ENHANCING CONSTRUCTION SAFETY & EFFICIENCY WITH DIGITAL TWINS

BACKGROUND

Nexer Insight, NCC, Microsoft, and Scharc have just completed the first phase of a unique joint project on digital twins. This project occurred in connection with constructing the new Sigfridsborgsskolan in Nacka municipality, Sweden. The purpose has primarily been to investigate how digital technology can make construction design safer, more sustainable, and more efficient. Microsoft introduced Nexer Insight to NCC about two years ago. This meeting resulted in the first joint and unique collaboration on safe and secure workplaces, one of NCC's most important focus areas.

AT A GLANCE

Company: NCC

Industry: Construction

Employees: 10k+

Objectives:

- Implement digital technology to enhance construction site safety.
- Use digital twins for more sustainable construction practices.
- Integrate IoT and real-time analytics to streamline processes.
- Develop a digital twin of Sigfridsborgsskolan for monitoring and optimization.

Products:

- Azure Digital Twins
- Azure IoT Hub
- Azure AI
- Azure Cloud Platform

> "...I believe that we will see great positive effects of working with digital twins and that our customers also see the benefit of it.

- Claes Henschel, NCC.

CHALLENGE

The initial project was based on cranes at construction sites – a high-risk area identified by NCC. The challenge was to leverage digital technology to improve safety, sustainability, and efficiency in construction processes. ***"In the crane project, part of the project Connected Construction Site, we tested new technology based on monitoring using cameras and advanced software that immediately warns the crane operator of any people on the ground. In the project, Microsoft provided the cloud-based technology platform that formed the link between us at Nexer Insight, NCC, and the others involved,"*** says Carl Tönseth, Business Manager, Nexer Insight.

SOLUTION

The solution for the Sigfridsborgsskolan project was to create a digital twin of the school, using data from intelligent helmets and other sensors at the construction site. This digital twin, built on the BIM (Building Information Model) created by Scharc, allowed for real-time monitoring and analysis. ***"We wanted to test how we could use our smart helmets to collect data from the construction site to improve the work environment and streamline the process on-site. We met several times and discussed what we wanted to achieve and whether we might make a project out of it. NCC liked the idea, and at one of these meetings, Claes Henschel, Digitalisation Project Manager at NCC, came up with the idea that it would be appropriate to connect our idea to the Connected Construction Site. Claes told about the things they have done together with Nexer and Microsoft when it comes to cranes and safe workplaces,"*** says Sven Staiger.

BENEFITS

Digital twins are virtual copies of real objects, processes, places, and human behaviors based on real-time data designed to simulate, analyze, and improve. ***"By adding analyses and AI to digital twins, you can track what has been, improve what is today, and predict the future. You can make digital twins out of pretty much anything: trucks, supply chains, wind turbines, and, not least, buildings,"*** says Carl Tönseth. The insights from the digital twins can help companies optimize processes, empower product development, and improve customer experiences. Using BIM models in the design and design phase is not unique, but creating and using a digital twin in the production phase is. ***"We have used the digital twin to visualize what steps will be done in production and work with work environment issues. This can be, for example, real-time sensor data from zones where it can be dangerous to work due to hazardous microparticles in the air. We have also tried to track where the material is, as well as people we may need to contact and who, in the worst case, has had an accident and need to be found quickly,"*** says Claes Henschel, NCC.

> "By adding analyses and AI to digital twins, you can track what has been, improve what is today and predict the future.
>
> **- Carl Tonseth, Business Manager IoT & AI, Sweden**

RESULTS

The project was launched in October 2020, and Nexer Insight was involved in innovating with NCC and Scharc. The goal was to aggregate data from intelligent helmets and other sensor data at the construction site and transfer these to a digital twin based on the school's BIM models that Scharc created. The collaboration proved highly effective. ***"With more types of input data, I believe that we will see great positive effects of working with digital twins and that our customers also see the benefit of it,"*** says Claes Henschel, NCC.

Microsoft's Azure Digital Twins platform, a so-called IoT platform, is the technical hub of the digital twin project. ***"In the work with NCC and Nexer Insight, the focus has been on creating innovative and connected solutions to generate new opportunities and health, safety, and sustainability solutions. The close collaboration and dialogue have enabled us to support the work with Microsoft technology to solve challenges and maximize the potential,"*** says Therese Treutiger, responsible for innovation and partner operations at Microsoft Sweden.

THE FUTURE

NCC sees integrating more parameters into the digital twin, including energy consumption and climate, as a natural next step. ***"The collaboration has worked well with our partners. The focus in the workflow is on the building. In this project, there have been 860 different people at the construction site. We want to work together even more in the future and ensure that the knowledge available to all these people benefits the building – in the digital twin – to be used by everyone involved,"*** says Sven Staiger. ***"When the individual's knowledge is combined with other experts who offer related services, the whole becomes much larger than the sum of its parts. The result is a powerful digital twin, creating clear customer value,"*** says Carl Tönseth, Nexer Insight.

Find out how Nexer Insight can help your organisation:

MATTIAS ZAUNDERS
Business Manager
mattias.zaunders@nexergroup.com
+14253891248

NEXER