



## Field data analysis of asphalt road paving damages caused by tree roots

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Tree root damages are a frequent problem along paved cycling paths and service roads of rivers and streams. Damages occur mostly on streets with thin asphalt layers and especially in the upper part of the pavement structure. The maintainers of these roads are faced with frequent and high annual repair costs in order to guarantee traffic safety and pleasant cycling conditions.

The focus of this research project is to get an insight in the processes governing the growth of the tree roots in asphalt layers and to develop test methods to avoid root penetration into the road structure. Tree vegetation has been analysed selectively along a 300 km long cycle and service path of the Danube River in the region of Austria. Tree characteristics, topographic as well as hydrologic conditions have been analysed at 119 spots with different asphalt damage intensities. On 5 spots additional investigations on the root growth characteristics were performed.

First results underline a high potential damage of pioneer trees which are growing naturally along rivers. Mostly, local occurring fast growing tree species penetrated the road layer structure. In a few cases other tree species were as well responsible for road structure damages. The age respectively the size of the trees didn't seem to influence significantly the occurrence of asphalt damages. Road structure damages were found to appear unaffected by hydrologic or topographic conditions. However, results have to be interpreted with care as the investigations represent a temporally limited view of the problem situation. The investigations of the root growth characteristics proved that tree roots penetrate the road structure mostly between the gravel sublayer and the asphalt layer as the layers themselves don't allow a penetration because of their high compaction. Furthermore roots appear to be attracted by condensed water at the underside of the asphalt layer.

Further steps of the research project imply testing of different compositions of gravel size mixtures as sublayer material. A coarse gravel size mixture allows the condensed water to drain in deeper layers and inhibits root growth because of mechanical impedance and air pruning of roots.