

1 mm per second, slowly but steadily, move the old building of Aka-Puri entirely

Astonishing construction site series

Nov 27 2013 7:00

Seibu Properties (Tokorozawa City, Saitama Prefecture), which is moving ahead with construction of two new high-rise buildings in the location of former Grand Prince Hotel Akasaka in Chiyoda Ward, Tokyo, on November 18th, disclosed "Hikiya" construction of the "older building" that will be preserved at the site. "Hikiya" means the method of relocating a building as it is without disassembling. The distance that was traveled by the older building is 44 m, and the construction has been provided by Taisei Corporation.



A view from the north. The older building moved from the front toward the far side in the photograph. In the location where the building was originally situated, objects such as cut pillars are left. Photographed on November 18th (Photograph: By Nikkei Architecture. The same applies to the photographs below.) Figure 1



The older building of "Aka-Puri" is moving slowly and slowly. Disclosed the relocation construction for preserving (18th) Figure 2

The older building is a reinforced concrete 2-story building, which was completed as a residence of the former Joseon Dynasty in 1930. It was designed by Takumi-Ryo of the Ministry of the Imperial Household (the current Maintenance and Works Department of the Imperial Household Agency), and constructed by Shimizu Gumi (current Shimizu Corporation).

The older building has been owned by Seibu Railway after the war, and started operating as Akasaka-prince Hotel (commonly called Aka-Puri) consisting of 31 guest rooms in 1955. After the 40-story "newer building" designed by Mr. Kenzo Tange had started operating in 1983, the older building had been used as facilities such as a wedding facility, a restaurant, and a bar.



The older building moving toward the left front side of the photograph. Under the floor, workers are busy with jobs such as rearranging and finely adjusting "rolling round bars" that support the building. Figure 3



A view of the construction site seen from the south. In the middle of the photograph is the older building. At the front of the photograph is ongoing earth retaining work and excavation work for a residential building. Figure 4

Seibu Properties closed its hotel business in March, 2011. The newer building was demolished by a JV (joint venture) of Taisei Corporation and Seibu Construction by July, 2013 using a method called "Tecom system", which suppresses noise and dust. During the demolish work, the sight of the hotel that was gradually being lowered attracted public attention.

At the site, a 180-m-high office and hotel building with 2 stories below and 36 above ground and a 90-m-high residential building with 24 stories above ground will be constructed. The total cost of the project is approximately 98 billion yen, and the target is to open them sometime around the summer of 2016.



The view of the entire construction site photographed from the northeast side out of the building site. The building that can be seen in the left side of the middle of the photograph is the 40-story new building. (Photograph: By Seibu Properties. The same applies to the

photograph below.) Figure 5



Photographed from the same position in October, 2013. The objects such as the newer building had been demolished, and disappeared. Figure 6



The construction progress map. The first phase of the "Hikiya" construction for moving the older building (the former residence of the house of Yi in Tokyo) 44 meters in the southeast direction was finished by November 19th. The Section 1 of the construction area on the map shows the office and hotel building that will be newly constructed, and the Section 2 does the residential building. (Map: By Seibu Properties) Figure 7

The older building was designated as a tangible cultural asset by Tokyo Metropolis in 2011. "We would like to preserve this important cultural asset so that it is recognized as a symbol of the reconstruction plan," says General Manager of the city development department of Seibu Properties, Mr. Hirohito Seno.

However, how to use the preserved older building has not been

revealed yet. General Manager, Mr. Seno just said "we would like to discuss with the concerned authorities to remodel it as a facility that will be used by a lot of people."

*Construct the underground framework during the relocation

The "Hikiya" construction has been conducted in two phases. The first phase of "Hikiya" was performed in November, 2013. The older building was moved 44 meters in the southeast direction from the original position for temporarily placing.

While the older building is temporarily relocated, a parking lot, a bus stop, and a taxi stand will be constructed at the site where it was. After the installation of the floor slab above the ground, the excavation will be performed using the top-down construction method. The older building will be relocated again by performing the second phase of "Hikiya", and placed almost on the same position as its original location.

"Our plan is to plant the ground with trees by laying the basic facilities such as the parking lot under the ground," explains Mr. Yoshihiko Matsuzaki in the PMO department of Nikken Sekkei, which is responsible for the design and supervision.



In a part of the site, floor slabs of the underground framework were installed in advance. (Photograph: By Nikkei Architecture. The same applies to the photographs below.) Figure 8



The older building under the "Hikiya" construction, seen from the north side. The building has been jacked up 22 cm in the vertical direction. Figure 9

An idea of proceeding with the construction of the framework (construction to create the main structural parts of the building) such as the parking lot directly below the older building leaving it in its original position without performing "Hikiya" was also discussed. However, this case, the devices such as the temporary support of the building will be complicated. "Considering both the cost and the length of the construction, relocating the older building temporarily by performing "Hikiya" was more advantageous." (Mr. Matsuzaki said.)

*Move slowly and quietly at a speed of 0.5 to 1 mm per second

The first phase of "Hikiya" was started on November 11th. The building was moved 44 meters within 8 actual working days by November 19th excluding construction holidays. The total weight of the building was 5,000 tons. It was moved at a speed of 0.5 to 1 mm per second by applying horizontal force of nearly 200 tons, which equals to 3 to 4% of the total weight, by means of hydraulic push jacks.



