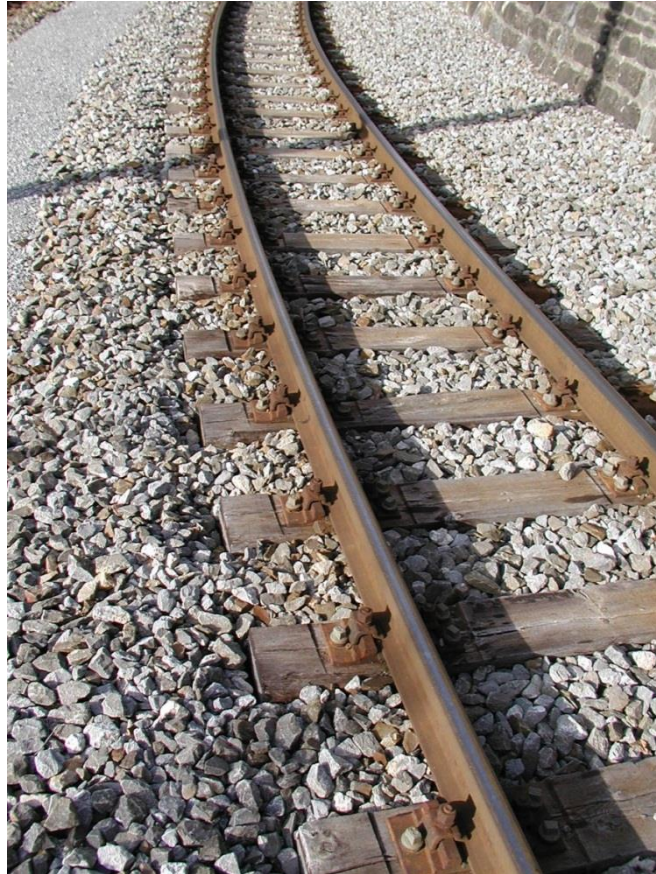




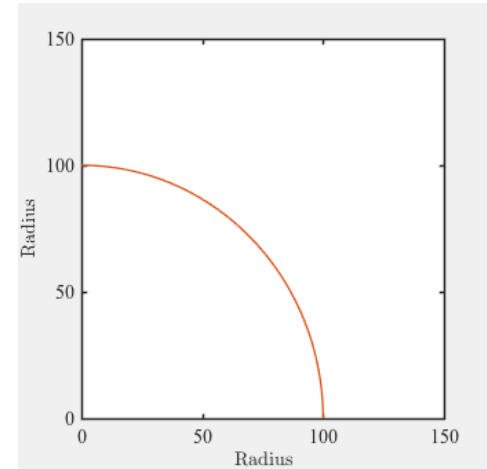
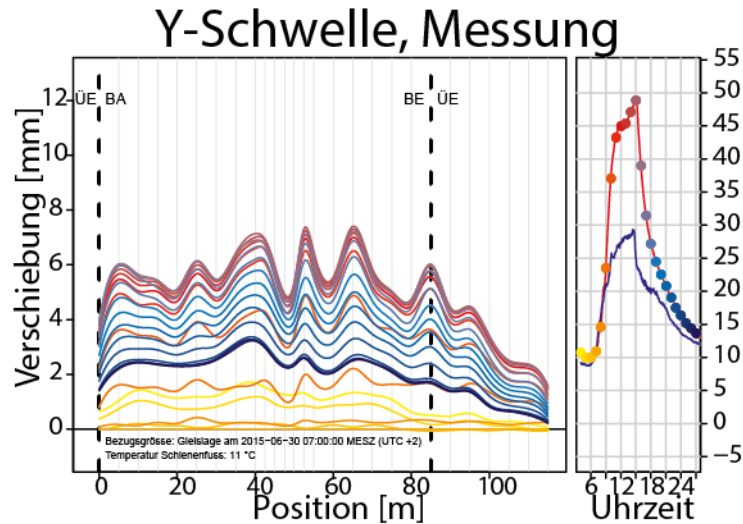
