

Elevator Retrofit Business for Existing Buildings in China

While many buildings constructed in China during the 1980s and 90s did not include elevators, the aging of the population and heightened expectations for convenience have increased demand for easier access. This in turn has led Hitachi to enter the market for supplying elevators that can be retrofitted in such buildings. Given the diverse building environments and operational conditions that such installations need to accommodate, Hitachi's retrofit elevators are designed to satisfy a wide variety of customer requirements. Hitachi has also actively engaged in promotional activities as part of its efforts to develop this market. Through its LGE-E elevator developed in 2018 specifically for retrofit applications, Hitachi has also successfully shortened installation times while minimizing the associated disruption to building users.

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1. Introduction

The expectations for a better quality of life (QoL) that have accompanied China's economic progress have included calls for easier access inside buildings as well as improvements in household interiors. As a result, elevators are now considered an essential feature in low-rise as well as high-rise residential buildings. Multi-story housing complexes have existed in China for the past 60 years, however, and many of these buildings constructed during the 1980s and 90s were not fitted with elevators.

Nowadays, with the ongoing aging of the population, the ability of the elderly to move around inside buildings has become an issue of concern for the Chinese government and public, and this in turn has directed attention toward the question of how elevators can be safely retrofitted into old buildings (see **Figure 1**).

Figure 1 — Current Practice for Building Access

An elderly person is assisted up a flight of stairs in a building that lacks elevators.



2. Demand for Retrofit Elevators

The aging of the population and heightened expectations for convenience are driving increased demand for the installation of retrofit elevators in old buildings that lack such facilities.

2.1

Growing Public Demand for Retrofit Elevators

Demand for retrofit elevators has grown year by year since the Chinese government announced assistance for their installation in existing buildings. Support for retrofitting elevators in aging high-rises and priority assistance for other housing buildings with a high proportion of elderly residents was announced in 2017. This was followed in 2018 by the announcement of a loosening of the building code for installation in existing buildings and encouragement of such installations in areas targeted by the government. The retrofitting of elevators also gained national prominence from its inclusion in the 2019 Government Work Report.

2.2

Customer Characteristics

Most of the housing building owners who participate in the planning of elevator retrofit projects are themselves elderly or middle aged and the criteria on which they base their purchasing decisions are different from those of commercial buildings.

While elderly owners in particular are strongly motivated to install retrofit elevators, they are also concerned about reducing costs as well as about product practicality, durability, and safety. Middle-aged owners, in contrast, tend to consider a wide range of factors when studying and comparing products, including practicality, durability, safety, price, quality, and performance. This means that a different marketing approach is needed for different customers.

Moreover, retrofitting an elevator in a housing complex requires approval of the owner and of a certain number of residents. However, whereas residents on upper floors tend to be strongly in favor of installation, it is not unusual to face opposition from those on lower floors, who may be comfortable with things as they are or have concerns such as the new elevator blocking their sunlight.

2.3

Study of Installation Methods and Schedules

Finding space to install retrofit elevators in buildings constructed during the 1980s and 90s can be difficult due to factors such as the site conditions and building code, including things like providing fire escapes. Accordingly, work is needed to determine the installation method that best suits the circumstances of each building. Another challenge, meanwhile, is how to shorten the installation time. With previous elevator models, a retrofit took between three and six months and would involve considerable disruption to residents' lives, including the dust and noise of construction work.

3. Operation of Elevator Retrofitting Business

3.1

Market Development

Salespeople from branches or agencies that are closer to customers play an important role in developing the market for retrofit elevators. Recognizing the need for a broad familiarity with retrofit elevators as well as knowledge of conventional elevators, Hitachi adopted a proactive approach to market development that involved training staff to specialize in the retrofit market, establishing business processes for sales, and encouraging information sharing between branches and agencies.

Figure 2—Retrofit Elevator Promotion in China

A promotional event in a large central-city housing complex (left) and customers being told about products at a showroom (right).



