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# EUROPEAN FOUNDATIONS

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**City people:**

Trevi will work at 21 locations throughout Copenhagen



new system that we are building, which adds to the challenge on this project.”

CSP piling is a new technique for Denmark – it is basically a fully cased CFA pile, but Cavalcoli says it uses no polymer or bentonite so is less messy. “Here all the piles extend to 28m and we are using tools that were specially developed for the scheme and it is a design that we are still tweaking,” he says. “The flint is highly abrasive so we are using a high quality steel to be more productive and adjusting the tooling position to create a more aggressive auger.”

Trevi is working on 12 sites at the moment. Two – Nørrebroparken and Nørrebro Runddell – are already finished and the first TBM was due to be launched from Nørrebroparken as *EF* went to press. Main contractor CMT will eventually have four 6m diameter Kawasaki earth pressure balance TBMs working on the scheme and the second is due to be launched soon from Otto.

Trevi finished at Nørrebroparken in June and work on casting the top slab and excavation of the box has been completed.

**“THE FLINTS ARE VERY HARD. WE HAD TO REPLACE 500 TEETH ON THE HYDROMILLS SO FAR”**

Giancarlo Zannoni, Trevi

The TBM will travel anticlockwise towards Nørrebro Runddell, which was handed over to CMT on the day of *EF*'s site visit. Nuuks Plaads (see box overleaf) will be the next site to be handed over.

Zannoni says that CMT hopes to achieve 13 to 14m of tunnel construction per day.

Trevi has 200 people working on the scheme and this has gradually ramped up since the company started work on site in late August 2011. “The demand for quality on this scheme is high but safety is also important,” says Trevi HSE manager Stefano Margozzi. “So far we have managed 200,000 hours ➤

**WHO?**

Trevi is the main subcontractor working on the DKK21.3bn (€2.85bn) scheme for main contracting joint venture CMT (Cityringen Metro Team). Trevi is undertaking all the main foundations work, which mainly involves a mix of diaphragm walling and Trevi's cased auger piling (CAP). The contract may be extended to include compensation grouting work when the tunnel boring machines (TBMs) are

**CHALLENGES**

Trevi is having to cope with strict noise and environmental limits, as well as overcoming some difficult ground conditions. Dewatering is being carried out by a specialist contractor to carefully control the groundwater around the site in a bid to prevent damage to timber piled buildings in Copenhagen. Layers of flint up to 2m thick in the underlying limestone are being prefractured using sonic drilling.

**MORE INFO**

More information

[www.m.dk](http://www.m.dk)

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