

RESPECTING THE ELEVATOR ENTRANCE

by Louis Blaiotta, Sr. and Louis "LJ" Blaiotta, Jr.

Respect. We've all heard Rodney Dangerfield bemoan his perceived lack thereof. So, I already hear you asking, what in the name of Elisha Graves Otis does this have to do with elevators?

The last time we posed this question, in an article some months ago (ELEVATOR WORLD, November 2002), it was to bring voice to our long-held view that elevator cabs do not get the respect they deserve. Not from the architect. Not from the elevator consultant. Not from the general contractor. And not from the managers/ owners of the buildings in which they're installed.

Much the same is true of elevator entrances, similarly taken for granted and often under-utilized as image enhancers.

Without a doubt, aside from the main entryway to any multistoried edifice, the most important doorways in any building are the elevator entrance assemblies found in the lobby. Along with their companions, the elevator cabs, these architectural portions of the elevator system are seldom given a second thought by the design professionals who compose their specifications, the riding public and even the building owners – despite the reality that the elevator entrances are likely the most used doorways in their buildings!

Using updated technology to deliver an excellent vertical transportation experience, modern automatic elevator systems provide for the safe movement of a platform up and down in hoistways that can be constructed in the form of an enclosed shaft/shaftway, an open atrium or simply on the exterior of a building structure or tower. Openings are provided in the hoistway walls of these multi-leveled structures at various points (stops/landings) along the elevator's path in order to gain access to the elevator system's moving platform. The part of the automatic elevator system that



performs the alternating roles of hoistway *accessibility* and *protection* is the elevator entrance assembly. Aesthetics aside, the primary function of this assembly is to open during the loading and unloading of a safely parked platform, and close to prevent accidental entry by passengers when the platform is away from the landing. The assembly also must prevent flames from moving from floor to floor during a fire (ASME/ANSI A17.1 Elevator and Escalator Safety Code, Rule 2.11, Protection of Hoistway Openings).

Aesthetics, however, should not be downplayed, since the elevator entrance is often the first appearance interior doorway that can be capitalized upon to make a vital statement about the building and its target market. The lobby entrance to the elevator should pack the design equivalent of a book cover or the opening curtain of a Broadway production. It should visually announce the equivalent of He-e-e-re's Johnny! Here's *your elevator*, the safest mechanical means of vertical transportation ever invented, an entrusted guardian of security and safety assurance for the building and its inhabitants! What an outstanding opportunity to convey an *uplifting* experience to all tenants and visitors who enter the elevator, whether on their way to/from work, or visiting a client, a medical professional or a friend or simply coming home. *Continued* ▶

Attractive rather than merely functional lobby entrances



EDUCATIONAL FOCUS: ELEVATOR ENTRANCES

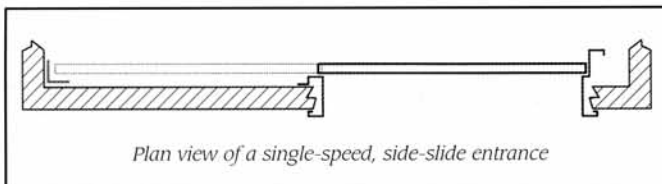
Continued

Sadly, misplaced attempts at cost containment typically cause design professionals to overlook this opportunity and call for the lobby entrance to be as inconspicuous as all the other doorways on the floor. Modern manufacturing techniques allow the elevator entrance to be dynamically and beautifully designed while meeting the many building, elevator safety, fire resistance, handicap and Americans with Disabilities Act Accessibility Guidelines (ADAAG) codes/requirements – so why not take maximum advantage of these techniques? (*Building codes mandate only minimum and maximum sizes, proper means for access and egress, and stipulate which fire resistance and structural issues the doorway must comply with, and which standards that must also be complied with, i.e.: elevator safety, handicap accessibility and ADAAG [Federal] requirements.*)

Types of Entrances

Side Sliding

One of the most common designs in use today is the **single-speed, side-sliding** entrance. This design features a single door panel that operates by sliding horizontally along the path of the sill and hanger track assemblies. Two important criteria limit the maximum width opening that it can protect: the upper limit of the fire door procedure to which the door system was successfully tested and the space available on the platform and/or within the shaftway. For single-speed, side-sliding entrances, this space must be at least twice the opening width in order to have sufficient room for the door to travel from the fully closed to the fully opened position.

