RESPECTING THE ELEVATOR CAB

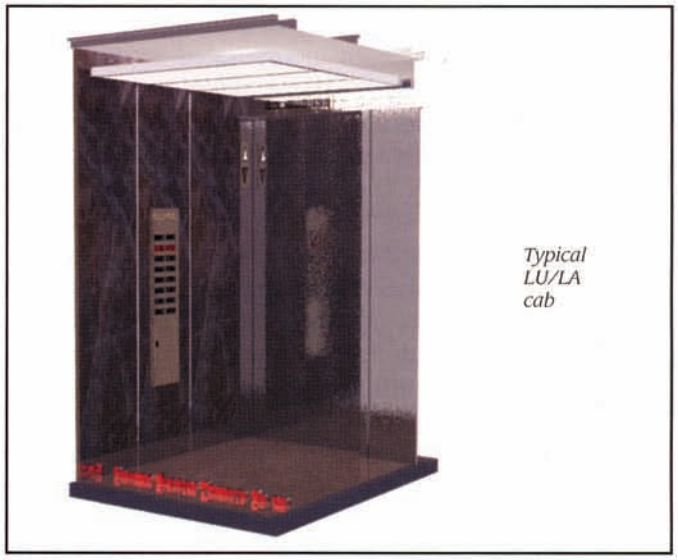
by Louis Blaiotta, Sr.

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?" To borrow a bit from Mr. Dangerfield, it has long been my view that elevator cabs and entrances do not get the respect that they deserve: from the architect, from the elevator consultant, from the general contractor and from the managers/owners of the buildings in which they're installed.

Typically what the riding public calls an "elevator" is limited to what they actually see, the entrance and the 30-square-foot enclosure that most of the world refers to as the cabin and we in America call the "cab." I like to refer to it as the last of the three B's of an elevator system: Brains, Brawn and Beauty.

"Beauty" is 100% visible by all, yet constitutes only approximately 15%, on average, of the total monetary value of the elevator system. The remaining 85% – the "Brains" (the electronic/computer systems controlling elevator movement) and the "Brawn" (the traction/hydraulic form of propulsion) – are obscured from view in the basement or rooftop machine rooms, hardly as welcoming as the car enclosure and often frequented by visitors other than human. So, á la Mr. Dangerfield, the faithful elevator cab is entitled to more appreciation and understanding of its underlying issues.

Since the beginning of the modern age of vertical transportation (the end of manned "car-switch" operation and the beginning of automatic elevator operation) elevator cabs have generally fallen into two categories, commercial passenger and specialty applications. The specialty application category includes freight, limited use/limited application (LU/LA) and residential applications. The commercial passenger cab category (the subject of the balance of this article) further divides into two subcategories, wood-core and steel-shell construction types.



Typical LU/LA cab

Commercial Passenger Cab Types

Wood-Core Enclosures

The traditional wood-core cab, while the oldest design of the modern era, still has a place in the scheme of things and clear advantages in certain situations. This

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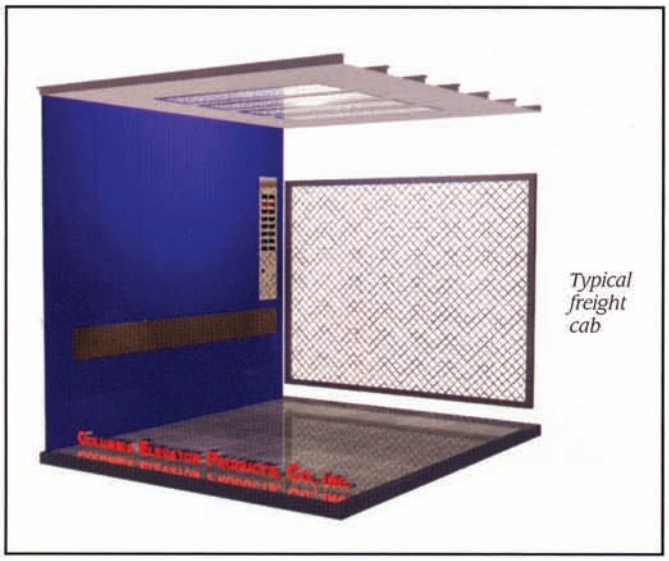
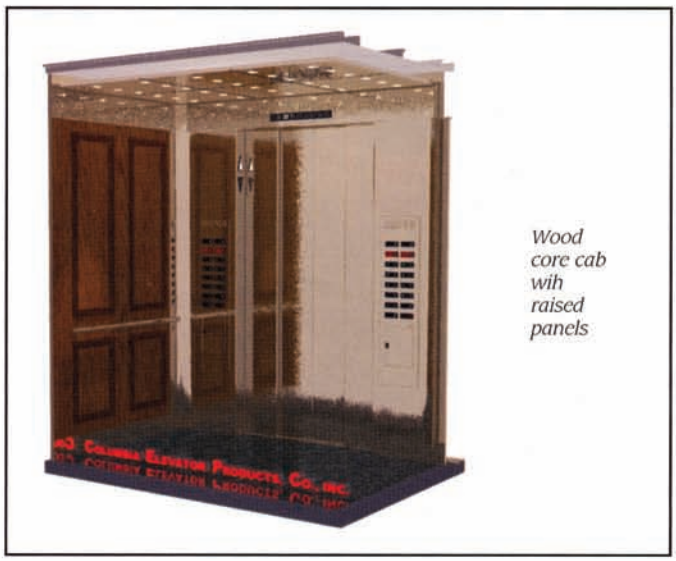