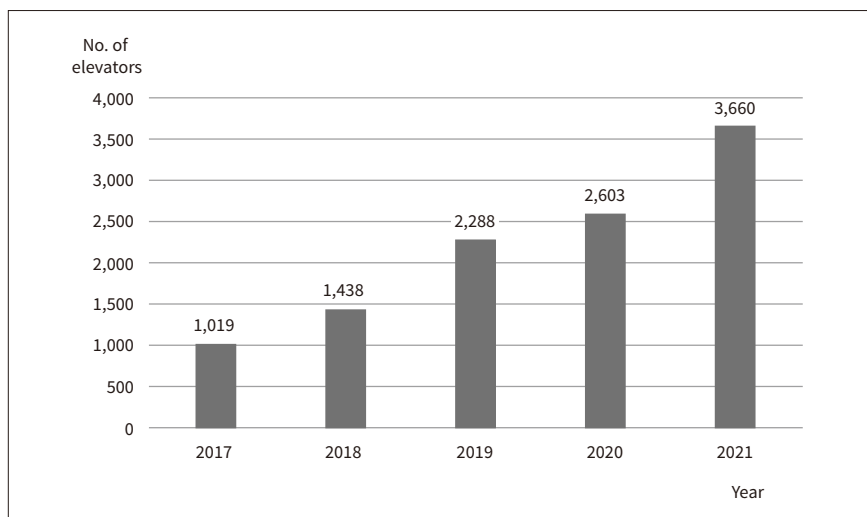


Figure 3 — Numbers of Retrofit Elevator Contracts

Past data and future projections for the numbers of retrofit elevator contracts obtained by Hitachi in China.

Another important aspect of market development was to identify the relevant information beforehand, including the availability of government support, whether sites have sufficient space for retrofitting elevators, and the size of housing complexes.

As a result of these effective and efficient marketing activities, Hitachi was able to supply 180 elevators for university teacher housing in Guangzhou, using this as a model case for similar projects elsewhere in the city and for expanding to the rest of China.

A promotion was also held at a major housing complex located in the city center where it would have high visibility. This provided an efficient venue for promotional activities that included distributing information to building owners and explaining the need for retrofit elevators and what is involved in getting them installed. Permanent showrooms were also set up at locations where building owners had a

high level of interest in retrofit elevators and the government announced assistance programs for elevators, thereby providing a venue where owners could call in at any time to obtain product information (see **Figure 2**).

Through these initiatives, Hitachi has progressively increased the number of elevator retrofit contracts it has undertaken year on year. **Figure 3** shows the numbers for recent years.

3.2

Installation Diversity

3.2.1 Different Types of Elevator Shaft Construction

Hitachi satisfies customer needs by offering a variety of different construction methods for elevator shafts depending on the condition of the building and the circumstances at the site. The main construction methods and their associated characteristics are as follows.

Figure 4 — Elevator Installation Configuration (1)

A configuration in which the elevator shaft is located between two buildings (left), plan drawings (center), and a photograph of the installed elevator (right).

