

Impact-Echo measurements of Concrete-Embedded Tracks (Rheda 2000)

Project: Inspection of concrete-embedded tracks

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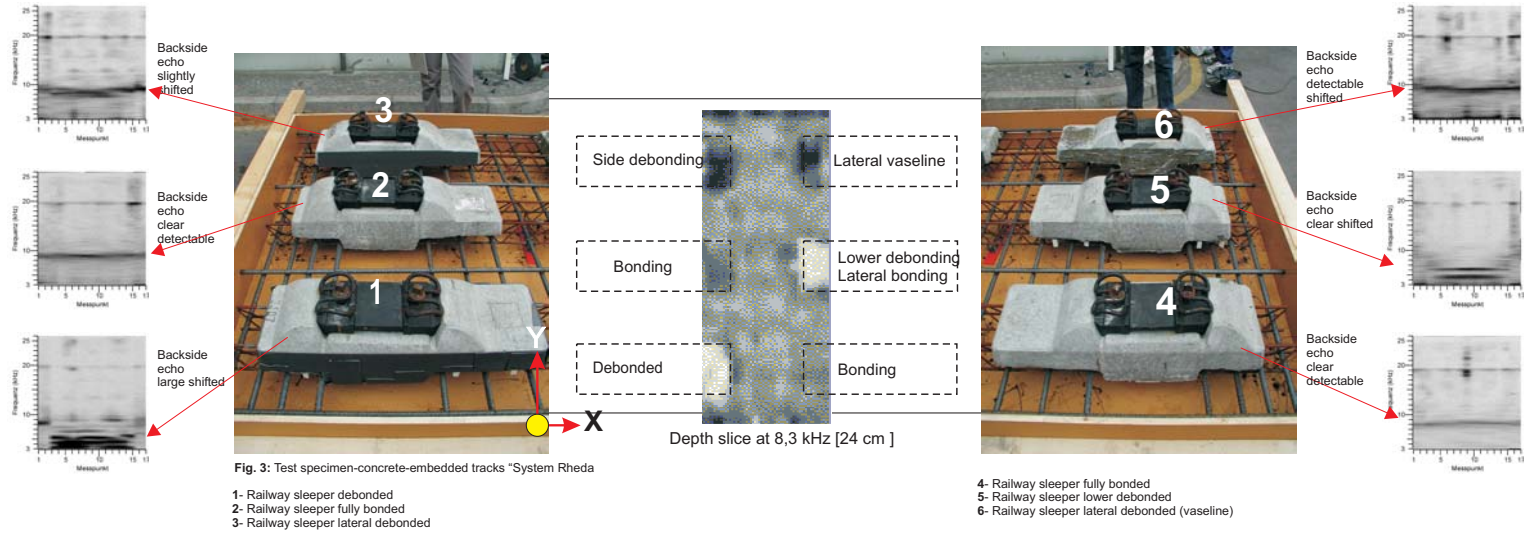
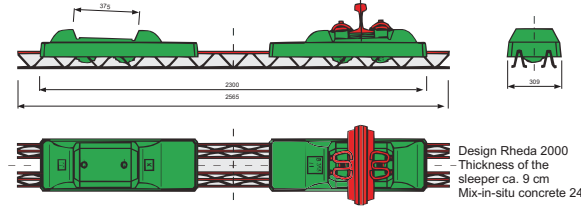
Motivation

In a joint project between BAM and Deutsche Bahn AG application and further development of NDT-measurements for the constructional conditions of the concrete-embedded tracks are investigated. Here results of impact-echo testing

on test specimens in the laboratory and a newly built concrete-embedded tracks railway line (System Rheda 2000 see Fig.1) are shown.

Investigation in the laboratory

The test specimen (Fig.2 and Fig.3) was manufactured according to the requirements of the producing company (German Track-Systems Proj.Ges.mbH). The three "two block sleepers type B 355 W 60M-BS" were prepared to simulate the test conditions of interest (debonded, laterale debonded and fully bonded).

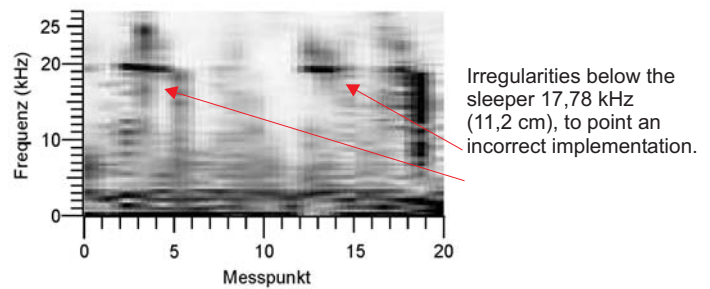
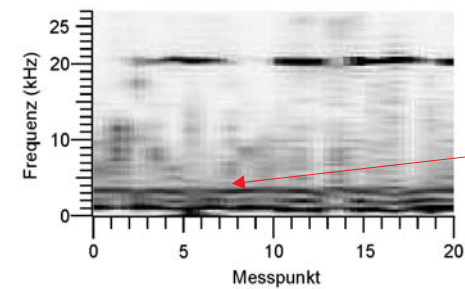


Results

The different test conditions could be characterized by the backside echo at 8,3 kHz. Especially the fully bonded railway sleepers (2,4) show a clear reflection peak at the backside (horizontal black line). The debonded railway sleepers (1,5) show in contrast a significant shift the backside echo. The railway sleepers with lateral delaminations have only minor changes of the reflection from the backside echo. The characteristic line at 20 kHz is a system artefact.

Measurements at the rail-track Leipzig/Gröbers

The measurements in the railway line (Fig. 4) were done in 10 sections, each with 10 railway sleepers and -fans with two measurement points, respectively. The results for a correct implementation shows Fig.5. In Fig.6 you can see irregularities below the sleeper.



Conclusions

The results of laboratory investigations show that it is possible to distinguish between a correct and a fault/defect condition.

As mentioned, the onsite measurements on a railway line indicate a variety of built in implementations.