AUTODESK UNIVERSITY

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Build a Digital Value Chain with Revit+BiM360+SpaceIQ+Forge & its results

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Learning Objectives

- How to utilize data throughout the building lifecycle
- Synergy between Autodesk products and SpaceIQ
- Explain the challenges and benefits to be gained when applying the Digital Twin to a real project
- What is the Digital Value Chain?

Description

When considering the "building life cycle" from the viewpoint of the process importance obtained through ISO19650 certification, to construct a Building database, using BIM360 as CDE and collaborating Information of BIM stored in Revit along with SpaceIQ is required. We will share our insights collected from real project. Also some of the insights on the evolution of data platform by leveraging SpaceIQ solutions in the design phase, while it is commonly used in the construction to operation/maintenance phases. What is the digital value chain brought by the data collaboration? The effects and future projections will be presented.

Speaker(s)

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・Joined Daiwa House in 2019
・Specialized in BIM, establishing CDE
・Hobby: Cooking

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・Joined Daiwa House in 2019
・Specialized in classification, Information system
・Hobby: Driving, Traveling

About Daiwa House

Daiwa House has developed an extremely wide range of business areas since 1955 and has grown to be the largest construction company in Japan. We have been providing new products to customers aligned with the times and realized the value chain. And now, by adding all kinds of information to conventional products, we provide services to enrich people's activities, not only to customers but also to employees, stakeholders, and the many people living there and achieve digital value chain in the digital society era.
URL: https://www.daiwahouse.com/English/?page=from_header

About Digital Value chain for Construction

Concept

As the digitalization with BIM models progress, it has created new value such as interference checks and simulation analysis that could not be brought about by conventional 2D works. However, these are only a small part of the benefits of BIM. By reforming our business operations through BIM and improving the productivity and quality of the entire construction process, we provide better products to our customers, which is in turn, becoming the foundation to deliver new value and services.

Digital Platform

Improving the productivity and quality of the entire building lifecycle, it is necessary to share and utilize all kinds of digital information throughout the construction process. To achieve this, it is necessary to build a data-centric digital platform. We connect various kinds of data with BIM model in each process as value-added information. It enables the digital value chain in the construction process.

Challenges and benefits in real project (FM-BIM), by utilizing Digital Twin

Verification of Facilities

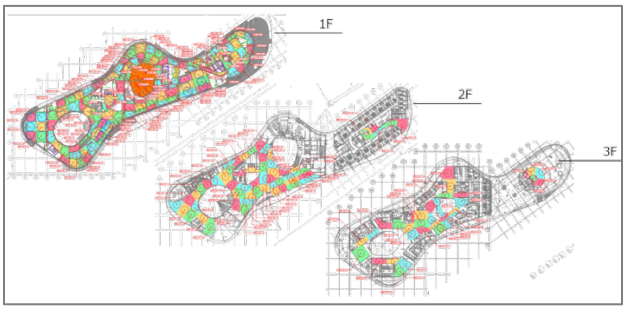
We selected our large scale training facility called Koto-kurie as a verification target with some critical operational requirements. Going through several verifications for Operation & Management BIM, collaborating with databases, it became a catalyst for digital value chain initiative.

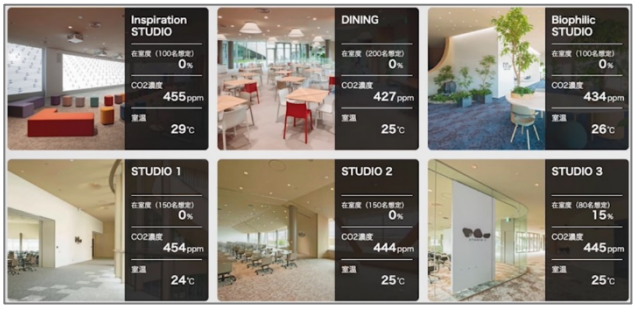
About ARCHIBUS

We chose ARCHIBUS as the FM database. It is an FM system for facility owners, and provides environment for bi-directionally data exchange between database and BIM parameters in real-time.

Utilizing O/M phase BIM at Koto-kurie

Our Digital Twin consists of sensors, BIM and databases. More than 300 sensors have been installed at Koto-kurie for various verifications. Among many information we can collect, we share the current implementation of the equipment status and the usage status of spaces as some examples. We also built a central monitoring system that informs the operator when any problem happened in the equipment. Dashboard function is useful for analyzing and optimizing the usage of limited space.





Summary of Koto-kurie project

By creating the Digital Twin with BIM model and ARCHIBUS,we found various effects and benefits for stakeholders. We also identified some challenges in terms of data integrity. To overcome such challenges and build the framework as a service from integration of BIM and ARCHIBUS, we have launched the SpaceIQ project.

