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# Railway Gazette

## INTERNATIONAL

# DB tries synthetic bridge timbers

**MATERIALS** DB Netz installed its first bridge timbers made from FFU synthetic wood during a track renewal programme in Bayern last summer.

Reinstating the rails following installation of the FFU bearers.

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German infrastructure manager DB Netz has launched its first trial of synthetic wood made from fibre-reinforced foamed urethane. The use of FFU for revenue service trials in Germany was approved by the Federal Railway Office in 2009, and FFU turnout sleepers have since been installed for testing on the Hamburg U-Bahn (RG 8.10 p42). Following negotiations with manufacturer Sekisui, DB Netz decided to undertake a long-term trial to examine the performance of the material as bridge timbers.

In August 2011 DB's Südostbayernbahn subsidiary refurbished a 9 km section of its Neumarkt St Veit – Landshut route between Egglkofen and Vilsbiburg, replacing wooden sleepers with concrete in order to raise the line speed from 100 km/h to 120 km/h.

As part of this programme, FFU synthetic bridge timbers were installed on the Große Vils bridge, as the first such application on the DB network. The 64·2 m long structure contains 108 timbers; although it is mainly straight there is a slight transition curve, which means that the beams vary in thickness between 260 and 380 mm.

Whereas most FFU applications to date have used sleepers prefabricated at the factory to the exact specifications required, DB Netz decided to order basic rectangular profiles and prepare the individual timbers at its existing Witten plant in Nürnberg. This plant prepares thousands of timber bridge beams each year, using specialist drilling and milling machines.

The FFU blanks were manufactured in Japan and shipped via Hamburg to Nürnberg for processing to meet the local geometric specifications. Because of the very high fibre content of FFU compared to wood, stronger tools were needed to resist the abrasive effect.

**Below:** Drilling the positioning holes to accommodate rivet heads on the bridge beams.

**Below right:** Special hooks were used to lift the FFU beams into position via the pre-positioned rail baseplates.

## On-site fitting

Once prepared at Witten, the beams were then shipped to site ready for installation. After the rails had been removed, the old wooden beams were lifted out in groups of five to 10, using a road-rail crane, and the FFU bearers lifted into position. Each beam was clearly numbered to ensure it was put in the correct place.

However, the old timbers rested on supporting steel beams with protruding rivet heads, which were accommodated by 50 mm diameter holes drilled into the wood. The rivet positions had been marked for drilling by lightly tapping the wooden beams with a sledge hammer, but this would not work with the FFU beams.

A plastic film was therefore attached to the underside of each FFU bearer to record the position of the rivet heads. The beam was lifted out and shallow indents milled in the right places. As well as ensuring that the bearers are correctly seated at the right height, these indents provide a positive lock against any movement of the beams within their securing straps.

Once all the fittings had been installed, a final visual inspection was made before the rails were reinstated and fastened to the bearers. As a final step, a fibreglass cover was bolted to the bridge timbers between the rails.

The total project cost was around 20% to 25% more than the cost of using wooden timbers, but the FFU synthetic bearers are expected to last up to four times as long.