



## Barchip54 Eliminates Corrosion on the Helsinki West Metro Extension

The Helsinki Metro System is currently undergoing a major expansion from Ruoholahti to Matinkylä in Espoo via Lauttasaari and is Finland's largest infrastructure project.

The expansion consists of 13.9 km twin tube tunnels, 6 m diameter with connection tunnels every 150 to 170 m. Seven new stations will be built along the line with a further station planned for Niittykumpu. Upon completion the west metro will transport over 100,000 passengers every day. The entire metro system will be a fully automated, driverless system.

The estimate for the overall project cost, drafted at October 2007 prices, is €713.6 million, shared approximately 72 % /28 % (Espoo/Helsinki), with the government taking over 30 % of the metro costs.

The Helsinki West Metro extension has a number of subsea sections which rained serious concerns over the corrosion and durability of steel fibre reinforcement. As a result, the original specification of 40 kg/m<sup>3</sup> of steel fibre was changed to 7 kg/m<sup>3</sup> of BarChip54 synthetic fibre.

The change to BarChip structural synthetic fibre also delivered owner Lansimetro an 82.5% reduction in handling, storage and transport of fibre materials and a 66% reduction in wear, tear and maintenance of shotcrete equipment.

BarChip structural synthetic fibre reinforcement was specified for the shotcrete support lining after achieving the specified 1000J (EFNARC) at the lowest cost per Joule.

### Quick Facts

- Estimated cost € 713.6 million
- Largest construction project in Finland
- 13.9 km twin tube tunnels 6 m diameter. Connection tunnels every 150 to 170 m. Comprises 7 new underground stations
- Drill and Blast tunnelling method.
- Initial mix of steel fibres was changed to BarChip synthetic fibres due to corrosion of steel fibres, cost advantages, performance and availability
- BarChip achieved 1000J EFNARC specification with the lowest dose rate and lowest cost per Joule
- BarChip offered a c.82.5% reduction in handling, storage and transport of fibre materials
- BarChip offered a c.66% reduction in maintenance of shotcrete equipment, particularly hoses and nozzles.
- BarChip offered a c.70% reduction in carbon footprint.
- Reinforced with BarChip structural fibres

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# Metro West Extension

Helsinki, Finland

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The Synthetic Fibre Experts