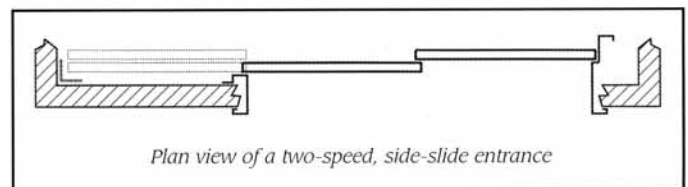


Plan view of a single-speed, side-sliding entrance

Field conditions, however, can call for a larger hoistway opening than a one door panel can possibly protect, or have tight shaftway conditions that do not allow sufficient space for the full travel of a single-speed, side-slide door panel. In such situations, multiple door panels are used in the entrance assembly. Again, the dual limitations of the fire door procedure and platform/shaftway size will come into play.

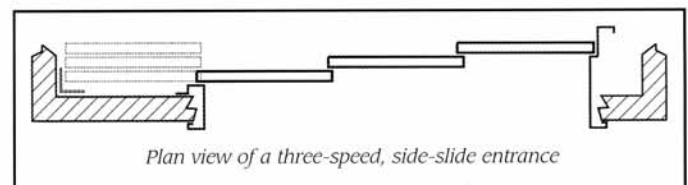
One type of multi-paneled entrance assembly in use today is the **two-speed, side-slide** entrance, comprised of two door panels that work together, spreading across the entire hoistway opening (with each door panel covering half of the opening) when the entrance is in the closed position. Upon opening, both doors then *slide* to

one *side* and stack one behind the other, collapsing into a space 1/2 as wide as the original hoistway opening. Two-speed, side-slide entrances therefore have a 1-1/2 times the opening size requirement for the door travel width within the platform and/or shaftway (the full opening width required in the closed position, plus the 1/2 opening space required when the doors are nested in the opened position). Since the leading door panel travels the entire opening width in the same amount of time as the trailing door panel travels half the distance (to and from the opening's midpoint) – the *leading* and *trailing* door panels must travel at two different speeds and are commonly referred to, respectively, as the *fast* and *slow* door panels.



Plan view of a two-speed, side-slide entrance

While multi-speed door equipment can be used to protect oversized hoistway openings, their most frequent application is found in undersized or tight shaftways. In fact, quite counter-intuitively, the tighter the field conditions, the more door panels should be deployed in the protection of the hoistway opening. For example, since three-speed, side-slide entrance assemblies are composed of three door panels, they can be used in shaftways with widths as tight as 1-1/3 times the opening size.



Plan view of a three-speed, side-slide entrance

Center Parting

Other common configurations for passenger elevator entrance assemblies can be found in the center-parting design group. **Center-parting** entrances are multi-paneled systems by definition. Similar to multi-speed, side-slide entrances, center-parting entrances incorporate two or more door panels that work together to protect a hoistway opening.

However, unlike side-slide entrances, where all door panels *slide in the same direction over to one side of the opening*, the center-parting entrance door panels *move in opposite directions to/from one another*.

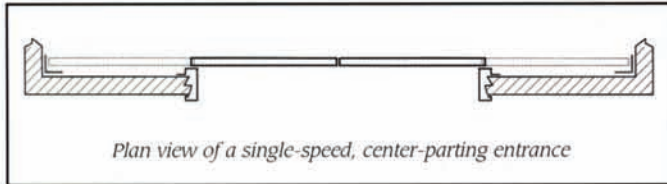
In single-speed, center-parting entrances, for example, two door panels work together, spreading across the entire hoistway opening when the entrance is in the closed position. Each door panel covers half of the opening, with

Continued ►

EDUCATIONAL FOCUS: ELEVATOR ENTRANCES

Continued

their leading edges meeting in the middle of the hoistway opening. Upon opening, both doors then *move away from each other at the same speed, parting in the center*, with one door moving to the left side of the opening as the other door moves to the right.



Single-speed, center-parting entrances are often encountered in high-traffic, high-rise buildings. In an effort to move as many passengers as time efficiently as possible, these building structures seek to minimize passenger boarding and unloading times while maximizing the available elevator platform area. The center-parting design is useful in both respects, helping to minimize load/unload times in two ways:

First, center-parting designs employ faster door open/door close cycles than side-slide designs. The door panels of center-parting equipment only travel to and from the *midpoint* of the hoistway opening, while the doors in side-sliding entrances must travel the *entire* distance from one side of the hoistway opening to the other. This saves boarding time, because rapidly opening doors allow the process of loading and unloading to *begin* more quickly. And, once boarding is completed, rapidly closing doors allow the elevator platform to get under way more quickly.

