KOBELCO

NISHIMATSU × K-D2 PLANNER

Manager of BIM Promotion Office, Building Division, Nishimatsu Construction Co.,Ltd.

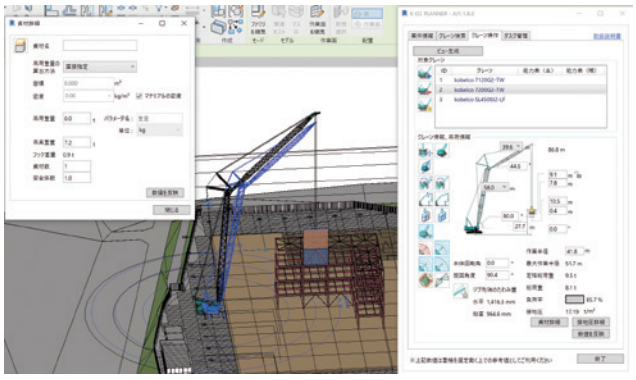
Akiharu Iwasaki

Mr. Iwasaki of the BIM Promotion Office, who was responsible for implementing K-D2 PLANNER, is in charge of building a BIM workflow from the design phase to the construction phase at the company and promoting the use of BIM within the company as well as engaged in endeavors with the theme of "Utilizing BIM in the construction industry."
In this interview, we asked him about the process of considering the implementation of K-D2 PLANNER and its effects.

I think K-D2 PLANNER is a tool that demonstrates the true value of BIM, which is the "prevention of rework, including construction."

What were the challenges you faced before implementing K-D2 PLANNER?

In construction planning, the biggest challenge is the occurrence of rework. In the past, we have had experiences such as when we were unable to secure a large class of crane as planned. To match the lifting capacity of a smaller class of crane that we were able to secure on short notice we changed PC slabs from ordinary concrete to lightweight concrete and extended the crane platform on short notice when a mistake in construction procedures was discovered due to a lack of information sharing with the site. Of course, you would like to proceed as originally planned, but various factors often lead to sudden changes, and I thought it would be good if we could formulate a highly accurate construction plan in advance.



Testing was conducted with two crane classes, 350-ton and 200-ton, and data was calculated to indicate that construction was possible with a 200-ton crane.

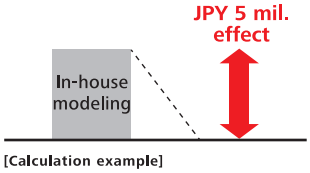
What made you decide to implement K-D2 PLANNER?

When I first encountered K-D2 PLANNER, I was fascinated by its ability to utilize accurate crane families (models) and accurate information such as "load factor" and "ground contact pressure." In addition, a detailed construction plan, including construction procedures, can be created and shared among members, and discussed at construction review meetings. Finally, by compiling a database of construction plans, including the review process, it is possible to create knowledge of the know-how related to construction plan formulation, which can be used for similar projects and improve the skills of planners. I felt that K-D2 PLANNER would enable me to do what I wanted to do.
I also feel the effects of the implementation of the system as shown in the figure below. The first is that K-D2 PLANNER provides a consistent crane family (model), which reduces the production cost. The second is that it is possible to select the most suitable heavy equipment based on correct information. And the most significant effect is the prevention of costs incurred in the event of rework on site. Thus, I decided to implement the system because I felt that we could formulate a construction plan based on correct data provided by the manufacturer.

The correct construction plan makes it worth sharing with the site and is expected to prevent rework.