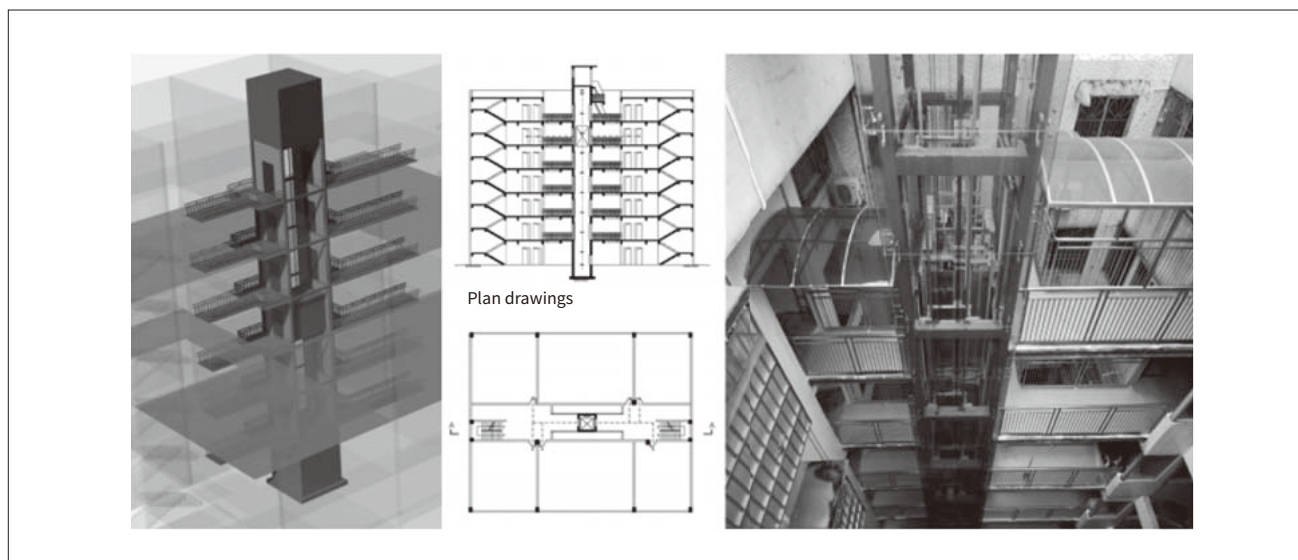
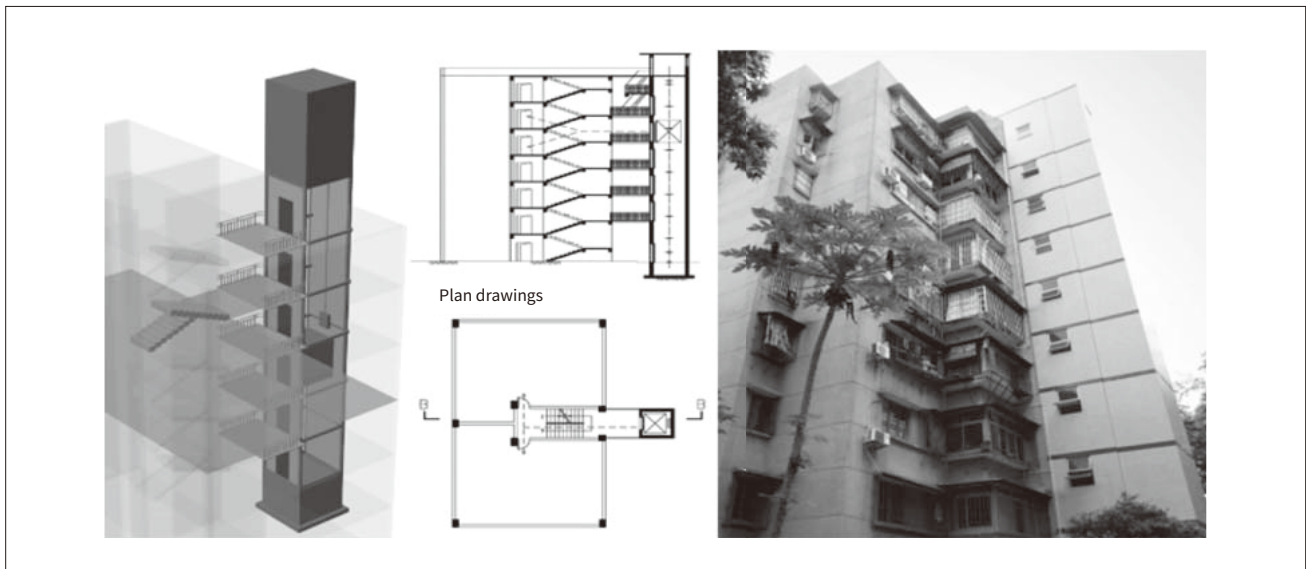


Figure 5 — Elevator Installation Configuration (2)

A configuration in which the elevator shaft abuts up against the stairwell (left), plan drawings (center), and a photograph of the installed elevator (right).



(1) Concrete

Excellent safety and does not require maintenance.

(2) Steel frame & glass

Short construction time together with excellent appearance and natural lighting.

(3) Steel frame & aluminum cladding

Short construction time and light weight.

3.2.2 Options for Elevator Shaft Installation

The circumstances for elevator retrofitting differ from building to building. One option, shown in **Figure 4**, is to locate the elevator shaft between two buildings in such a way that it can be used by the residents of both. Elevator cars with doors on both sides are used to provide access from both buildings. Another option, shown in **Figure 5**, is to abut the elevator shaft up against the stairwell, which then provides direct access to the elevator car. In this way, Hitachi responds to user needs by offering a variety of options for

elevator shaft installation to suit the different circumstances and patterns of use at existing buildings.

