

E18 BJØNNÅS TUNNEL, NORWAY AMBERG TUNNEL & NAVIGATOR

No one's left in the dark



Key Challenges and Solutions at a Glance:

- Multiple construction sites requiring surveyor's presence.
- Tight tolerances, intense pace of excavation.
- Unpredictable complex geology caused frequent design changes.
- Tunnel crew with Amberg Navigator performs basic surveying tasks, which reduces downtime
- Design and measured data are synchronized between field and office via cloud
- Streamlined data flow optimizes collaboration, detailed digital reports are produced daily
- Comprehensive tunnel surveying solution.



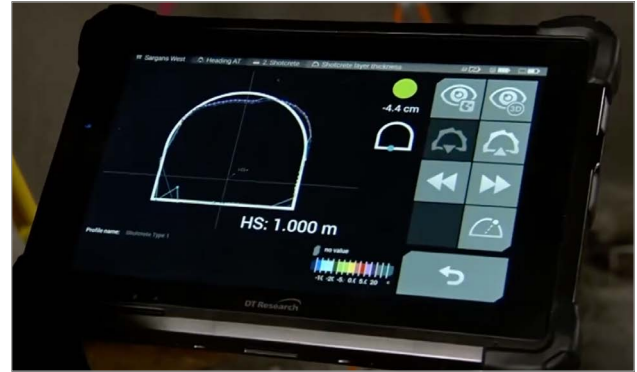
FULL ARTICLE

AUTOMATION AND DATA SYNCHRONIZATION LIGHT THE WAY TO TUNNEL SUCCESS

The Bjonnas tunnel is the second longest tunnel on the newly built motorway E18 from Langangen to Rugtvedt. The project includes several cross passages and technical buildings. In order to complete the tunnelling works as fast as possible, the excavation is ongoing simultaneously in various places. With 4 blasts per day, this is quite a challenge to survey and document.

For production optimization and efficiency, each crew was given one total station, one scanner and one tablet running Amberg Navigator. With this equipment, they can independently check the excavation and shotcrete. Along with all the blasting and shotcreting has been positioning and installing varied bolts such as rock bolts – a task the tunnelling team can do autonomously with a dedicated workflow in Navigator. Performing a resection with the total station, they establish the rig's position and import the coordinates into the rig's cab. The operator then follows a pre-defined bolt plan to install the georeferenced bolts. And because they have a constant exchange of data between the office and the field, surveyors are able to ensure the tunnelling is on point and the stakeholders are informed.

With an approach that combines traditional total stations, 3D laser scanning and the automation and intuitiveness of the Amberg Tunnel solution, the survey team has been successfully supporting and directing a daily routine of blasting, drilling, confirming, and reporting for the past 18 months.



Crews can immediately check shotcrete layer thickness by clicking on any point on the theoretical design profile on the tablet and Navigator will show the corresponding layer thickness.

E18 Langangen-Rugtvedt, Bjønnås Tunnel

- Eastern Norway
- 2.5km twin-tube tunnel, 10 cross passages, 3 technical buildings
- Construction: 2022 - 2024 (completion 2026)
- Costs: NOK 5.2 billion (~€516 million)



Entrance to Bjønnås. Twin tube tunnel under construction



Christophe Poloni
Tunnel Surveyor, Eiffage

"In tunnel construction, 'delay' is a dirty word. No one wants to wait for surveyor support, but we can't be everywhere at once. With the different sites and dynamic nature of the project, we wanted to adopt technology that would enhance tunnelling efficiency and tracking, reduce downtime and streamline data flows.

Amberg Tunnel is an all-in-one solution that not only handles diverse file formats, it automates stake out, blasting, profiling, and other tasks with the push of a button. It also provides task-specific data analytics and real-time data synchronization. With all the variables involved in tunnelling, we knew Amberg Technologies would be the one constant we could rely on. Most importantly, the automated nature of the field software would give us the time to focus on complex survey tasks."