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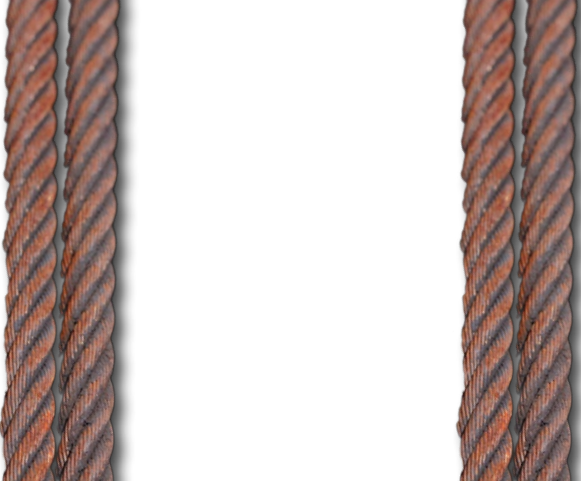
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The Evolution of Elevator Technology

NICOLE SALOIO



Necessity is the mother of invention.” This often overused cliché is generally considered to be hackneyed hyperbole—but in the case of the elevator, it also happens to be pretty accurate.

With urban populations in the United States growing faster than any other demographic, and the United Nations World Urbanization Prospects report projecting that 60 percent (4.9 billion) of the world’s population will live in cities by 2030, space in the modern American city has never been at a higher premium. As more and more people funnel into urban areas, the only place left to build is up.

Where it all began

Since the early 1900s when high-rise buildings first began appearing in earnest, engineers faced the reality that stairs could only carry people so high. Beyond a certain point, they would need a mechanized way to provide access to the upper floors in these ever-growing structures.

The invention and implementation of the modern elevator did just that, and they quickly evolved as technology allowed human elevator dispatchers to be replaced by the push-button panels we are all familiar with today.

The main problem that building owners and facility managers faced was that they had highly-advanced elevator machines in their buildings, operating independently—and inefficiently—without any overarching method to how they brought people to their destination.

Using the current configuration of the time, four passengers traveling to four separate floors could enter the same elevator, requiring it to drop each individual off at their destination before returning to the lobby for another round of passengers. This meant four starts and four stops, which greatly increased the amount of energy needed to operate the elevator—but it also meant significantly longer wait-times for the passengers in the lobby waiting for an empty car.



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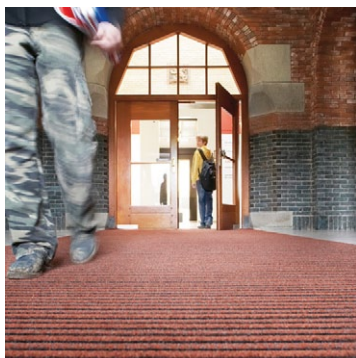
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Second generation destination-dispatch interfaces feature card-reading technology as well as push button and voice commands.

Not only did this leave passengers unhappy, but it also left a hole in building owners' pockets as the morale and productivity of their employees languished in the lobby. As buildings became increasingly populated and multi-use facilities became the norm, this gap between technology and convenience continued to widen.

Additionally, because elevators operated independent of one another, pressing the elevator call button sent a request to one elevator. However, if there are 20 people in the lobby, another elevator cannot be called using that button until the previous elevator has arrived and been dispatched, leaving those who didn't fit waiting for another car—one that may have been sitting idle the entire time.

Two small, yet vital improvements changed all that.

Technological advancements

The first was the introduction of the microprocessor to vertical transportation technology. The microprocessor offered a simple, yet revolutionary solution to the traffic management conundrum by allowing the individual elevators within a building to operate as a team and the system to handle greater numbers of passengers in less time.

The second idea was to move the destination buttons from the inside of the elevator to the outside. It wasn't until 1992 that both pieces of this puzzle were first integrated into a commercially-viable destination dispatch system. By prompting passengers to choose their destination before entering a car, the elevator—now operating in conjunction with the rest of the system—could group and sort passengers with like destinations, resulting in fewer stops, less wasted energy and greater up-peak handling capacity.

The end-result was that fewer cars could now move more people.

The popularity of touch-tone phones mixed with the shrinking size and cost of computer technology meant that the system could overcome the learning curve of a keypad on the outside of an elevator in a user-friendly, cost effective interface. Users approach the keypad, input their destination and the sophisticated algorithm linking the elevator system groups those passengers going to similar floors, dispatching the proper number of elevators to carry them there.

The success of this first-generation destination-dispatch system led to even greater attention paid to how people could be moved throughout a building more efficiently. By conducting a traffic analysis for their building, facility managers began to evaluate the various factors that impact the speed and efficiency of their elevator systems.