Implementation effect ①

Reduction of crane family (model) creation/maintenance costs

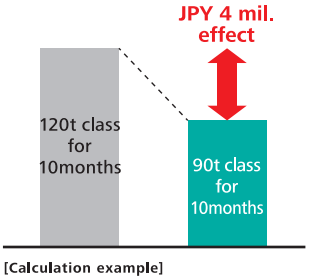


[Calculation example]

- Assuming that it is no longer necessary to create and maintain in-house crane families (models) for 15 crawler crane models and 10 rough terrain crane models
- Modeling cost is assumed to be JPY 200,000 per model

Implementation effect ②

Cost reduction of rental fee of construction equipment with operator for mobile cranes

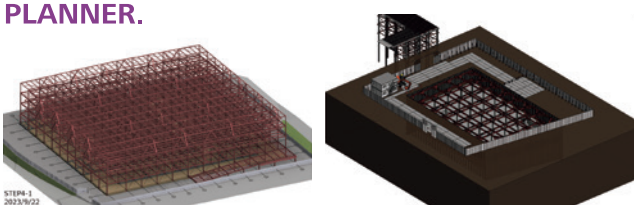


[Calculation example]

- Assuming a site where the selection of one 120-ton class heavy equipment as mobile crawler crane work for 10 months was realized with one 90-ton class.
- Reference: "Construction Prices, February 2023," ©Construction Price Survey Association, issued February 1,2023, p.809 Mobile crane operation fee [Kanto].
  JPY 2 mil./unit/month for 90-ton crane, JPY 2.4 mil./unit/month for 120-ton crane

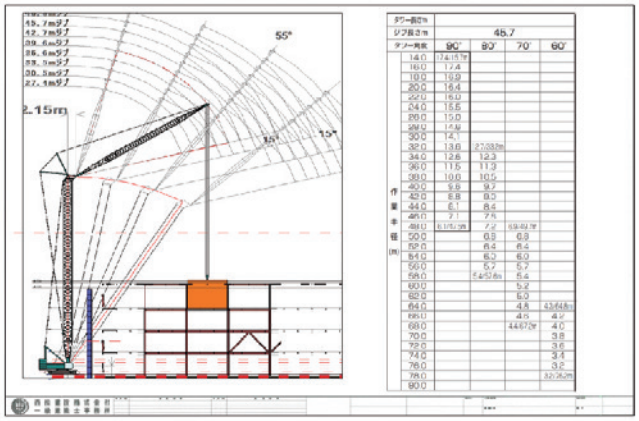
The time required to create drawings for construction plans was greatly reduced.

Please tell us how you actually use K-D2 PLANNER.



This time, Mr. Iwasaki spoke based on (1) testing of steel frame erection methods in a logistics facility (left figure) and (2) verifying ground contact pressure in a earth retaining model (right figure).

We are actively promoting the use of K-D2 PLANNER in four settings: "selection of heavy equipment," "verifying ground contact pressure," "drawing creation," and "review meetings".
When verifying the ground contact pressure, an "overload" is required when earth retaining is performed. With the conventional method, a lot of time and effort was required to check on the web, checking PDFs, and sometimes checking with the manufacturer. With K-D2 PLANNER, however, ground contact pressure is calculated simply by placing heavy equipment and clicking on materials, and this ground contact pressure can be used to set the earth retention conditions. In addition, drawings such as floor plans and cross sections can be output with a single click, and by combining these output drawings with our drawing frames, the time required to create drawings for construction planning has been greatly reduced.



Actual construction drawings created using K-D2 PLANNER.

We are also promoting the use of K-D2 PLANNER in our construction review meetings. In the case of a suggestion such as, "While you say that, it may be difficult to hoist this part in reality," the plan's "feasibility" and "validity" are finally confirmed at the review meeting by reproducing and visualizing the lifting operation at the meeting. We also use the output function to Navis works® to produce videos for construction review meetings. By including captions, we are able to share information correctly, such as "200 tons will be brought in at this step" or "The maximum load will be reached here." We feel that this video can also be used at safety conventions and disaster prevention councils.

Information is actually shared at construction review meetings using K-D2 PLANNER.

Do you have any requests or expectations for our products or services going forward?

I have been told that K-D2 PLANNER will be updated about twice a year. As such, I expect its functionality to be expanded. I would also like to be able to consider assembly and disassembly. For example, "Will it fit on the property?" and "Can the boom be collapsed?" Also, I think the range of use of K-D2 PLANNER would expand if there are more models not only from Kobelco but also from other companies.