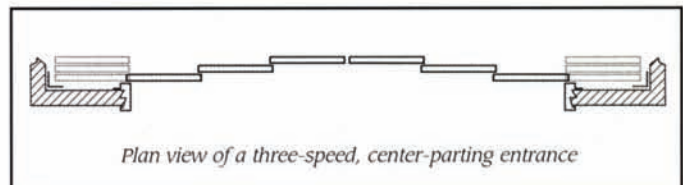
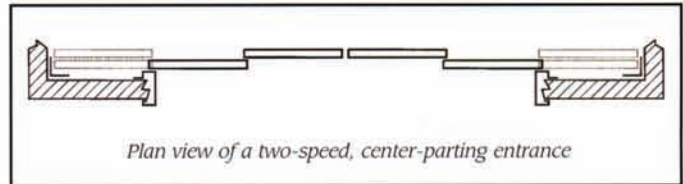
A second factor is the reduction of congestion in front of hoistway openings during boarding, best accomplished (short of adding additional elevator systems and platforms) by increasing the size of the hoistway openings themselves. As with all multi-paneled (two/three-speed, side-slide, etc.) door systems, single-speed, center-parting entrances are well suited in the protection of these oversized hoistway openings.

However, unlike the multi-paneled entrances of the side-slide design group, single-speed, center-parting door equipment has no inherent door travel advantages over single-speed, side-slide entrances of similar opening widths (each requiring door travel space of at least two times the opening width). This is due to the fact that both of the center-parting door panels travel in the same plane and therefore cannot save any door travel distance by stacking one behind the other in the open position. However, this design trait is useful in the maximization of platform square footage.

Often, it is this ability to maximize usable platform space that makes single-speed, center-parting the design

of choice in high-traffic/high-volume applications. Since valuable platform space must be sacrificed to make room in multi-speed, side-slide entrances in order to nest or stack the fast door behind the slow door, each additional door panel in these applications causes a corresponding reduction in the usable platform space. Similarly sized single-speed, center-parting entrances do not suffer losses in platform space because the door panels operate in the same plane and do not have to stack one in front of the other.

Applications requiring extremely large hoistway openings also look to the center-parting design equipment for design solutions. Multiple-speed center-parting door equipment such as two-speed center-parting (with four door panels: two moving to the right and two to the left) and three-speed center-parting (with six door panels: three moving to the right and three to the left) provide design solutions for even the largest hoistway opening requirements.



Typical swing-door installation

Swing Doors

Not all installations can be covered by the sliding elevator entrance design (either side-slide or center-parting). **Swing door** entrance assemblies are used at installations not requiring automatic operation of the hoistway door equipment (residence lifts) or older, retrofit sites with extremely tight shaftways (sufficiently tight that a collapsible car gate must be used, since there isn't enough door travel room for even the smallest door paneled multi-speed entrance). These entrances employ

Continued ▶

EDUCATIONAL FOCUS: ELEVATOR ENTRANCES

Continued

doors that swing open and closed on hinges/pivots that affix the back or trailing edge of the door to one side of the entrance frame.

Fire Resistance, Protection and Operation

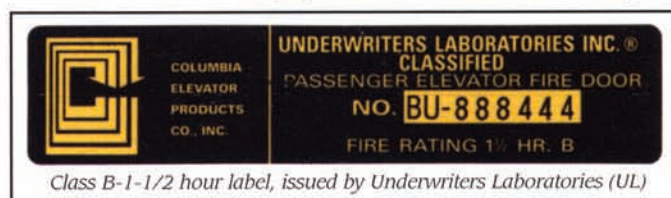
Since most elevator door equipment is installed in fire-rated wall systems, it must additionally assume the role of acting as a fire door. In North America, fire door systems in general – and elevator fire door systems in particular – receive their fire rating/classification by undergoing an intensive engineering review process that culminates in a destructive burn test in accordance with the test criteria found in the NFPA-80, ASTM-152 and UL-10B standards (*Rule 2.11.14, Testing*).

These standards require that the elevator doorway must be capable of resisting fire temperatures of 1800° F for a period of 1-1/2 hours in order to assure that the door system will prevent fire from spreading from one floor to another through the elevator shaftway. At the conclusion of the burn, the doors are immediately sub-

jected to a Hose Stream Test, with the rapid change in temperature simulating the effects of an explosion.

