



Lakewoods at MWC Chennai Phase 1



Image courtesy: KONE India



What Goes Down Must Come Up & Vice Versa

Amar Tendulkar, Chief of Design and Sustainability at Mahindra Lifespace Developers

The global elevators and escalators industry is expected to reach 125-billion U.S. dollars by 2021; driven by innovation and the vertical growth of cities. Historically, elevators have had significant influence on the development and advancement of architecture - especially tall, vertical structures. As buildings get taller, so must elevators' ability to meet demand; and as elevators meet that demand, structural innovation can blossom.

A brief history of elevators

The history of elevators spans over five thousand years. The need for solutions for vertical transportation was probably first felt when human beings began settling at altitudes to

protect themselves from wild animals or other environmental threats. Exponential progress has been made since then, and

World's First Elevator 3rd Century BC



Elevators



Eiffel Tower's old

today, elevators carry an equivalent of the earth's population every three days!

The first written record of elevators dates to the 3rd century BC, in Greece. The earliest elevators were called 'hoists' and were powered by human and animal power, or water-driven mechanisms. In 236 BC, the Greek mathematician and engineer Archimedes invented the first elevator based on ropes, weights and wrenches. In fact, this invention and the principles that powered it formed the foundation for all elevators in the next 2,000 years! The Roman Colosseum too was built with an integrated network of 24 elevator cages that carried gladiators and wild animals to the

arena floor; these elevators were manually powered by over 200 slaves.

The 1800s witnessed a notable phase of advancement in modern elevator technology, when steam-driven elevators made way for hydraulic power. Even then, the first hydraulic elevators were designed using water pressure as a source of power. These elevators were used for conveying materials in factories, warehouses and mines. Thereafter, motor technology and control methods evolved rapidly; and electricity became the norm as a source of power.

A few 'elevating' firsts

- In 1852, entrepreneur and inventor Elisha Graves Otis introduced the first safety contrivance for elevators. At the 1853 World's Fair, in New York, Elisha Otis made his original "elevator pitch". This included a death-defying drop in which he "dramatically cut the only rope suspending the platform on which he was standing," according to Otis Elevator Company lore. The platform dropped a few inches, but then came to a stop. His revolutionary new safety brake had worked, stopping the platform from crashing. The display raised eyebrows, but elevators were adopted enthusiastically. Otis established a company for manufacturing elevators and went on to dominate the elevator industry. Today, the Otis Elevator Factory is the world's largest manufacturer of vertical transport systems.
- In 1857, the first steam-powered passenger elevator was installed in the new E. V. Haughwout Building in New York City.
- The first electric elevator was built by the German inventor Werner Von Siemens in 1880.
- In 1887, an electric elevator with automatic doors that would close off the elevator shaft was patented. This invention made elevators safer.
- In 1889, the first commercially successful electric elevator was installed. That same year, Otis made the then-tallest man-made structure in the world - the Eiffel Tower - accessible by lift!
- Otis Elevator Company installed its first elevator in India in 1892 - the iconic bird-

cage elevator at Kolkata's Raj Bhavan.

- The most popular theory about the origins of music on elevators states that elevator music first appeared in the 1920s to calm fearful passengers who used elevators for the first time. Yet another theory propounds that elevator music was a distraction to fend off boredom and keep people's minds off the interminably long time it took (back then) to get from floor to floor.

The safety and speed of elevators was thus significantly enhanced as far back as the mid-19th century. And with the safety of lifts established, designing and building larger and taller structures became an increasingly stronger reality. In fact, as passenger and commercial lifts became

more affordable and readily available, it became common practice to create foyers worthy of elevators. As evident in almost any non-mass-built hotel, an elevator entrance is often accompanied by grandiose decoration such as a chandelier. Moreover, when buildings were without elevators, the top floor was considered for the poor or for servants, as it was more inconvenient to reach. As lifts improved access to the higher floors of ever-taller buildings, the concept of a penthouse and the associated connotations of wealth followed.

Types of elevators today

Modern commercial buildings commonly have multiple elevators with a unified control system. In addition, all modern elevators have special override controls to enable



Luminare - Gurugram



Luminare, Gurugram - PrivateLift Lobby



Luminare Elevator

elevators to go directly to a specific floor without intermediate stops. Elevator components include speed controlling systems, electric motors, rails, cabins, shafts, doors (manual and automatic), drive units, buffers and safety devices, among others.

- a) Passenger elevators – These are designed to carry people between building floors. Their capacity is determined by the need of the specific building and can vary between 5 and 25 persons.
- b) Double Decker elevators - The TWIN elevator system has two cars, arranged on top of each other, that operate together in one hoistway. These elevators have a smaller footprint, resulting in more leasable space.
- c) Twin Elevators – The Twin elevators also have two cars in one shaft. But unlike the Double Decker, they move independently in the same shaft, which makes logistics more efficient. Their movement is synchronized by a specialized program and its microprocessors which prevent any collisions. At present, this technology is available only with Thyssenkrupp.
- d) Express elevators - These do not service all floors, but only selected parts of the building. Most notably, they move

passengers from the building lobby to the top floor/sky lobby.

- e) Dumbwaiter – These are small elevators used to transport food and other kitchen materials between several building levels. They are often used in hotels, restaurants and cruise ships.
- f) Paternoster – These are a special kind of elevators that use the principle of revolving cabins. Several traveling cabins that are in constant motion are set on one rotating chain.
- g) Belt elevators – These are used to transport material over inclined planes. The conveyor belt is equipped with a lot of transport boxes that transport material from one place to another.