K-D2 PLANNER

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KOBELCO

JOUSAI × K-D2 PLANNER

Crane Division Technical Planning Section
Jousai UnyuKiko Co., Ltd.
Noriyuki Otsuki

Striving for differentiation from other companies with enhanced proposals to general contractors using K-D2 PLANNER. Taking the crane industry to great heights with BIM.

Issues

- Used to use 2D, but became necessary to use 3D to check hazardous contact when placing girders. Issues included the enormous amount of time it would take to work with the 3D models we had created

Introduction

- Use K-D2 PLANNER to make optimal crane selection and do contact hazard checks for building construction
- Taking advantage of the MLIT project to accelerate construction BIM allowed purchase of the software with a subsidy

Benefits

- A construction plan proposal in 3D gained more client satisfaction and allowed looking at a crane that would be optimal for the construction site, and proposing a larger-class crane than originally planned resulted in increased earnings
- Achieving a more efficient work process more prospective construction projects to be accommodated, and resulting in more work orders being placed

Jousai UnyuKiko Co., Ltd.

Crane and Elevated Work Vehicle Rental

https://www.jousai.co.jp/

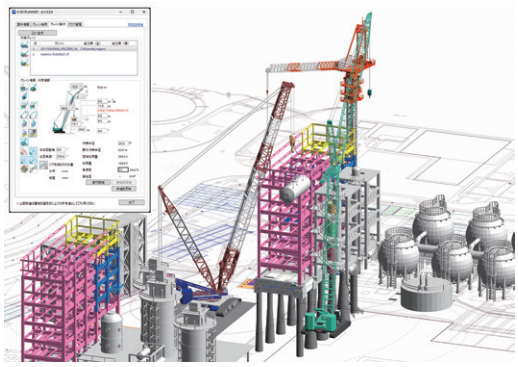
The company in this case study introducing the software, Jousai UnyuKiko Co., Ltd., possesses a wide variety of equipment including large cranes, heavy-equipment transports, and 53-meter elevated work vehicles, and provides rentals at construction sites with sales locations reaching across the country. The Crane Division Technical Planning Section is headed up by Otsuki, who actively uses BIM in carrying out hazardous contact checks by way of 3D models, as well as takes it upon himself to make detailed proposals for construction sites.

Going Past Crane Rentals Spurned Large Growth into Construction Proposal Company

My job is supposed to be mainly planning and drafting diagrams for assembling and disassembling large crawlers. However, since introducing K-D2 PLANNER, I've been working on a proposal to a general contractor client regarding the order for proceeding with steel frame construction. We make use of K-D2 PLANNER with the general contractor's 3D model, and in addition to checking for contact hazards and proposing cranes, we are also presenting a plan that details things like tonnage of girder.
It was 2017 and we were doing girder construction on a 750 t viaduct in Kyushu. As we were going to place girders, it came up that there would be contact with the crane. At the time, I was using 2D, but it was going to be necessary use 3D to do a hazardous contact check, so I created the 3D modeling myself. I got a simulation running, but it required a lot of time. And so I began looking for a 3D tool that would allow us to do studies of construction.

Using K-D2 PLANNER® to Propose Downsizing a Crane from 130 t to 220 t Contributed to Sales

Our first use of K-D2 PLANNER after introducing the software was a construction site where the BIM model was created by the general contractor. The general contractor approached us about crane location, what crane should be used, and to study whether the structure itself could be built. As I mentioned, we looked for a 3D tool that would allow us to do construction studies, and just then I was using K-D2 PLANNER's free trial version. It was intuitive and easy to operate, and as I could put together a construction plan efficiently, I was sure that "this project was going to be absolutely impossible without this software", and went ahead with purchasing it.
And actually, K-D2 PLANNER is software eligible for subsidization under the Ministry of Land, Infrastructure, Transport and Tourism's project to accelerate construction BIM. After learning that we could apply for a purchase subsidy, we took advantage of it. We didn't have to prepare any special paperwork, so that alleviated any effort that would have been needed introducing the software.



Checking crane lift and capability with K-D2 PLANNER's operation screen.

