



BIM in Office: BIM Level 3 for Infrastructure | Tuesday November 6

BIM level 3 for Infrastructure is a tailored program for civil engineers, infrastructure project managers and other professionals with the ambition to meet the current - as well as shape the future - requirements of the civil engineering and construction industry.

6:30 – 17:30 Registration

6:30 – 8:30 Breakfast

8:30 – 9:00 **Trimble Civil Construction Continuum: using the Trimble ecosystem for BIM level 3 collaboration**

Trimble has a wide range of solutions that support the workflows throughout the project lifecycle, from early planning of Infrastructure, to conceptual and detailed design, planning and execution of construction, and finally to model hand over and maintenance. The role of the BIM model is becoming increasingly important, as it is being enriched with information and sophisticated data at every stage of the project lifecycle. The result; the BIM Level 3 model then follows the lifecycle of its objects, not only the lifecycle of a given project. We call it the Trimble Civil Construction Continuum.

Heidi Berg, Mats Fensholt and Idar Kirkhorn, Trimble, Norway

9:00 – 9:30

The BIM Level 3 requirement from Infrastructure owners

The BIM level 3 requirement from Infrastructure owners drives innovation in Norwegian Road projects. Nye Veier, the new road client in Norway, was established in 2017, with a mandate of reducing the design and construction time and costs. One of their solutions to this was to set high demands of BIM level 3 in their Best Value Procurement tender documents, showing a clear path towards the vision of a fully digitized design and construction process within 2020. This has created a strong movement in the market, where contractors, designers and suppliers need to innovate and take major leaps towards full digitalization. Their mandate, given through the Parliament proposal, was to construct 534 km of highways (mainly 4-lane) at an estimated cost of 148 billion NOK (2015 cost level) (approx. 16.4 billion EURO) and complete the construction in 20 years. Their ambition is to complete the job in 12 years with a 20% reduction in cost.

Øyvind Moshagen, Nye Veier, Norway

9:30 – 10:00

Break

10:00 – 10:30

How to Integrate Quantm System into China Highway BIM technology

Infrastructure construction is booming in China today, and a great deal of road construction projects are also extending from the eastern plain to the western mountainous areas. Highway routing in mountainous regions is a complex and far-reaching systematic work. It needs to take full account of overall planning, topography, engineering scale, project investment, environmental impact and social benefits. If the alignment planning depends on the individual engineers, it takes a large amount of time and manpower to determine a reasonable and feasible route scheme. The Trimble Quantm system combines engineers' experience in route selection and road design regulations with computers' calculation function. In that way engineering could quickly and reasonably determine the road plan in the early stage of project determination. In the Sichuan province's mountainous area, highway engineering applies the Quantm system for alignment selection. By setting the control conditions, such as project scale, investment, environmental factors and also its weight values. Analyzing and calculating by computer gets 20 to 50 reasonable route schemes. The outcomes include the corresponding route plane, profile and cross-section, as well as bridges, tunnels, digging and filling. We have also used Trimble UX5 Unmanned Aircraft System in some projects as a substitute for conventional survey. Digital orthophoto map and the Quantm system's scenario could be imported to China's current mainstream highway design platform for in-depth detailed adjustment and optimization.

Ming Zhu, Sichuan Communication Surveying & Design Institute, China

10:30 – 11:00

The Jokeri Light-Rail Line (Integrated Project Delivery) – A 25 km long multidisciplinary design environment

Constructing a new light-rail connection, the Jokeri Light Rail Line, in a built environment created a substantial challenge in the capital area of Helsinki. The project is realized as an Alliance project, i.e. an integrated project delivery with early contractor involvement. The model includes a development phase where the best and most cost-effective solutions are currently investigated as a joint effort by the client, the contractors and the designers. The project has a joint organization and a joint contract with no-blame clauses, shared pain and gain. The designers in the project are Ramboll, Sitowise and VR-Track, the contractors YIT and VR-Track, and the clients are the cities of Helsinki and Espoo.

The new Jokeri light-rail line aims at serving an increasing number of passengers traveling across the region, the forecast for 2040 is 102 000 passengers per day. The light-rail connection is 25 km long (15.5 miles) and the investment amounts to ca 275 MEUR (320 MUSD) excluding rolling stock and a depot. The overall goals of the project are to improve the reliability of traffic, grow the capacity of public transportation in the region, improve orbital public transport connections, connect to radial metro and train stations, promote sustainable transportation, and to improve land use.

