing Elevators and Escalators
- ASME A17.7/CSA B44.7 Performance-safety code for elevators and escalators

Both the A17.1 and A17.7 codes provide the basic safety parameters for new elevators, including not only "regular" ones found in office buildings and hotels, but also freight elevators, those installed in private homes, and obscure locations like underground mines, wind turbine towers and on board ships. They also include provisions for the inspection, maintenance and repair of existing elevators, escalators and moving walks. The A17.3 code applies some basic safety design criteria to existing equipment.

When questions or disagreements arise regarding what a particular code provision requires, the ASME A17 Standards Committee will respond to inquiries sent by interested parties to clarify what the code requires. Inquiries that uncover an ambiguity or contradiction in the code will lead to technical code revisions for the next edition. This is a primary way the codes are maintained.

For significant technical revisions to the code, projects are assigned to either a standing subcommittee of the ASME A17 Standards Committee (e.g., the A17 Hoistway Committee) or a special multidisciplinary task group created for the job (e.g., the Task Group on Elevators and Fire). These groups determine whether a code change is warranted and, if so, what the new or revised requirements should specify. In many cases a formal hazard assessment is undertaken whereby all of the potential related hazards are identified and then eliminated or mitigated by adding new code requirements. The final proposal is balloted first within the

working group, then at the A17 Standards Committee level, and may be re-balloted numerous times if negative votes are posted. When all or most negative ballots are resolved, the Chair of the ASME A17 can rule consensus and the code changes are filed for inclusion in the next edition of the standard.

Even in this case, opponents can appeal the Chair's decision with the ASME Board of Safety Codes and Standards or through the American National Standards Institute (ANSI) appeal process. Proposed changes are also subject to public review and comment before they are published in the code, and may be revised or withdrawn based on that process. Figure 1 shows how this code development process takes place.

The above-referenced codes are maintained on a continual basis, with the A17 Standards Committee and its subcommittees meeting throughout North America numerous times throughout the year. All meetings are open to the public. New editions are published on a 3-year cycle.

#### National Fire Protection Association (NFPA)

The NFPA maintains and publishes hundreds of codes related to fire protection and safety. Those of particular importance to the building transportation industry include:

- NFPA 101 Life Safety Code
- NFPA 72 National Fire Alarm and Signaling Code
- NFPA 13 National Sprinkler Code
- NFPA 70 National Electric Code

The NFPA codes are written and maintained by their own separate technical committees and published on a 3-year cycle.

#### International Code Council Accredited Standards Committee A117

The ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities standard was first published in 1961 and is referenced in numerous codes and standards in the U.S. It establishes minimum requirements for accessibility for individuals with physical disabilities, and includes comprehensive requirements for passenger elevators, limited-use/limited-application elevators, private residence elevators, and vertical and inclined platform lifts. Two notes of interest:

- The adoption of the A117.1 standards in U.S. building codes marked a slight departure from the premise that building codes are meant to address general health and safety needs. It addressed the social concern for providing equal access for disabled persons in the community and integrating them into our built environment. Other recent excursions into areas of social concern include providing special allowances for historic preservation structures and improving the environment and energy efficiency through Green Construction and Energy codes.
- In 1990 the U.S. Congress passed and President H.W. Bush signed the Americans with Disabilities Act, a federal civil rights statute to meet the needs and rights of disabled Americans. Because access to the built environment is essential to exercising those rights, accessibility design requirements were written into that law and its subsequent regulations. The 2010 ADA Standards for Accessible Design promulgated by the U.S. Department of Justice are very similar to the accessibility standards of A117.1 that are enforced through state and local building codes. For example, requirements for elevator door widths and the height of elevator buttons are identical in both documents. However, the ADA standards are federal civil rights regulations enforced through the U.S. federal court system, while the A117.1 standards are enforced locally by building departments through the plan review and permit process. Even where a jurisdiction references the ADA Standard in its building code, it is enforcing the local code, not federal law.

#### **A Note on the Code Development Consensus Process**

The ASME, NFPA and A117 codes and standards addressed above are developed and maintained through a consensus process established by the American National Standards Institute (ANSI). In this process, code committees must be comprised of a balanced membership that includes most or all of the parties interested in and affected by the code's or standard's subject matter. For example, the ASME A17 Standards Committee includes representatives from the enforcement community, building owners, consultants, manufacturers of elevator components as well as elevator Original Equipment Manufacturers (OEMs) like the companies on NEII's membership roster.

The International Code Council (ICC) family of international codes addressed below is not developed by an ANSI-accredited consensus body but through a governmental consensus process. The voting membership that develops the "I-Codes" is comprised of building inspectors, plumbing inspectors, fire marshals and other government employees from across the U.S., acting as representatives for their home constituents much as legislators represent the citizens of their communities.

#### International Code Council (ICC)

The ICC publishes a number of codes that affect the building transportation industry:

- International Building Code (IBC)
- International Existing Building Code (IEBC)
- International Fire Code (IFC)
- International Green Construction Code (IgCC)

Interestingly, the IBC and IEBC never require elevators in buildings. Rather, they require that interior accessible routes be provided for persons using wheelchairs or having other mobility impairments, and passenger elevators are the only practicable way to provide that route in most multi-story buildings. What the building codes do regulate are:

1. Compliance with the ASME A17.1/CSA B44 Safety Code for Elevator and Escalators (or the ASME A17.7/CSA B44.7 Performance-based safety code for elevators) where building transportation is provided.
2. The environment or envelope in which an elevator is installed. The latter includes enclosing hoistways and lobbies, providing standby power in certain circumstances, specifying ventilation for elevator machine rooms and hoistways, and other construction-related provisions. It also includes special provisions allowing firefighters to use elevators to access a fire and where building occupants can evacuate the building in a fire using the elevators.

The International Fire Code has provisions for including elevator status indicators in a building's Fire Command Control Center and information on if and how elevators can be used to evacuate the building in its Evacuation Plan. The International Green Construction Code specifies certain energy efficiency requirements for elevators and escalators.

## Conclusion

Building and safety code and standard development in North America today involves tens of thousands of volunteer-hours from thousands of experts from across the world, all dedicated to improving the general health and safety of the citizens of our states, provinces and localities. It impacts everything from the design and construction of a new World Trade Center complex in lower Manhattan to the renovation of a mom-and-pop restaurant in Kingman, Arizona. No single city or town can bring that level of expertise to the development of a building or safety code. That's the value and importance of model codes in North America today.

It also begs the question of why some authorities having jurisdiction (AHJs) are compelled to "tinker" with these consensus documents when the overwhelming evidence is that adopting model codes without modification makes the most sense in terms of both safety and economics. If a standard elevator of a certain design can be installed and used safely in Cincinnati, Ohio that same elevator is safe and reliable in Sacramento, California without state or local authorities extensively modifying the North American elevator safety code. If code-compliant electrical installation is safe in an elevator in Nashville, Tennessee that same installation will be safe in Lansing, Michigan. The same is true for A117.1 accessible apartment units in Florida or Georgia or NFPA 72 Fire Alarms in Las Vegas or Chicago. Even where special seismic concerns, snow load factors, or flood plain considerations may be unique to a particular area, the model codes include specific requirements or allowances for specific regions.

In addition to adopting model codes without local modifications, NEII encourages AHJs to accept interpretations from the committees that write the model codes and standards regarding the requirements and applicability of the documents they create. These committees know more than anyone why the code says what it says and have the resources to research committee rationale for wording the code a certain way whether it was written 25 years ago or last year.

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