A moving dolly made out of rails and rolling round bars on them. One moving dolly can support the building weight of a little more than 50 tons on average. Figure 10



Push jacks that are pushing the moving dollies. Two jacks with 200 millimeters of travel have been combined. Figure 11

"The speed is so slow that the movement may fail to be recognized by our eyes. We are working carefully by putting hydraulic pressures of the jacks and displacements of the building under the integrated management to avoid trouble," says the head of the field office, Mr. Manabu Ogura from Taisei Corporation.



The push jacks have been put on the rear ends of 15 out of 18 rails.
Figure 12

Prior to the "Hikiya" construction, since July, 2012, Taisei Corporation had been building around 75-cm-wide reinforcing floors called "mat slabs" made of pre-stressed concrete (concrete with higher resistance to tensile force with embedded special steel materials that are different from the ordinary steel bars), in sequence, under the floor and beams of the first floor of the older building. They installed temporarily supporting jacks under the mat slabs for receiving the weight of the building, and cut the older pillars with wire saws.

After that, they laid the rails on the ground, placed the building on a total of 95 dollies that moves through rolling round bars with diameters of 60 mm, and pushed it in the horizontal direction using push jacks. The number of the push jacks was 15. They moved the building with 350 mm of travel approximately.

"We moved the building at a pace of around 6 m a day by performing pushing out processes by jacks 17 to 20 times per day," the head of the office, Mr. Ogura said. While the building was being moved, approximately 30 workers were working under the floor and around the building. They worked with caution so that the building could move smoothly rearranging the rolling round bars and finely adjusting the positions in accordance with the movements of the building.

*The older building has a Tudor style appearance



The appearance of the older building before the "Hikiya" construction (Photograph: By Seibu Properties. The same applies to the photographs below.) Figure 13



The hall of the first floor of the older building Figure 14

The older building is also called "the former residence of the house of Yi in Tokyo", and has an appearance based on the British Tudor style. Over the opening of the carriage porch and the upper part of the stained glass window in the stair case, characteristic arches shaped like a little crushed semicircles can be seen. Wooden roof trusses support a slate tiled roof, and dormer windows and towers are combined with a large, steep pitched hipped roof.



A scene of a garden party held in former Akasaka-prince Hotel. Photographed in 1965. Figure 15

Also, in the interior, multiple designs such as a twisted column and mat ceiling are coexisting. On the first floor, a hall for guests and a large dining room were located. On the second floor, there were private rooms such as bedrooms.

*Restore the appearance of the building at the time of its foundation

The older building, the two phases of the "Hikiya" construction of which has been finished, will be reconstructed for restoring its state as of the time of the foundation by modifications including removal of a part of the second floor that was extended in later years and installation of a veranda. Base isolation of the foundation part has also been scheduled.

Furthermore, the northwest side of the building will be extended for reutilizing, and the necessary rooms will be put together. Seibu Properties explains that they "aim to convert the building into an asset that has a life as a building preserving its face of those days as former imperial architecture."

Among the two high-rise buildings that will be newly constructed, the office and hotel building will be constructed by a JV of Kashima, Tekken, and Kumagaya Gumi.

Currently, they are demolishing the existing underground framework, and working on earth retaining work and excavation work for the new construction.



An image of the finished older building viewed from the east side. The north side of the second floor extended in later years will partly be removed, and a veranda will be restored. (Picture: By Seibu Properties: The same applies to the picture below.) Figure 16



An image of the entire finished site viewed from the south side. In the left side is the office and hotel building, and the right is the residential building. Figure 17

The office and hotel building will be a steel-framed building with a seismic response controlled structure. The 1st to 4th floors above ground will be occupied by commercial facilities, offices will be on the 5th to 28th floors, and the 30th to 36th floors will be a hotel. For the offices, large space of more than 1,000 tsubo per floor will be secured. The hotel will consist of about 250 guest rooms, and a company of Seibu Group, Prince Hotels (Toshima Ward, Tokyo) will operate it together with the older building.

The residential building will be constructed by a JV of Seibu Construction, Obayashi Corporation, and Maeda Corporation. The earth retaining work and excavation work for the new construction are on-going also for this building. The building will be made of reinforced concrete, and a base-isolation structure will be adopted. Their plan is to create a building that will consist of 130 residences for rent with services including front concierges.

The period of the construction of the office and hotel building and the residential building will be approximately from January, 2013 to May, 2016. Nikken Sekkei will be responsible for the design and supervision. The exterior design was provided by Kohn Pedersen Fox Associates (KPF), an architectural firm in the U.S.

The outline of the construction:

Name = "Hikiya" Construction of the older building of former Grand Prince Hotel Akasaka, Location of the construction = 1-2, Kioicho,

Chiyoda Ward, Tokyo, Owner = Seibu Properties, Designer and Supervisor = Nikken Sekkei, Constructor = Taisei Corporation, Period of the construction = September 1st, 2011 - November 30th, 2014, Building area = About 950 m² (square meters), Total area = About 1,790 m², Number of stories = 2 stories above ground, Structure = Reinforced-concrete structure, partly wooden

(By Shigeru Kawase, Nikkei Architecture)