Presenting innovative solutions for the light-rail line to decision makers, the residents of Helsinki and other stakeholders is an important part of the project's development phase. Coordinating the technical solutions between three designers, two contractors, and two clients requires tools that enable real-time information management throughout the design and construction phases. The Jokeri light-rail line project is being realized using Trimble Novapoint as the main design software and relying on Trimble Quadri as the information and communication management tool for the whole project.

Peter Molin, Ramboll, Finland

11:00 – 11:30

Break

11:30 – 12:00

Collaboration across borders and companies using Trimble Quadri - a BIM Level 3 server; E18 Rugtvedt – Dordal

The highway E18 Rugtvedt - Dordal is a Design-Build project where the contractor requires a BIM design- and build process. COWI applied its global design resources through model based collaboration across borders. The multi-domain infrastructure BIM model is continuously updated in the cloud, so all designers can collaborate on the latest version from all domains, in real-time. The client and contractor are given access to the model, to ensure that their input is handled using geo-referenced model commenting in an OpenBIM standard (BCF2).

Magnus Jacob Christensen, COWI, Denmark

12:00 – 12:30

Trimble Quadri : a BIM Level 3 platform across multiple design applications

All domains can use their own BIM design tools, sharing their changes and receiving calculation basis and changes from others through the multi-user BIM server, Trimble Quadri.

Being able to enrich the common BIM model with a range of other sources like IFC, LandXML, (City)GML and even GIS data, all users see the same single source of truth, in the common Quadri model.

All data gets stored as rich objects (features) with attached information (attributes). And more importantly, the structure that defines how the model is created and enriched is made available to the users through information on tasks and processes. With multi-domain design and existing terrain data in the same model, you can run analyses over the complete model and extract the information you need, independent of the source files.

Chris Dheere, Arkance Systems, BeNeLux

12:30 – 14:30

Lunch

14:30 – 15:00

BIM modelling for infrastructure, using Trimble Novapoint Infrastructure Design Suite and Trimble Quadri for BIM Level 3 collaboration

BIM is far more known within the building industry than the Infrastructure industry. In Norway, where Trimble Novapoint Infrastructure Design suite is developed, the official requirement from the government since 2012 has been to work after the principles of BIM and deliver BIM models to site. The design and construction market in this region has therefore developed fast and industry players now deliver “paperless” to sites, utilizing the BIM modelling tools from early planning all the way through an optimized, multidisciplinary BIM process, to a constructible set of models to the site.

Heidi Berg, Erling Tronsmoen and Patrick Mc Gloin, Trimble, Norway

15:00 – 15:30

Multidisciplinary collaboration within the BIM model, Crown Bridges, Helsinki

The Crown Bridges project in the city of Helsinki will connect the Laajasalo, Korkeasaari and Kalasatama areas to the center of the city by means of a 10 km tramway. The most visual part of the project are the three new bridges: Kruunuvuori Bridge, Finke Bridge, and Merihaka Bridge. With a total length of 1,200 meters, Kruunuvuori Bridge will be Finland's longest bridge.

In this presentation, the focus is on the street- and municipal infrastructure design. Digital models create enormous possibilities that enable controlled decision making within a design team and between owners, contractors and designers.

In the Crown Bridges Project Trimble Novapoint is used as the main design system for infrastructure and water supply design, Trimble Tekla Structures is applied in bridge- and structural engineering, and project collaboration in the BIM model is conducted using Trimble Quadri.

Mr. Valtteri Brotherus and Mr. Matti-Esko Järvenpää, WSP, Finland

15:30 – 16:00

Break

16:00 – 16:30

How to monitor a construction project with Trimble TILOS?

Site monitoring is a key aspect of construction project management. However, it is often managed with basic tools and is very time-consuming. Reporting progress, evaluating impacts, taking corrective actions and providing up-to-date reporting can not be improvised and requires special preparation. Fabien Gaboriau and Quentin Herbreteau, experienced planning managers, present some of their best practices, around project organization, scheduling and monitoring through a case study.

Fabien Gaboriau and Quentin Herbreteau, Project Lineaire, France

16:30 – 17:00

How to get optimal value of an Open BIM Level 3 process. Panel Discussion

OpenBIM has been a hot topic in the construction industry for some time now. What are the lessons learned? The approach has proven to give less errors and conflicts between the designed objects, but do we see the value and benefit all the way out on site and back to the client? The experienced panel will share and discuss their lessons learned: What needs to be in place (what requirement, contractual documents, procedures, level of detail etc.); What are the requirements for the infraBIM tools to be used for connecting planning and design phases, construction execution and maintenance of infrastructures; And best practices and lessons learned on information delivery with open infraBIM. Let's share and discuss the lessons learned and move forward.

Moderators: Merete Tøndel and Heidi Berg, Trimble, Norway