After purchasing the software, we selected the optimal crane. Planning was for a 130 t crane, but as it didn't have adequate reach, we proposed a 220 t crane. The result was that the heavier crane enabled us to increase our sales return. And accompanying the change from a 130 t crane to a 220 t crane, introducing K-D2 PLANNER was why we were able to make a proposal to the site head regarding a place for cutting material for 3-layer, 1-section construction based on the crane lift study.
Although a certain general contractor about 5 years ago commented that "there's another company that is really good with CAD drawings", it is very significant that our company was able to use K-D2 PLANNER to make a proposal with a study in 3D that gained a higher level of satisfaction than drawings in 2D would have.

Worksite Went as Per Simulation, Realized High Level of Precision Possible with K-D2 PLANNER

We were worried if construction at the site would really go as simulated with K-D2 PLANNER. We could see that it was progressing as per the simulation when we viewed pictures that the site supervisor sent daily, and that gave us a great sense of confidence. We realize the high level of precision possible with K-D2 PLANNER, and it makes me wish that we had known about K-D2 PLANNER sooner.

Possibilities for Software in Demolition Work That is Increasing in Urban Central Area, Metropolitan Area

Being a "company that can make crane construction plan proposals with BIM" is a strength, and we would like to go on to build up the crane industry while at the same time differentiating ourselves from other companies. If BIM becomes more widely used in the industry, we won't have to stop at simply renting out cranes to construction sites, we would be able to expand business as a partner that can create highly precise construction plans. I would like to see us preparing estimates that could gain work placements and have crane construction planning fees also added on top. And, I would like to see BIM users share knowledge and know-how so that we can all raise our technology level.
It is predicted that demolition work will grow with redevelopment in the urban central and greater metropolitan areas. That's where cranes will come in, and making plan proposals in 3D should allow for smooth delivery of cranes to demolition work sites, so K-D2 PLANNER will be a great advantage. I would like to appeal to prospective clients that we are a crane company that can use BIM so that we can actively put effort into increasing orders from the construction planning stage.

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CBS JAPAN × K-D2 PLANNER

Representative Director, CBS Co., Ltd.
Masanori Koyama

With K-D2 PLANNER, time for doing a study of crane work decreased as much as 40 percent, and work reform with "ease and pleasure" becomes a possibility.

Issues

- Although BIM was used to do crane work studies, numerically checking loads was done manually and not efficient
- As a result, it would take 3 days to select a crane model and do a study of hoist load

Introduction

- Use K-D2 PLANNER and its 4D simulation to take into account crane hoist capacity and load factor

Benefits

- Time to do a study of construction using crane work was reduced 40 percent
- Period until delivery that would take 3 days was shortened to only 1 day
- Became possible to precisely check contact hazards taking into account boom flexion

CBS Co., Ltd.

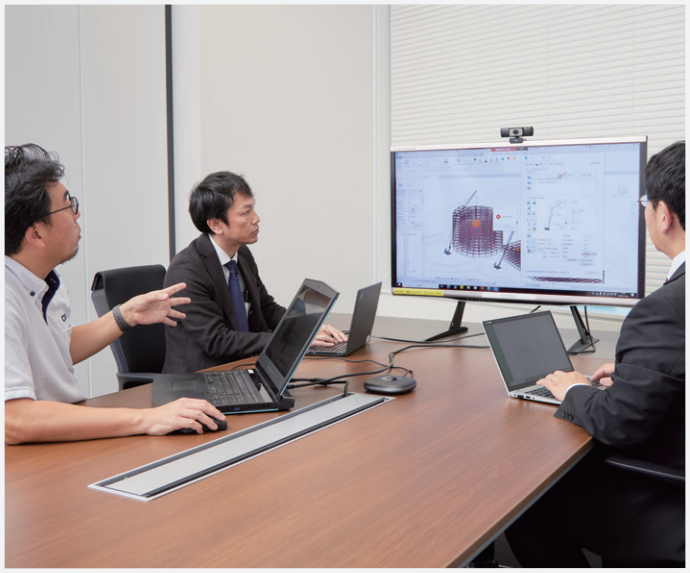
Construction and machinery design using BIM, ICT support business　other