Typical freight cab



Wood core cab wih raised panels

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style represents the classic, traditional aesthetic in elevator cab design, ideal in climate-controlled, new-construction environments and applications where the climate is not unduly moist/humid. Often nicknamed the "wood box," this wall construction was traditionally composed of plywood, and, later, fire-retardant particleboard or MDF substrates. Older designs even incorporated wood core in their car-top constructions. These precision-built wood-core elevator cabs are custom fabricated and therefore need to be preassembled at the plant to assure quick and easy field installation. They may be creatively designed and assembled with an unlimited selection of plastic-laminates, luxuriant hardwood veneers, metallic and applied moldings. Since the wood-core cab is comprised of fewer components (a car top, front and three large walls, etc.), its design naturally lends itself to new construction installations in which heavy lifting and lack of maneuverability are less of an issue.

In the modernization market, however (involving "rip outs" of old elevator cabs and replacement with new ones), the wood-core cab had distinct disadvantages. Unlike new construction, where the elevator is installed before the building's sheetrock or masonry corridor walls are in place, modernization jobs mandate the installation of all cab components by bringing them into shaftways through already-existing door/entrance openings. In such situations, it is often impossible to bring a one-piece, five-foot by eight-foot wood-core wall through the typical three-foot by seven-foot door opening. The installation of the traditional wood-core cab frequently required the opening up (knocking down) of corridor walls. The advent of the steel-shell cab addressed these existing conditions.

Steel Enclosures

Steel-shell cabs were specifically designed for assembly inside the shaft by incorporating several smaller, 1.5-foot to two-foot by eight-foot steel wall sections; each very light and portable, fitting easily through typical entrance openings. Similarly, sectional car-top panels were also deployed. Like the sectional wall panels, car-top sections are lighter in weight and more maneuverable than the heavy one-piece wood ceilings found in wood-core cabs. This advancement greatly enhanced the safety of the installing field mechanic who was no longer required to erect cab walls below a precariously hanging car top that was previously hoisted and chained overhead.

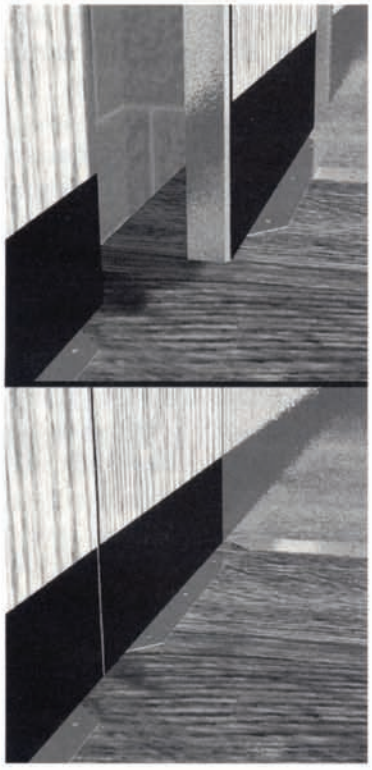
While the steel-shell approach solved fundamental assembly problems, other issues emerged. Plain steel cars (industry nicknamed "tin cans") appeared very industrial, at best like a freight car, at worst like the inside of a refrigerator, a look not at all appealing to building users, landlords and tenants alike. To present a more aesthetically pleasing car to riders, the landlord needed to spend additional time and money installing decorative panels. Solution: development of the hanging (or removable) panel cab to provide maximized options and flexibility over decades of service. The obvious drawbacks of added time and cost by hanging an interior set of panels onto the steel-shell car often makes the hanging panel car an expensive solution. Less obvious, but of equal importance in the modernization market where replacement cabs must be within 5% of the original cab weight, the hanging panel cab design has serious weight considerations.