For instance, if a facility manager could experience a 20 percent gain in up-peak traffic capacity, could they increase leasable space by reducing the number of elevators they installed with no loss of productivity? Could they bring in more paying tenants due to the increase in performance using the same number of elevator cars? Could an architect extend the height and layout of a new building based on this newfound ability to serve more floors while maintaining shorter wait-times and faster round-trip service?

Destination dispatching made all this possible and encouraged facility managers, architects and engineers to push the limits of what they could do for their buildings and their tenants.

Learning along the way

However, these first-generation systems were not without their drawbacks. Facility managers would often complain of difficulties with inter-floor traffic or multiple entries (when one person tries to hurry the elevator by pressing the floor entry multiple times, giving the impression that there are many people waiting for that floor). The thousands of installations performed throughout the 1990s and early 2000s provided important feedback that precipitated the improvements that came with the next generations of destination dispatch systems.

It wasn't until 2006 that those lessons were put into practice with the introduction of second-generation technologies which completely redesigned the elevator algorithm, taking into account a different approach to building travel. Using the latest microprocessors of the time, this destination dispatch system could now instantly calculate the optimal elevator arrangement based on the number and variation of calls at that moment in time.

This constant re-evaluation of building traffic patterns gave an almost real-time picture of how efficiently the elevator system was operating and provided an opportunity to adjust and personalize that experience until it met the specific needs of each building.

This second-generation technology represented a fundamental change in approach that meant an elevator company should no longer see itself simply as a manufacturer of safe and efficient vertical transportation equipment, but as a service provider to ensure that its customers experience the most comfortable and efficient ride possible.

Personalizing the experience

The introduction of card-reader technology to elevator systems further enhanced the idea of personalization in the elevator experience.

Card-reader technologies allowed passengers to identify themselves to the system through a personalized badge or ID card programmed with individual details about the passenger. The system could then assign an elevator car that conformed to their needs—including handicapped, VIP or limited-access passengers—and take them to their destination even more efficiently, allowing or limiting access to various floors depending on building requirements. Not only did these advanced systems know where a passenger needed to go based on their card, but it also knew who the passenger was and personalized the trip accordingly.

But the building environment is an ever-changing one, and when faced with new challenges, these destination dispatch systems needed to be responsive to those evolving circumstances.

Environmentally friendly

The latest advancements in destination-dispatch technology are specifically designed to provide facility managers with significant overall energy savings of up to 30 percent more than conventional systems, as well as the constant demand for a simple and intuitive user-interface for these complex technologies.

These new technologies help meet environmental challenges with features such as a touch screen; a proximity sensor that operates in low-energy mode when not in use; an ambient light sensor that

determines the necessary brightness level for the illuminated screen; and an even greater ability to streamline traffic flow during peak periods of heavy use.

Because this third-generation destination dispatching system learns and adapts to the specific traffic patterns of each tenant and the building as a whole, it can provide unparalleled occupant service by helping predict user needs before they arise. The system can account for the off-peak periods that can put a strain on resources. Using a specialized energy control option which defines the average acceptable passenger

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waiting time for a building—the system places unnecessary elevators into standby mode and, in some cases, sleep mode when wait times fall below the specified level.

One of the most important features of this third-generation destination dispatch system, however, is that it has the ability to integrate seamlessly with any elevator system, regardless of original manufacturer. This provides facility managers with a unique opportunity to upgrade their elevator systems virtually overnight, with no interruption in service for tenants.

An evolving option

As facility managers continue to seek to meet the latest sustainability demands brought on by their tenants and the bottom line, the elevator system will undoubtedly play a key role in their ability to provide comfortable and productive environments for their occupants.

From the ICC Tower in Hong Kong and the LEED® (Leadership in Energy and Environmental Design) Platinum One Bryant Park in downtown Manhattan to office buildings and hospitals of all shapes and sizes around the world, destination dispatch technology is evolving to keep up with pace of the urban environment. Necessity truly is the mother of invention, and while no one can know exactly what the future holds, destination dispatch will certainly lead the way. **FMJ**



Nicole Saloio is manager of destination products for Schindler Elevator Corporation. She is responsible for the launch and implementation of revolutionary Schindler technologies in North America.

Saloio has 20 years of experience in the elevator industry and has served in a variety of technical, product development and commercial positions.

For more information on Schindler Elevator Corporation's advanced systems go to www.schindler.com.

Conventional



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New Technology



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Destination-dispatch systems outperform conventional elevator systems by up to 30 percent by grouping passengers going to similar floors.



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The lobby of the Humana building in Louisville, Ky., features the latest in destination-dispatch technologies—increasing overall building energy efficiency by 1.5 to 2 percent.