Special Report 1

A Futuristic Medical Facility Born from the Latest Construction Management Method

Eulji University Hospital & Campus

The Eulji University Campus and Hospital construction site was once used by the U.S. Forces Korea (USFK). The land was returned to the Korean Government according to the US-ROK Status of Forces Agreement (SOFA).
A long-cherished dream of Uijeongbu City, this is the first privately funded development on land returned from the USFK.

This project involves the construction of a university campus and hospital, to provide residents of the northern Gyeonggi region with an outstanding educational environment and medical services. In particular, the hospital (B5/15F) will have 1,234 beds, the greatest capacity in the northern Gyeonggi region and for a single hospital contract. As for the campus, a main building (B1/8F), a dormitory (B1/8F) and a faculty housing building (F1-F6) are planned for construction.
As of late August, the project is 45 percent completed, with the university campus and hospital slated to be opened in March 2021. To ensure efficient and thorough construction management, Building Information Modeling (BIM), drones and other techniques are being actively utilized.

[Photo of the project site]

[Glass being installed on the first floor of the hospital building]

Working Process

[Site preparation (March 2017)]

Project Overview

- **Project Name**: Eulji University Hospital & Campus
- **Project Value**: USD 291 million
- **Project Period**
  46 months (January 10, 2017 - October 31, 2020)
- **Project Scope**
  - University Hospital: B5 - F15 (174,628 ㎡, 1,234 beds)
  - Campus: Main building B1 - 8F (12,957㎡), dormitory B1 - 8F (9,403㎡, 252 rooms), faculty housing building F1 - F6 (955 ㎡), parking garage B1 (12,390 ㎡)
- **Site Location**
  Geumo-dong, Uijeongbu-si, Gyeonggi-do

[Frame construction (September 2017)]

[Frame construction for the main university building (4F) (June 2018)]

[Completion of interior, exterior and utility work (June 2019)]

> A reduction in time required for the initial phase (e.g. earthwork and framing) has allowed for the extension of available time for finishing work.

Unique Challenges of Hospital Construction

A large hospital construction is prone to design challenges and reconstruction due to diverse factors, including changes in hospital operation policy, input from healthcare workers, operation plans for medical equipment and complicated spatial arrangement. These challenges lead to construction delays and a hike in costs.

According to one statistic, the average rate of redoing interior and finishing work among domestic general hospitals is 36 percent, leading to a 2.5–3.0 percent increase in construction costs. As such, the site has actively applied the following four construction management schemes, along with the latest techniques involving BIM and drones.

Maximization of Time for Finishing Work

With ordinary construction projects, the finishing work period is usually 12 months. However, the project team came up with a construction plan that would maximize the finishing work period by reducing time spent from commencement to early-stage works.

By securing extra time for finishing work in this way, the team was able to smoothly cope with design changes while improving the quality of finishing work and project cost management.
They also shortened the earthwork period by three months thanks to the pre-estimating of earth volume, using GPS coordinates from a drone and then adjusting the quantities of earth carried into or out of the site.

[Estimation of earth volume using GPS coordinates from a drone]

Coordination with Healthcare Workers

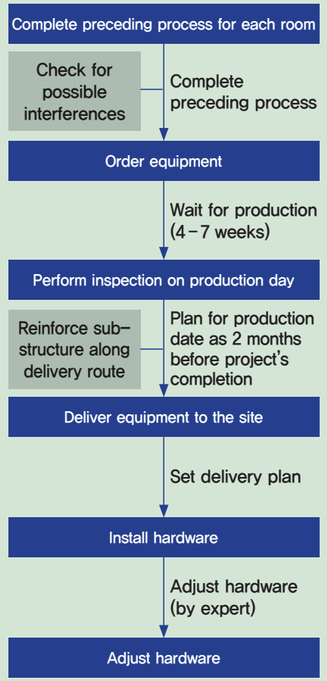
As previously mentioned, a large hospital construction is challenging as it is difficult to reflect the needs of the user (healthcare workers), which then leads to frequent design changes. As such, the project team asked for the opinions of healthcare workers in 20 hospital departments before framing and the installation of partition walls. By reflecting user opinions and amendments in medical plans before each construction phase, the team is minimizing possible changes that may occur after finishing work.

Coordination of Medical Equipment

Quite often, medical equipment that was considered for installation during the project's design phase becomes out-of-date, discontinued or greatly modified in performance and specifications. As such, the key to reducing reconstruction is recognizing beforehand the latest trends and upgrade details related to advanced medical equipment.

For the project, the team has examined the latest trends in medical equipment, and after discussions with the client, applied the information to the structure and construction of the site. Plus, the delivery routes of large medical equipment are being reflected in the framing and finishing work. The team is also handling future needs, by considering, for example, how to secure extra space and the application of movable walls, as preparation for possible hospital expansion and the introduction of a hybrid operating equipment.

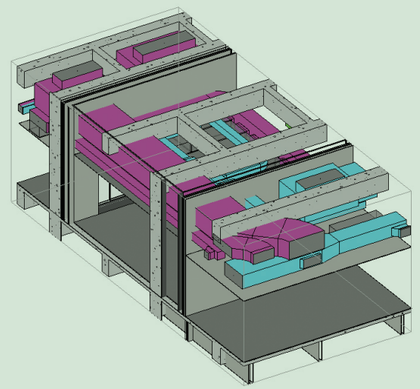
Medical equipment coordination process



Effective Use of BIM

For effective healthcare worker and medical equipment coordination, the team has actively used Building Information Modeling (BIM) as a means of minimizing faulty construction and reconstruction caused by frequent design changes. For instance, when an operating room's height was considered insufficient due to complicated arrangements of air conditioning, hygiene, fire protection, electricity and medical equipment systems, BIM was used to examine interferences in advance before making design modifications.

In addition, as a solution to such issues, comprehensive 3D coordination of different aspects (e.g. construction, structure, electricity and equipment) has been performed for major rooms (spaces). Every week, the team also reports to the management of the client company on design issues and suggests modifications, as a proactive measure to avoid future problems.



[Image for reviewing complex interferences at the top of an operating room (3F)]

Somatom Definiton Flash

Magnetom Skyra 3.0T

Magnetom Avanto