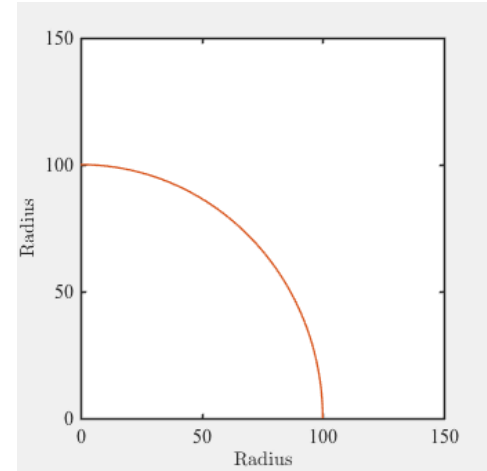
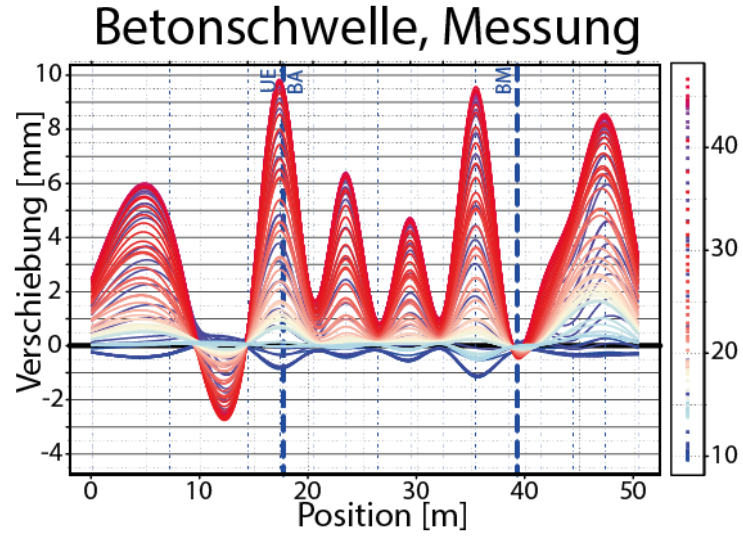
Large-scale track stiffness tests of different types of railway sleepers

