



| Heavy haul traffic

For the North-American rail network – for which tracks must be designed in accordance with static axle loads up to 40 tons – a new prestressed-concrete tie has now been developed and successfully tested. This tie not only meets the strict requirements of the American specifications, but also the stipulations set forth in European standard EN 13230. Applications in the USA with conventional concrete ties have revealed problems in the form of cracks, predominantly occurring at the middle of the ties. Extensive testing conducted by Munich Technical University on the newly developed mono-block ties has disclosed that the new Type HHS 44/8 tie successfully fulfils all specifications: in static testing (for determining cracking and breaking strengths), in dynamic tests (for establishing the cracking behaviour upon passage of loads), and in fatigue testing (for revealing the long-term behaviour over the simulated equivalent of approx. 30 – 40 years of loading).

Installation of test ties in the USA

In 2007 two different concrete tie types were subjected to practical testing in the USA. The HHS 36/6 concrete tie was developed for an axle load of 36 metric tonnes. The second tie, the HHS 44/8, was significantly reinforced by employing greater dimensions and greater prestressing forces, resulting in a design rating for loads up to 44 tonnes. From the engineering standpoint, this tie appreciably better withstands high loads, and therefore allows expectation of longer life cycles. RAIL.ONE produced 100 samples of each of these two tie types for a test section in the USA.

In addition, both types were also produced in small numbers with two-layer concrete, in order to counter the erosion of the concrete feared under high axle loads in the rail-fastening zone. In September 2007 all

ties were transported to Brady, Nebraska. According to information from the American private railroad company UP RR, the small town of Brady (between Denver and Chicago) is crossed by a rail line that carries the heaviest freight loads in the world. This line in fact supports loads between 225 and 250 million gross tons (MGT) per year. The ties had been pre-assembled in 4 track panels, each 30 metres long, and were installed. During the time in which rail traffic was interrupted, approx. 120 metres of the existing track were removed with three excavators, and the ballast was taken away. This ballast exhibited a heavy admixture of coal, which had fallen off the freight cars during daily rail operations on this line. On the average of every 5 minutes, coal trains with around 150 cars pass along this line, to meet the enormous coal demand by power-generation plants in the eastern and southeastern USA. RAIL.ONE is confident that these newly developed ties will hold up under service without difficulty on this heavy-haul line, with approval granted for axle loads up to 44 tonnes.

Data and facts	HHS 36/6	HHS 44/8
Permissible axle loads in t	36	44
Length in mm:	2600	2600
Width in mm:	280	330
Height in mm:	247	229
Weight (without fastenings) in kg	352	400