Copenhagen Airport A/S Created BIM Process Standards for Existing Building Projects

Bentley’s 3D Modeling Applications Helped Achieve a 4.46 Percent Cost Savings

A Milestone Event Venue

The Copenhagen Airport A/S wanted to implement building information modeling (BIM) processes on its upcoming projects to prove that utilizing BIM methodologies would be a beneficial investment. Most of the airport’s projects are the operation, maintenance, and refurbishment of existing buildings, but the airport still wanted to see the benefits of BIM workflows. The DKK 10 million initiative included producing information-rich 3D models of the facilities based on a combination of 2D drawings, surveys, and field inspections. The project also called for creating BIM process standards, including specification of a level of detail (LOD) for new building projects.

Implementing a BIM Process

The project team wanted to prove that using BIM processes throughout the project would benefit the building owner by saving cost. According to a 2012 report from the Danish Technical University, building owners who implemented a BIM process achieved a cost savings of approximately 12 percent. To prove that they could also achieve savings, team members set a goal to save at least 4 percent of the entire project’s budget, as their BIM processes would not be as mature as others in the study.

The main challenge for the Copenhagen Airport project team was that BIM processes in Denmark were not well established. To overcome this challenge, the organization collaborated with different companies to hear other views on the best way to implement BIM methodologies. By speaking with these different organizations, the project team produced a standard for future BIM process creation that would help them and other Danish organizations prepare for and benefit from BIM adoption.

Setting Standards

To create an effective model, Copenhagen Airport looked at existing LOD definitions to create their models, making sure to include the right amount of information to benefit both operators and consultants. Many of the existing definitions lacked the idea that much of the information can be obtained with data on less detailed objects. The project team decided to include graphical and non-graphical information in the definitions, with more non-graphical information than seen in other standards.

The team created a 3D model that included the important information from the 2D drawings, which they used as a baseline. Engineers also visited the sites and added any 2D information that was missed or incorrect. The team adopted their new BIM processes on this model, including the parameters on all surveyed objects. Additionally, all project participants were taught how to accurately use the model to gather information.

Existing LOD definitions were used to create the models.

ROI

The organization realized a 4.46 percent cost savings, surpassing its 4 percent goal.

To execute the project faster, the team joined IFC and DGN files, as all the original 2D drawings were in DGN format.

Compiling all data into a central repository in ProjectWise saved significant time.

Saving Time and Improving Collaboration

By using Bentley applications to help create a 3D model and an innovative BIM process, Copenhagen Airport’s project team saw significant time savings. The team quickly extracted heights with MicroStation’s ability to handle large point clouds, even when the surveyor was not present on the construction site. Users also joined IFC and DGN files, which helped execute the project faster because the original 2D drawings were in DGN format. There was also greater quality control over the information because the 2D data was included in the 3D models.

Fast Facts

- Copenhagen Airport looked at existing LOD definitions to create their models.
- MicroStation joined IFC and DGN files and helped handle large point clouds of data.
- ProjectWise housed all project information, including the 2D data.

Project Summary

Organization
Copenhagen Airport A/S

Solution
Buildings and Campuses

Location
Copenhagen, Kastrup, Denmark

Project Objectives
- Produce information-rich 3D models from 2D drawings, surveys, and field inspections.
- Create BIM standards to save at least 4 percent of the entire project’s budget.

Products Used
ContextCapture, Descartes, Pointools, Bentley Map®, MicroStation®, ProjectWise®

Existing LOD definitions were used to create the models.
The team used ProjectWise to house all relevant information, including the 2D data, which helped users easily find information. Previously, team members would have spent unnecessary time searching through thousands of documents. Bentley applications also helped improve collaboration with stakeholders, creating a web platform to exchange information and invite external people to participate in collision and consistency control. With weekly updates, everyone involved in the project knew its status and could easily access the necessary information. Bentley’s applications made it easy to manage contributions from all involved parties while still working to coordinate systems issues.

Realizing Benefits, Preparing for Future Projects

By incorporating BIM processes for all projects at Copenhagen Airport, the project team used the model to extract quantities for the contractors, which reduced the risk, and thereby the bidding. Together with detecting and correcting unhandled collisions before completions, the team could calculate the benefits. The organization calculated the difference between using the BIM process and not, and realized a benefit of 4.46 percent cost savings. Since 4 percent was their goal, the organization proved the effectiveness of a BIM process and received a mandate to continue using the process for all projects.

The surrounding community will also see the benefits of Copenhagen Airport’s project, providing insight into how Denmark might use BIM processes for future endeavors—especially since Copenhagen Airport is one of the largest building sites in Denmark. Therefore, if the airport could realize major benefits, then other organizations would realize the benefits as well. The airport set a goal in actively contributing to helping other large building owners mature their BIM processes and increase their level of implementation.