https://www.kk-cbs.co.jp/

Koyama, in charge of having the software introduced, is the representative director of CBS Co., Ltd. and has developed business around BIM modeling that encompasses building construction design, structure, and facilities as well as support for the use of BIM in a diversity of situations including detailed planning, temporary structures, and construction. He is active in improving industry-wide efficiency that will allow BIM to become widespread throughout Japan, and a diversity of research is under way into management and operation of BIM at Cielo Lab Inc., the CBS Group's technology division.

BIM work was inefficient, being done while tediously checking crane hoist load with a specifications table

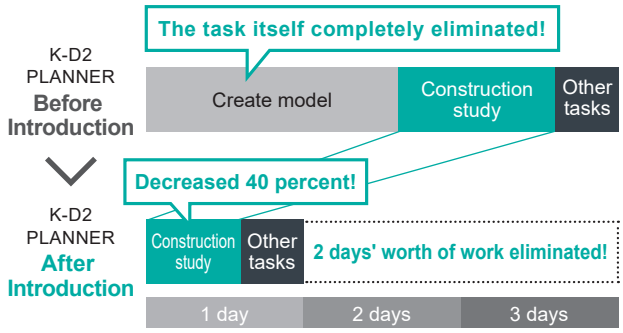
In doing a study of construction steps with crane work making use of BIM models, checking boom and crane rear counterweight as well as possible contact with surrounding temporary construction material is relatively easy. However, a crane's hoist capacity changes with boom angle and length, so it was necessary to continuously check hoist capacity manually with a crane's specifications table each time a boom was moved. As a result, it took time to do this work, and if it turned out that hoist capacity was inadequate, then a crane with more capacity would be substituted and the same study process had to be repeated. While this was all BIM, it was very inefficient.



BIM models are coordinated with hoist numerical data, so time to do a study of construction decreased as much as about 40 percent.

We introduced "K-D2 PLANNER", an add-in tool for Revit® which allows one to do a study of crane work, thinking that it would be useful in our business by improving productivity through BIM.
And the benefits were tremendous. Crane families included with the tool are created based on specifications of actual cranes, and so just moving a boom on a BIM model allows data including the load factor for hoist capacity and crawler ground contact pressure to be calculated automatically.
It became no longer necessary to check a specifications table while looking at a BIM model, so time taken for doing a study of crane construction was decreased by as much as 40 percent. Before, it would take about 3 days from the time we would be requested to do a study until we delivered a result. Now, we can provide an answer in 1 day.

Time for construction study down from 3 days to 1 day

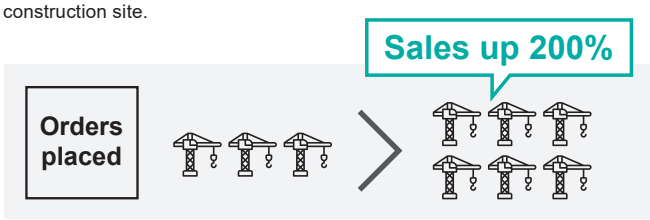


For instance, if an initially planned 50 t model does not have sufficient hoist capacity, we then do not immediately look at the frequently used 90 t class or 120 t class, since a different-model crane can be simply selected from a menu and so it is easy to start doing a study with a 70 t-class model. It is now easier to select a model that has optimal capacity, and this is also useful in decreasing construction costs.

Front loading eliminates causes of needing to replan, and doing studies visually is a pleasure.