In order to be awarded a Class B-1-1/2 hour rated fire door certification, the door panels of the entrance assembly, at the conclusion of testing, must remain operable within the limits of the test criteria. Only elevator doors and emergency stairway doors (which assure the occupants of the building a safe means of egress) are required to bear the Class B rating, the second most rigid fire door rating.

The independent, third-party testing laboratories that perform the engineering analysis and burn tests will also, through a series of perpetual, random and surprise inspections of the door manufacturing facilities (*Rule 2.11.16, Factory Inspections*), issue labels/markings certifying the products will perform as required under the *ASME A17.1 Elevator and Escalator Safety Code (Rule 2.11.15, Marking)*.



Destructive Burn Test of Elevator Doorway



Door prior to test



During test, with fire on corridor side – note distortion of door toward flame, due to heat



Hose stream test, after 1-1/2 hours at 1800°F to simulate explosion



At conclusion of test, door must remain operable.

The ASME A17.1 Code also addresses how an elevator is to perform in a fire emergency. The Emergency Operations Rules (*Rule 2.27.3, Firefighters Emergency Operation – Automatic Elevators*) specify exactly how an elevator must perform during a fire. Upon being signaled by an alarm or smoke detector, all elevators must immediately cease upward motion, reverse direction downward to a designated evacuation floor and remove themselves from service by closing their entrance doors. During this type of firefighters service operation, elevators can only be reactivated at that evacuation floor by firefighting personnel using a special key to commandeer the elevator for their exclusive use. Frequently, due to its required fireproof construction, the lobby of the building is the designated evacuation floor – another in the list of situations where lobby elevator entrances play critical roles in the design of multistoried buildings.

Structural Integrity and Safe Operation

In addition to performing the architectural and fire protection roles outlined above, elevator entrance doors must also address several structural and safety issues. ASME A17.1 sets forth stringent structural integrity requirements for the elevator entrance in order to ensure their performance under extreme impact and static force conditions. Many of the rules even go as far to specify what materials and devices are to be used in conjunction with an entrance assembly in order to achieve the code's high safety standards (*Rule 2.11.11.5, Panels*).

There even are code requirements to ensure safe operation of the entrance assembly under normal operating conditions. From simple issues of clearances, to exposures

EDUCATIONAL FOCUS: ELEVATOR ENTRANCES

as diverse as pinching hazards (*Rule 2.11.11.3, Frames*), the ASME A17.1 document has more than 30 pages of rules devoted to ensuring that the elevator entrance always performs in a safe and reliable manner over a broad spectrum of operating environments/conditions.

Summary

A great deal of talent, knowledge, experience and planning enters into the safety, design, styling and manufacture of elevator entrances. This escapes most people's notice and appreciation, and that's as it should be. Building owners and the riding public *should* transparently enjoy the benefits of our products as they deal with the priorities of their daily lives. But, the next time you're in an elevator lobby, awaiting the next available cab, take a moment to appreciate the true value of the entrance before you. And, if you're an elevator design professional, think about using the entrance system as a medium of expression for your next project. As we observed in our earlier piece on cabs, Rodney Dangerfield just might call it "respect."

Louis Blaiotta, Sr., founder and chairman of the board of Columbia Elevator Products Co., Inc. is a former member of the NAESA International Advisory Board. He has been an active participant in ANSI/ASME A17 activities since 1963. He served on the Main, Hoistway and Code Coordinating Committees until 1995, when he was

elected to a Lifetime Honorary Membership on the ANSI Main Committee. Blaiotta is a charter member of the ASME/QEI Committee, in addition to having served as the National Association of Elevator Contractors (NAEC) chairman of Codes and Standards for over two decades. He is a former member of both the International Association of Elevator Engineers (IAEE) and the National Fire Protection Association (NFPA). In 1991 he received the prestigious NAEC Distinguished Service Award for his technical and philanthropic contributions to the elevator industry.

Louis James Blaiotta, Jr., began working at Columbia Elevator Products Co., Inc. in 1986. He designed and implemented a new business structure for enhanced customer relations, production efficiency, employee relations and the aggressive application of emerging new technologies to a very traditional field. By 1991, he had risen to the level of vice president and, since January 1, 1994, has been the president. He is a member of the Hoistway Committee of the ASME A17.1 Elevator & Escalator Safety Code Writing Authority. He is a member of both the American Society of Civil Engineers (ASCE) and the American Society of Quality Control (ASQC). Blaiotta holds a MBA from the Lubin School of Business, Pace University.



Blaiotta, Sr.



Blaiotta, Jr.