Mast upgrade

Demanding conditions were faced by UK firm Bulroc in part of a project to replace rail masts in Norway.

Jærbanen is part of Norway’s South Country (Sørland) Railway that connects the capital Oslo with Stavanger in the south west. Jærbanen covers the stretch between Egensland and Stavanger, and crosses the Jären district, noted for its typical flat moraine landscape strewn with boulders large and small.

The line was originally constructed in the 1870s and was electrified in 1956. Traffic on the line has increased dramatically over the past decade and as the old masts and poles were over 50 years old, it was decided that an upgrade of the catenary masts including foundations for these was required.

The railways’ geotechnical engineers and independent consultants concluded that precast concrete foundation piles, 555mm in diameter, would be required for guaranteed stability.

On other stretches of railway in Norway where upgrading had already taken place, concrete foundation piles of 355mm were typically used, but the ground conditions across Jären were considered more demanding than most, varying from solid hard rock, soil with stones and boulders, moraine with boulders, to gravel and fine silt.

The contract for installation of the concrete foundations was awarded to Raneservice, an independent company owned by the Norwegian Department of Transport.

A special rail wagon mounted drill rig was ordered from BS Mekaniska Verkstad in Falköping, Sweden.

The concrete foundations used come in lengths of 2m, 3m and 4m, with drill rig operators evaluating which lengths to use according to the ground conditions observed during drilling.

As drilling equipment, Raneservice chose a Bulroc Hyper 181 18m (457mm) DTH hammer with in-the-hole shock absorber, and model CDS 560 RS (Stablex) overburden drilling system with drive shoulder for driving the casing.

The system consists of a driver (pilot), an exchangeable ring bit and three segments that swing out during drilling, reaming the correct diameter hole to clear the casing. The segments swing back as rotation is reversed so that the drill-string can be pulled out through the casing shoe.

Bulroc said that an important feature with the RS (Stablex) version was that most of the flushing air was directed back up the casing (retroflush). This not only helps flushing, but very importantly avoids large volumes of air being pumped into the ground. Since the distance from hole centre to centre track is only 3.5m, this is very important, it said.