As the world became more time-challenged and cost-conscious, methods were sought to shorten installation times and generally make life easier for installers. Enter the invention of quick-assembly technologies, ways to instantly fasten cab components without the need for bolts. This is most often accomplished by fabricating steel wall panels with alternating male and female joints that interlock with the adjacent panel. Various methods involve sliding,

Baked-enamel steel shell cab with light troughs

Typical hanging/removable panel cab

For modernizations, modular steel panels fit easily through existing openings.



Typical quick assembly (bolt-less) connection

hooking, snapping or hinging joints together instantly engaging them without additional fasteners. The joints themselves secure the panels together, much faster than the traditional, century-old process of assembling a cab with bolts.

Laminated Steel Enclosures

The most recent development in steel-shell design has been the introduction of the laminated steel-shell car, fabricated by applying plastic laminates, wood veneers or metallic skins directly to the steel wall panels. This type of cab found its first market in the more humid or tropical

Light-weight interlocking laminate on steel-shell assembly

coastal regions of the U.S. and Caribbean where the "look" of a wood car is preferred, but where site conditions demand the durability of a corrosion-resistant galvanized or galvanealed steel shell. (Often, by the time wood-core cabs had arrived at their sites, the particleboard or plywood

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Laminate on steel-shell cab

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substrate material had absorbed so much humidity from the journey – continually worsened by continued moisture-absorption in these tropical environments – that the walls would expand and disassemble.) Equally important as its ability to stand up to hostile environments, the laminated steel-shell design has found its calling in the modernization market. With its aesthetically pleasing decorative laminates applied directly to the sectional wall panels, the need for additional hanging panels has been eliminated along with their additional associated costs, installation times, and most importantly, weight.

Marketing Elevator Cabs

Additional to the innovative new ways that cabs are designed and manufactured, our industry is seeing similar evolution in the ways they are sold. New elevator systems are now marketed in a number of ways; the three most popular methods I will categorize here as (1) The Package System, (2) The Bid and Selection System (by far the most prevalent), and (3) The Design/Build Method (the high art of negotiation and compromise!).

Package System

This is a method by which a manufacturer or elevator contractor offers an owner (and/or his design professional) a completely packaged elevator system. The "package" tends to provide the purchaser the "best buy" for Brain, Brawn and Beauty. By way of caution, however, the "going in" price has limitations and restrictions that may ultimately cost more in the long run. Package systems can be proprietary and limited in accessory options – especially in the Beauty components. Beauty upgrades are often costly, since now the owner is in a captured negotiation process and often makes economic choices limiting his design scope for the project.

This is an area where design professionals could avail themselves of elevator consultants who are more inclined to assist the design professionals with generic/open systems that do not compromise the owners' desires. Design professionals or elevator consultants with good track records – in value engineering rather than wordy specifications – are the only ones who should attempt this method of purchasing an elevator system.

Bid and Selection Process

This most popular American method of contract specification and qualified low-bid selection is still the best method of assuring a reasonably cost effective solution for the owner. Each of the three-B components is meticulously itemized and spelled out in performance language defining what the owners' representatives wish to achieve with their elevator specifications. Again, I stress the importance of the language of this specification to avoid ambiguity and omissions that will almost certainly lead to expensive compromises after contract signing.

Design professionals and their specification writers often do not crosscheck to verify that the written word and what is actually represented in the architectural drawings are one and the same. Even prior to computerized word processing, "spec-writers" often cut and pasted paragraphs of previous installations to minimize the error of syntax (the written words and phrases) but often missed the entire subject matter in the process (e.g., describing counterweight components for holed low-rise hydraulic elevator systems). Today, in spite of the universal availability of sophisticated word processing and software, the bane of "cut-and-paste" errors remains, sometimes worse than before!