Many of our clients use BIM, so the construction step diagrams we deliver are also construction plan simulations done with BIM models. More than just animations, these are created based on numerical data of crane hoist capacities, so they are very different in terms of reliability. And the client that receives the deliverable can then also make use of it in such ways as in BIM models and diagrams when planning construction.
When we run a 4D simulation of crane work inside a BIM model, sometimes a construction worker viewing it will point out a problematic area. Correcting that early at the construction planning stage allows us to prevent construction site accidents and needing to replan with "front loading".
Plus, important operations can be done with icons, so the software can be mastered quickly and one can move on with actual work. So one benefit is

that we conduct training in a short period. The tool is in Japanese, but our Vietnamese staff have been able to start using it in half a day.
Studies with K-D2 PLANNER are all done visually, so that makes it a pleasure. And work can be done speedily, so it also contributes to solutions for the Year 2024 Problem and realization of work reform. We have actually had increases in placed orders and in sales since introducing K-D2 PLANNER. At present, our clients are primarily construction companies, but we'd like to expand business into the civil engineering field making use of this tool.
What we would like to see in the future with K-D2 PLANNER are functionality allowing information from studies to be transferred to diagrams and documentation, ability to express a crane's maximum and minimum work radiuses in a dome shape in addition to a cylindrical shape, and real simulations making use of travel locuses and load information in VR.
And we'd also like for it to grow into a tool that could be put to use as a simple yet accurate construction data base, such as linking with ICT construction machinery that can sense hazards and avoid them at the construction site.



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SANKYU × K-D2 PLANNER

Sankyu Inc.
Plant Construction Section, E & M 1st Division, Machinery Construction Headquarters
Yusuke Higashi (Left)
Business Promotion Group, Equipment Section
Yumeho Obata (Right)

Introduced as Part of Solution to Construction Industry's Year 2024 Problem

Allowed us to alleviate site workloads with higher client evaluation.

Issues

- Permeation of construction BIM in the plant industry is still ahead, so checking at sites is mostly by 2D drawings

Introduction

- K-D2 PLANNER allows creation of heavy equipment plans by pasting on screenshots
- Explanations can be made to clients all on one PC

Benefits

- Creation of heavy equipment planning has been significantly reduced, alleviating workload on the site supervisor
- "QCDS" (quality・cost・delivery・service) enhanced

Sankyu Inc.

Plant Construction, Logistics, In-Site Operations, Maintenance, Etc.

https://www.sankyu.co.jp/

The company provides complete total support ranging from plant construction to in-site operational support and maintenance, procurement logistics, and raw resources product logistics. In this case study, we gained the cooperation of Higashi and Obata in explaining their introduction of K-D2 PLANNER and using it in plant construction.

Expectations for Improvement of "QCDS" and Preventing Need to Redo Site Planning

Higashi: Our E & M 1st Division is developing a plant engineering project. As a member of the Plant Construction Section within that division, I am engaged in installing plant facilities and demolition work. One of the ways we look at revolutionizing things at our company is as "to move from labor intensive to a fusion of people and technology".
We looked at using BIM as a way to provide new value to clients by going from the way we had been doing construction studies to changing the flow of site management. In introducing the software, I talked with Obata in the Equipment Section where they used BIM, and with her cooperation we studied tools that would allow us to do heavy equipment planning in 3D. We went with K-D2 PLANNER since it was Revit add-in software that would work well with client data. Cons+D9truction BIM in our plant industry is just beginning to be known. And mostly, Sankyu checks and does studies with 2D drawings, and we simply have not made use of 3D modeling. With the software, we could expect to improve "QCDS" as well as labor required by the site supervisor, and it should prevent us from having to redo site planning.

Obata: I was approached by Higashi about introducing K-D2 PLANNER as he wanted to strive for "front loading" and we went about introducing it. We made use of the knowledge we had on BIM, and provided BIM technical support. Usually, I am with the Equipment Section where we work on temporary structures planning, but this was a project where we worked together with another department so that the entire Sankyu Construction Group could solve the construction industry's Year 2024 Problem, and in addition to provisional planning, we also tried making an effort into implementing BIM throughout all our project planning. I hope that clients seeing us making a positive effort as a company toward problems and challenges will earn their trust, and will work as a foothold to enhancing our corporate value and developing new clients.