Patrick Braess, Manuel Zimmermann

Curve breathing



Influence of track stiffness

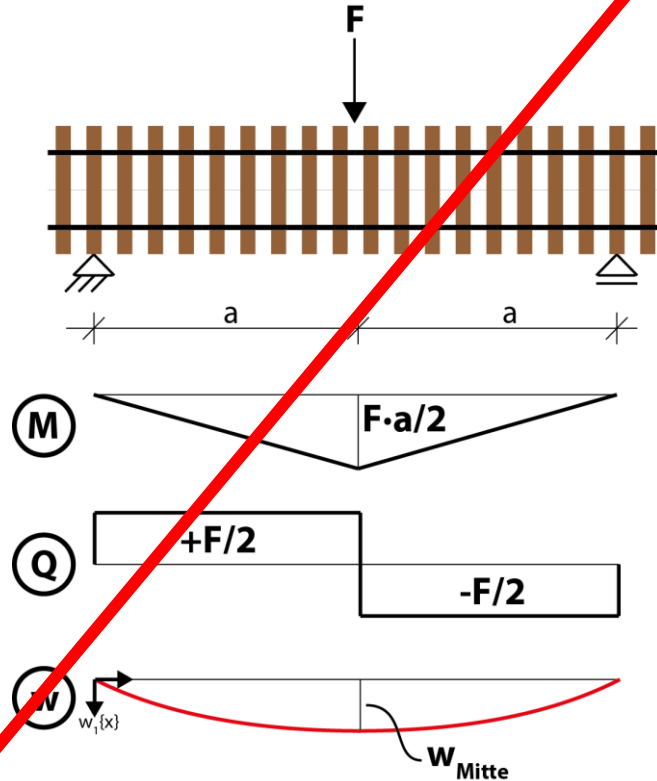


Track stiffness tests

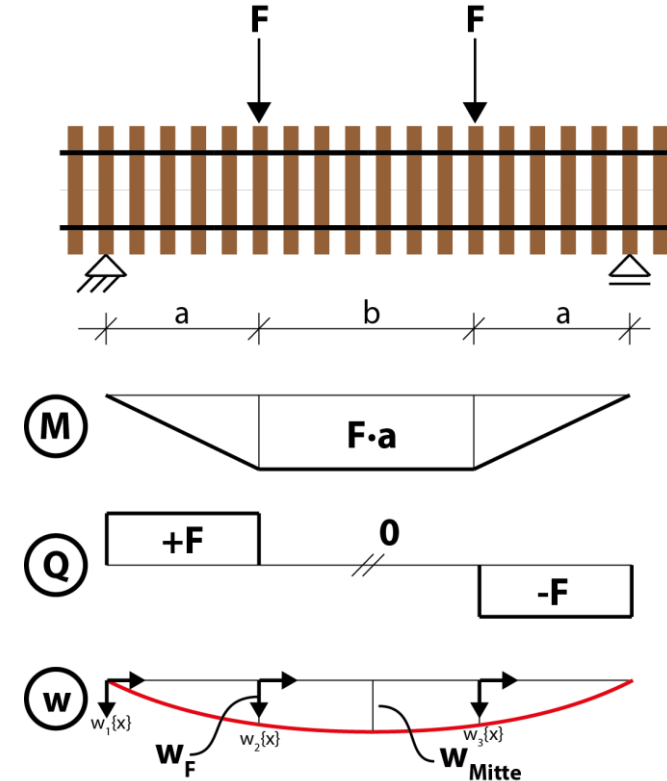