The elevator industry in India

Per recent reports by independent analysts, India is the world's second-largest market for elevators and escalators, after China. Until some years back, elevators and escalators in India were more about luxury, but now they are more of a necessity. Elevators used in India are mostly imported from the US or Europe. India is also currently one of the biggest markets worldwide for many elevator manufacturers, driven to a significant extent by our Government's focus on infrastructure and real estate development. KONE Elevator India is consolidating its

manufacturing operations, while looking at growth opportunities in Tier 2 and Tier 3 markets, in addition to big Indian cities. Schindler, for example, is setting up an R&D and manufacturing facility in India and is looking at increasing its localisation (two-thirds of its supplies are from India-based companies). Demand for elevators and escalators in India is growing at a healthy rate every year; and rising demand can drive sophisticated technologies and speed in the segment.

The technology thrust

The futuristic MAGLEV: From a futuristic technology perspective, magnetic levitation technology (MAGLEV) has already found applications in the global elevator industry. This technology eliminates the need for steel ropes. The elevator uses a 'maglev' track in the building, which is embedded with coils to guide the cabins through a moving magnetic field. The system also allows more than two cabins per shaft as each cabin can operate independently from the other, thus reducing waiting time for passengers and increasing capacity up to 50%. The use of Maglev technology also eradicates height or design limitations that previous elevators had as these elevator shafts can be placed more freely around buildings and operate similarly to a metro. They are also 25% smaller than traditional ones, which enables considerable savings in floor space.



Iris Court (Residential project) at Mahindra World City, Chennai

With India's cities and towns growing increasingly vertical, there is a growing need for optimally priced, high-speed elevators and escalators that can reduce travel time. Similarly, the need for convenience at public infrastructure areas like airports, metro stations and railway stations will drive demand for elevators in India.

We may increasingly see 'smart' elevators. A smart elevator is a connected elevator capable of communicating with passengers, building managers, service staff and other building systems to improve the passenger experience and elevator performance, especially via improved elevator maintenance – the focus is on digitalisation and enhancing passenger experience.

Need for speed: Most Indian elevators travel at a speed of less than one metre/second. You could compare this to the world's fastest elevator installed at Burj Khalifa, which travels at 10 metres/second! There is a growing demand for high-speed elevators in India too, especially for high-rise buildings in our metros. Previously, I have supervised the installation of lifts as fast as 6 meters/second – the fastest in India – at 'Omkar 1973 Worli' in my previous assignment.

In a country like ours, where urbanisation and population explosion is at its peak, high-rise buildings are the way forward and will fuel demand for elevators. Every urbanized citizen who is exposed to international standards aspires to settle in societies which are not only equipped with state-of-the-art facilities, but also offer faster vertical movement at safe speeds.

'Green' elevators: With growing thrust on green buildings and sustainable urbanisation in India, Indian markets are now witnessing a multitude of options in energy-efficient elevators with locally sourced parts and optimal maintenance costs. We are also seeing the advent of energy-efficient elevators specifically designed to meet the needs of the affordable housing segment (think of elevators employing energy-saving regenerative drives that supply powerback to buildings).

Most of the development of global elevator technology can be traced to Europe (Switzerland, France, etc), or to the US. Thus, there remains significant scope for further in-depth research and development in the indigenous elevator industry in India. We can definitely have a 'Make in

PASSENGER ELEVATORS

Designed to carry people between building floors. Their capacity is determined by the need of the specific building and it can vary between 5 and 25 people.



EXPRESS ELEVATORS

They do not service all floors, but instead only selected parts of the building. Most notably they move passengers from the building lobby to the top floor/sky lobby.



TWIN ELEVATOR

The TWIN elevator system has two cars, arranged on top of each other, that operate independently in one hoistway. Requires a smaller footprint, leaving more leasable space.



India' vertical transportation. Innovation in vertical transportation will also improve confidence to go higher with tall buildings in our cities, which can help ease congestion and improve efficiency of resource consumption.

At Mahindra Lifespaces, we understand that elevators are an important facilitator of building experience as they enable comfortable ease of access and safe connectivity. For example, each residence at our project Luminare in Golf Course Extension Road, Gurgaon, is a corner apartment with its own private elevator lobby for exclusiveness and privacy. We are also implementing our learnings in residential buildings in our township projects (like Mahindra World City, Bloomdale at Nagpur, Large Residential projects in Mumbai and Pune etc), which are 20-30 stories in height. Our focus is on green elevators which consume less electricity, have lower operational costs and reduced need for maintenance. Our priorities when identifying elevator technology/brand include energy efficiency; operational expenses; ease of maintenance; safety and security; and user-friendliness.

To sum it up, vertical logistics in tall buildings is as important as the blood circulation in the human body. Elevators are akin to our bodily systems which enable circulation via arteries and veins, and keep life going! ●

DUMBWAITER

Small elevators that are used to transport food and other kitchen materials between several building levels. They are often used in hotels, restaurants and cruise ships.



PATERNOSTER

Special kind of elevator that uses the principle of revolving cabins. On one rotating chain is set several traveling cabins that are in constant motion.



BELT ELEVATOR

Used to transport material over inclined planes. Conveyor belt is equipped with lot of transport boxes that transport material from one place to another.