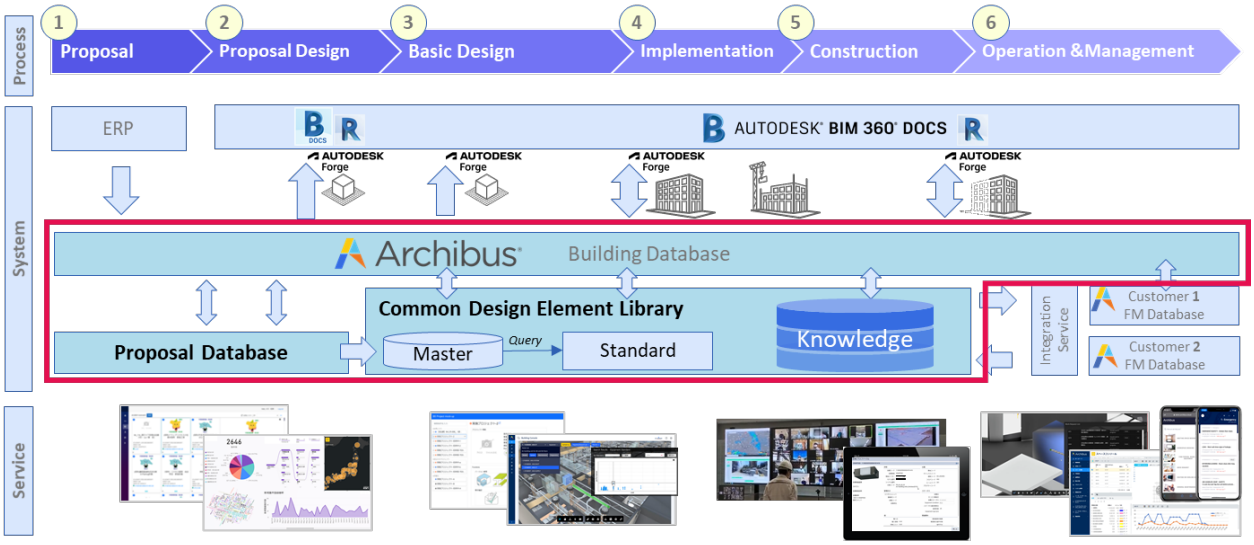
SpaceIQ project

Autodesk × SpaceIQ

Autodesk and SpaceIQ entered into a partnership last year. Our project is supported by the partnership.

Overview of SpaceIQ project

To share information across each process throughout the building lifecycle, establishing the Common Data Environment is the key. It encompasses the entire process and database, and to manage across each project. Out digital platform is using Revit as the BIM tool, BIM360 as the common data environment, ARCHBUS as the database linking to Revit, and ForgeAPI as the technology connecting each solution.



Establish Building database

The Building database manages all projects handled in Daiwa House. To co-relate ERP information with BIM360 and Revit data, we use technologies such as ForgeAPI.
By start utilizing ARCHIBUS in the early stage of the project, the BIM model and the database are linked at an early stage in the lifecycle. It helps to centralize information and enables seamless transition throughout the lifecycle. With buildings and assets information managed across project boundaries, we can also improve traceability.

Build Common Design Element Library (DEL)

Common Design Element Library (DEL) is a library of technical elements for designers to utilize downstream information in upstream. DEL manages four types of data to achieve the data-centric approach for designers.

- Master data; to manage detailed parameters of each manufacturer's products and other information
- Standard data; packaged combination of multiple master data
- Project Knowledge data; contains product specification information defined in design, construction, and maintenance processes

- Physical data; operational data, including building materials and equipment such as walls, floors, and glasses etc.

Create Proposal database

Proposal database manages two kinds of the project data; one is ended in the proposal process and the other is completed construction. Based on attribute information (building-use, site, regulations, cost, floor plans etc.), it searches for similar projects and provides information to designers.

Challenges we are working on

First, we need to break the business process down to the functional level and define LOD and LOI for each process. Also, “who”, “when”, “where”, “how”, and “what information is created, referenced, and updated” are defined. Next, we need to map the parameters of each Revit family to the fields in the database, to connect Revit attribute information with database information.

Revolution by establishing the digital platform

The experience and knowledge of the buildings will be recorded in the database and they are referred by other buildings and new buildings being created in the future. The digital value chain will greatly improve the entire building lifecycle. In Design phase, value engineering based on accumulated data can be achieved without depending on the individual skills/capabilities. In Construction phase, risk management for work-in-progress buildings will be enhanced by utilizing information from existing buildings in operation. Those are some of the examples of transformation to help providing high-quality buildings and services for our clients. Our buildings will grow together with people.

Summary

The key to achieve the digital value chain lies in Revit model, Autodesk Construction Cloud, ARCHIBUS database, and Forge API technology.
We are trying to build the digital platform and to achieve the digital value chain by 2025. And then, we'd like to move on to the next step, to realize DX across industries.

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