Test design

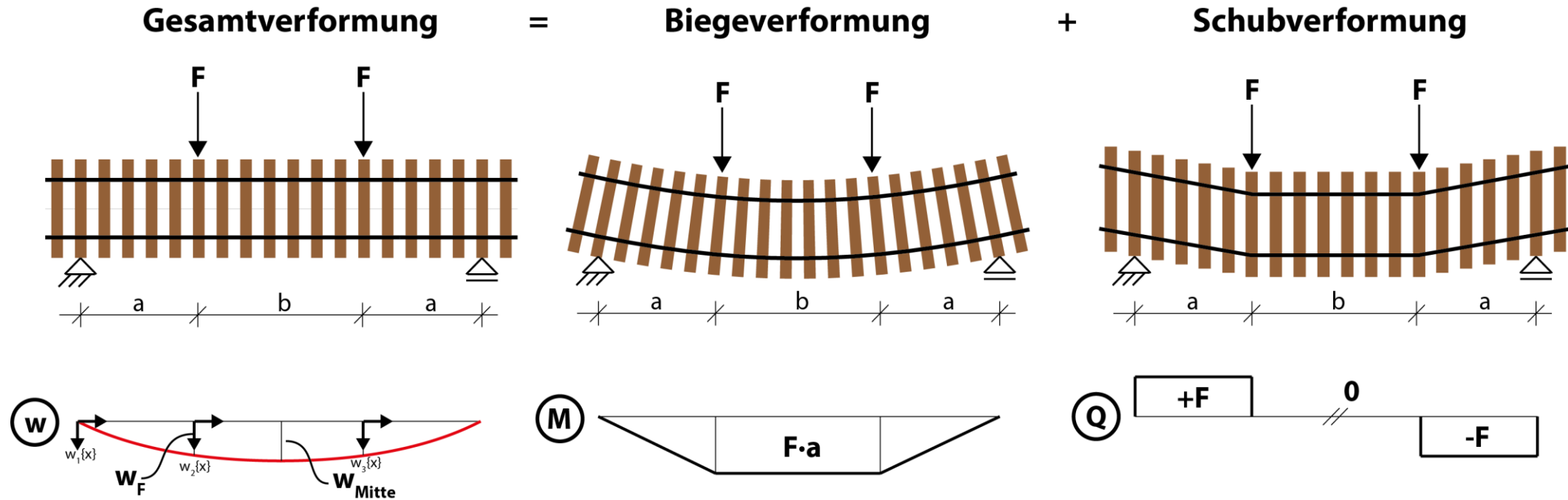
3-point bending test



4-point bending test



Deformation parts

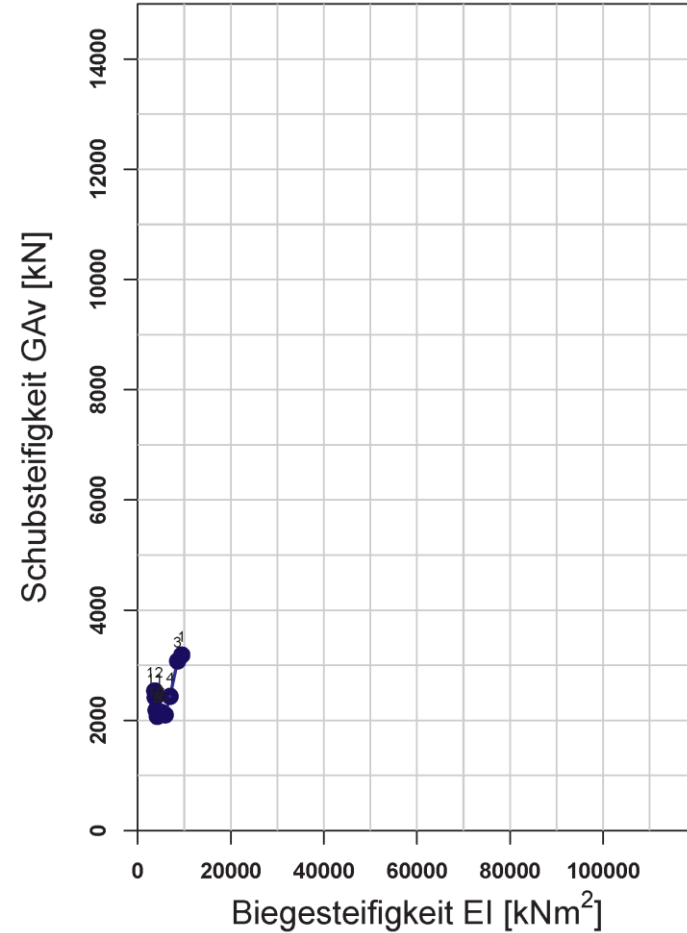
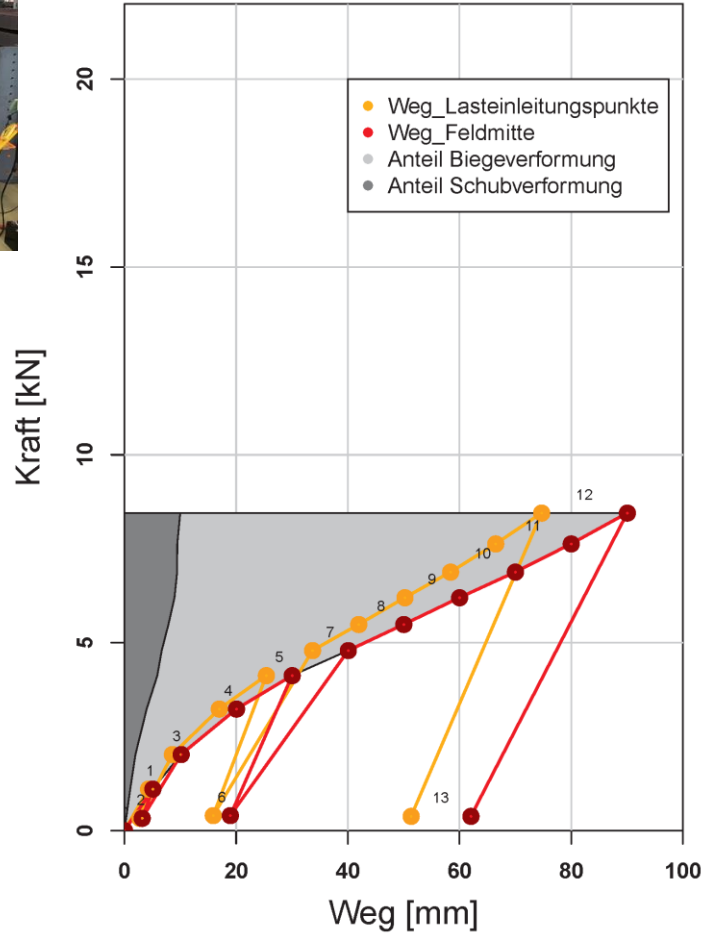