Another area where ambiguity can lead to unfortunate compromise is with the general contractor's or construction manager's goals to achieve the "best buy" for the project's specification document. Owners have little recourse for recompense after the project is completed and running, except for litigation. Nonetheless, the elevator system and the future service contract are in place at the expense of the owners and the riding public. The design professionals and consultants can ill afford to enter into an adversarial position with the owners or the general contractor for fear of loss of future business and sheer embarrassment for their errors and omissions.

Design/Build Method

I refer to this route, in street-wise language, as the "Good Ol' Boys/Handshake" method. Owners and/or their design professionals sit with a preferred elevator contractor and design an elevator system that will best serve the owner's purpose. This method is usually chosen to expeditiously complete a project in a tight time frame – most often by design professionals with major elevator manufacturing companies. This most likely results in completion by a major corporation, rather than by an independent elevator contractor who must purchase all three-B components from several vendors in order to complete a project in a specified time. Here again, the "package" is selected as the desirable vehicle for the project, and, again, the proprietary package system is offered. The results are not always cost effective or timely delivered.

Elevator Cab Safety

Over the years, the elevator industry has endeavored to manufacture, install and maintain elevator equipment using the safest possible methods. Safety manuals have been diligently updated and distributed throughout the various segments of the industry including the manufacturers, installers, maintenance workers and code-enforcement officials.

ASME A17.1/B44 ("The Code") is a harmonized document and is at present the "official word" for two countries – the U.S. and Canada. The perpetual periodic revisions and interpretations of ASME A17 documents are living proof of the code makers' intent to make elevators the safest form of mechanized transportation in the world.

The fact that elevators provide the highest level of safety per miles of travel is testimony to the industry's commitment to safety. The dream of a safer and better product is the ultimate goal of everyone in the industry. I do not know of any other industry where competitors have worked as well together to achieve a safer environment for the installing, maintaining and riding public.

Sections of the code make specific requirements to address issues of fire resistance, structural integrity and electric shock in the elevator cab. At present, the code rules fail to mention how certification can be achieved. Perhaps in the future, the code will require independent inspection agencies to certify that all cabs are manufactured in accordance to the requirements of the code as the code presently requires for Fire Resistance Ratings of Entrances, Electrical devices (ASME A17.5) and structural integrity of safety devices and buffers.

While not required by the code, independent, third-party certification of elevator car enclosures is available to the industry on a voluntary basis. The car enclosure (cab) has been classified by the Underwriters Laboratory Inc. (UL), and a procedure has been developed for testing and in-plant inspection of these elevator cabs prior to their delivery and installation on the jobsite. The code rules have been in existence since 1984, and the UL procedure has been available to in-plant certify cabs since 1992. In the procedure, structural cab components are lab-tested and periodically inspected during the manufacturing process to assure the manufacturing process is the same as the tested assembly. The Fire Resistance Ratings of combustible components and their adhesives are also periodically tested for compliance by the certifying agency UL.

Typical U.L. Labels/Certificate

The argument of "No-need-for-additional-expense" must be moot when personal safety is in question. Furthermore, in-house quality assurance cannot replicate the outside independent inspection agency in all areas including swing and sliding (horizontal) entrances, shaft wireways and draft seals.

Besides receiving outside certification of code compliance to ensure the safety of the riding elevator public, cab manufacturers must continue to strive to consistently provide the installation mechanics with a durable, safe and easy installation of individual components. Ceiling and wall panels that can be interlocked to eliminate many nuts, bolts and fasteners help assure owners, inspectors and mechanics that all fasteners provided are actually employed and secured. Cab wall and ceiling panels that have been designed to be strong, yet light enough to be handled by individual mechanics, help to minimize product damage and personal injury, while simultaneously improving speed of installation.

Summary

Bottom line, much goes into the safety considerations, design, manufacture and effective marketing of elevator cabs that most people never take the time to consider. For the most part, that's as it should be. The riding public should be able to press a button and step into our product without a second thought or a single doubt about getting safely and comfortably to their destinations. Building owners and elevator professionals should be able to count on the ready availability of cost-efficient, state-of-the-art cab products to achieve their objectives. However, once in awhile, some appreciation for what it takes to accomplish this would make us smile. 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 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 A17 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 the past two decades. He is a member of the International Association of Elevator Engineers (IAEE) and a former member of 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.*

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