In Addition to Reducing Time for Creating Heavy Equipment Plans by 20 Hours Monthly, Highly Evaluated for Contribution to Sharing with Clients, Sites

Higashi: Before, to create a heavy equipment plan ahead of construction, the site supervisor would create plan views and elevation views in 2D-CAD, and paste on rated total loads, but after introducing K-D2 PLANNER, such work to put together plans was replaced with K-D2 PLANNER operation screen captures, and it reduced time for creating plans by about 1 hour. Monthly, that converts into 20 hours, or a reduction of about 2.5 days. Also, we became able to bring along a single PC and provide explanations to clients on everything from the monitor. Additionally, the software allows us to visualize any contact between the boom of a crane required at a site as it is lowered and any facilities in 3D, so clients and construction contractors also say that it is "extremely easy to understand" and it has been well-received. We can also check operating radius, lift route, and load factor when installing devices and ducting in 3D with one click, so any need to redo site planning which could not be solved with 2D drawings also decreased.

Benefits of Introducing Software

Reduction of time for creating heavy equipment plans and making site explanations before construction

Time for creating plans views/elevation views, creating materials such as capacity calculations, and site explanations

K-D2 operation time*

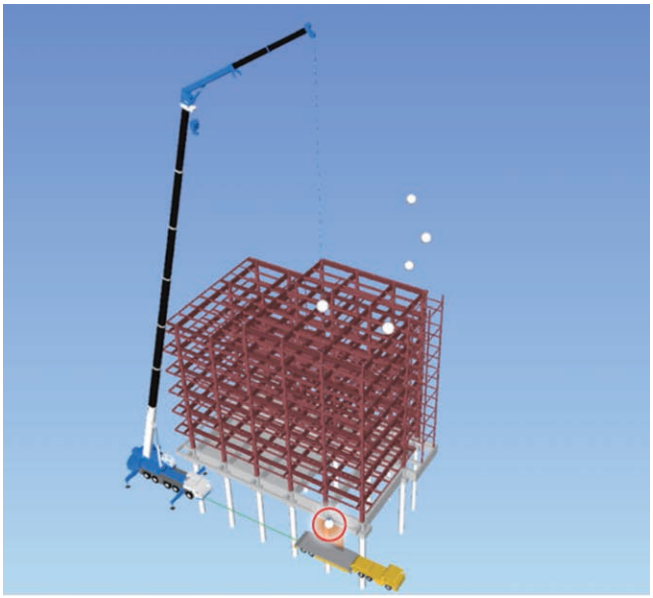
20 hours/month reduction

Faster and smoother plan sharing, less redoing of site planning

*Work done in 2D until now has been replaced with operation all in K-D2 PLANNER.

Anticipating Demand for Demolition Work, Heavy Equipment Added to Lineup

Higashi: In our company, there have been opinions that we should also include large cranes, unit dollies, and other equipment we have in simulations in making proposals to clients. Since plant construction also encompasses demolition work, it'd be good to put demolition equipment in our lineup.



Outputting construction step plans created with K-D2 PLANNER to Navisworks allows display of lift paths.

Use of BIM for Site Front Loading Leads to Expanded Orders

Obata: We introduced BIM in 2019 in the Equipment Section. It has contributed to improving client's work, and we have a high instance of repeat orders as well as more orders placed with ourselves being designated. Among our clients are super general contractors, and all of them are putting effort into BIM.
Myself, I would like to make use of our knowledge of heavy equipment planning we gained from the construction team with this project introducing the software in our operations, in generating more work, and vice versa, see what I've learned in serving our clients externally be used within our company to improve Sankyu's BIM technology.

Higashi: In the future, I would like to strive toward lowering costs and improving productivity of Sankyu together with our clients and expanding orders through proposals to clients with the entire Sankyu company that make use of BIM in aiming for site front loading.
I would also like to actively make proposals for heavy equipment plans using K-D2 PLANNER and temporary structures plans with BIM, to increase cooperation with clients on projects from the planning stage, and grow as a reliable partner that can respond to client needs.
And to do that, our newly added K-D2 PLANNER will be a big advantage. We would also benefit greatly by having Kobelco Construction Machinery partner with us in promoting BIM.

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