$$w = \frac{1}{EI} \int_0^l M_0 M_1 dx + \frac{1}{GA_v} \int_0^l Q_0 Q_1 dx$$

Concrete Sleeper

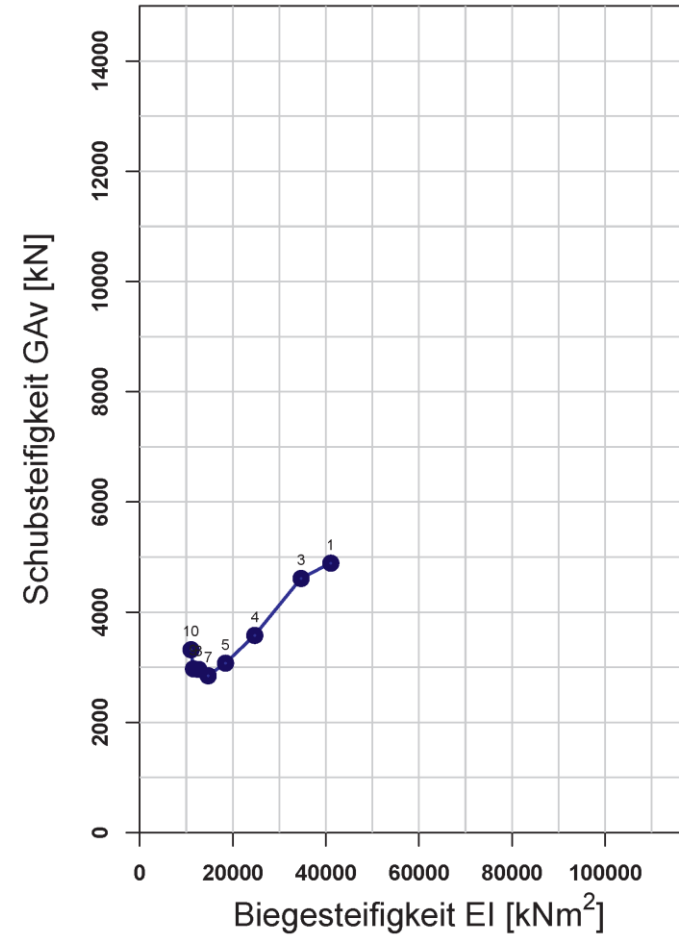
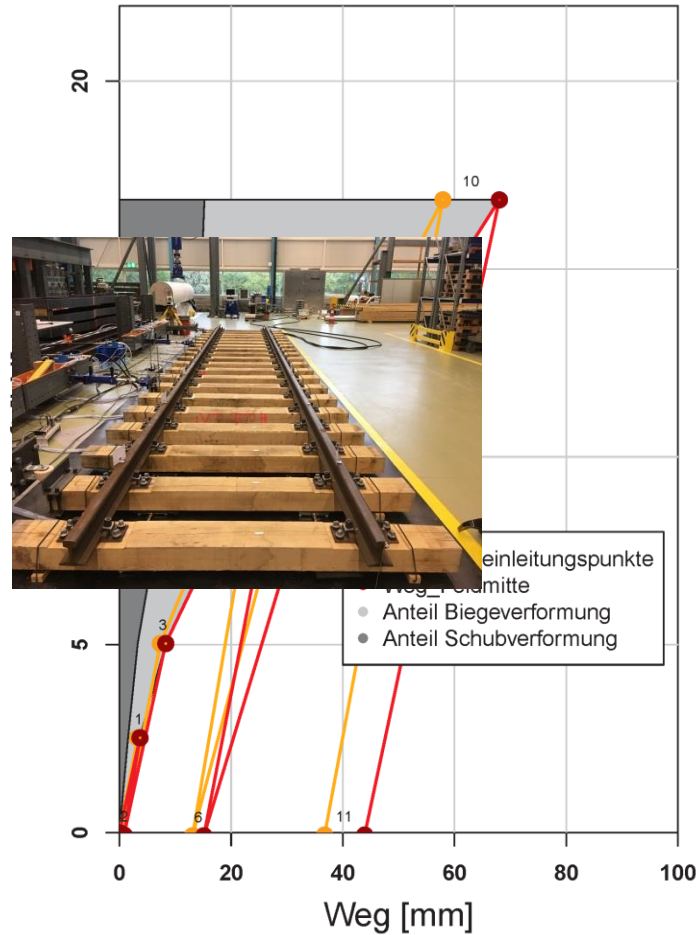