3.3

Development of Elevator Purpose-designed for Retrofit Applications

Recognizing the need for elevators suited to comparatively small sites (sites of around six to nine floors that only require small capacity and low speed), Hitachi in 2018 developed the LGE-E as a purpose-designed elevator for retrofitting in existing buildings.

3.3.1 Modular Elevator Shaft

To facilitate installation, the LGE-E is fabricated as a series of modules (“units”) at the factory. These units, which provide the main equipment and components as well as the elevator shaft, are then stacked on top of one another at the site (see **Figure 6**). Development of the LGE-E

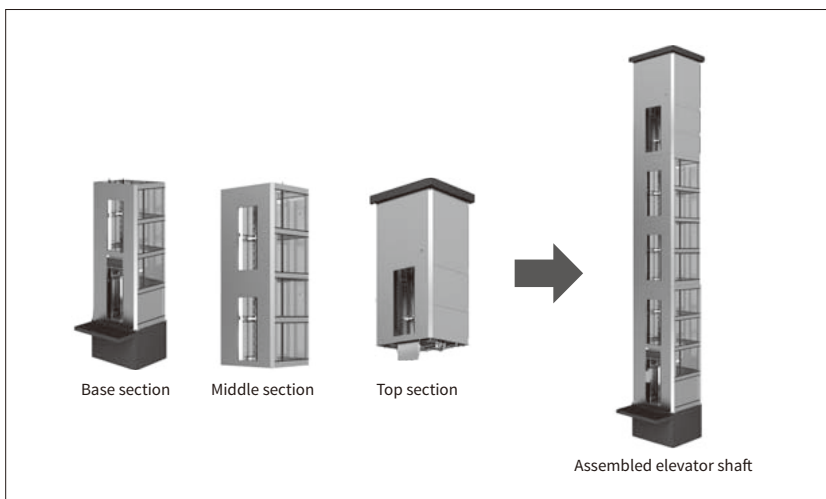


Figure 6 — LGE-E Elevator

Installation is simplified by fabricating the elevator shaft in modules (“units”) that can be stacked on top of one another on site.

Table 1 — Comparison of Installation Schedules for Nine-story Elevator

The table lists the installation schedules for the LGE-E and the previous model.

Stage	Foundations	Shaft interior	Hall	Commissioning	Total
LGE-E	20 days	3 days	10 days	15 days	48 days
Previous model	20 days	30 to 60 days	10 days	20 days	80 to 110 days

purpose-designed retrofit elevator has not only significantly shortened the time taken for construction and made it possible to respond promptly to the needs of residents, but it has also reduced the disruption to residents' lives, including reducing the dust and noise of construction work. This in turn has improved Hitachi's competitiveness in the market.

Table 1 shows a comparison of the installation schedules for the LGE-E and the previous model.

3.3.2 Design for Reducing Temperature Rise in Elevator Shaft

To prevent temperature rises when the external elevator shaft of the LGE-E is exposed to sunlight for long periods of time, its design includes natural ventilation with multi-directional and vertical convective air flow. This prevents performance degradation and the shortening of product life due to high temperatures in the elevator shaft.

4. Conclusions

The retrofitting of elevators into existing buildings is expected to be an area of increasing activity in the future driven by the formulation of guidelines by regional government and the announcement of policies that encourage such installations.

Having already gained more than 60% of the market for retrofit elevators in the Guangzhou region of China, Hitachi also hopes to further expand this market through the development and release of the LGE-E retrofit elevator that is designed to take account of installation and other considerations specific to this application. Noting that a total of 69 regions in China, including 27 provinces or municipalities, had released guidelines for the retrofitting of elevators by the end of 2019, Hitachi intends to continue its work on product development and sales promotion to respond to future increases in demand.

Reference

- 1) Hitachi, Ltd., "2019 CHINA Bringing Joy to the Elderly with Elevators," https://www.hitachi.com/corporate/about/identity/i_am_hitachi/interview03.html

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