04.05.2017, B91, 1435 mm, 46E1, SkI3, 200 Nm, 600 mm

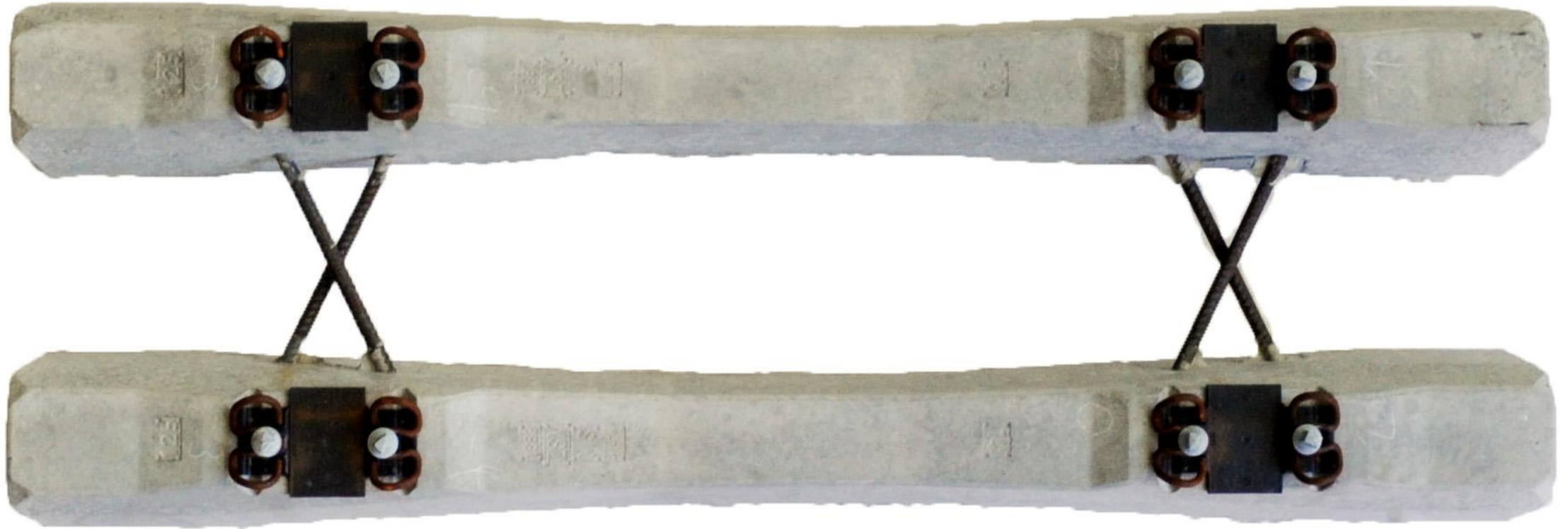


Wood Sleeper

27.04.2017, Holz, 1435 mm, 46E1, Kpo3, 200 Nm, 600 mm



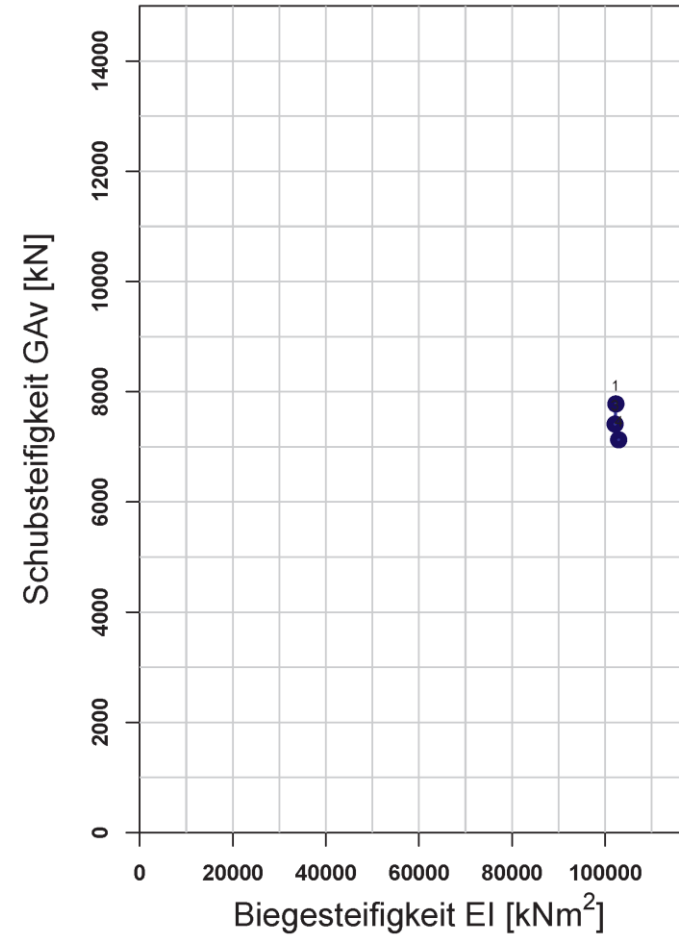
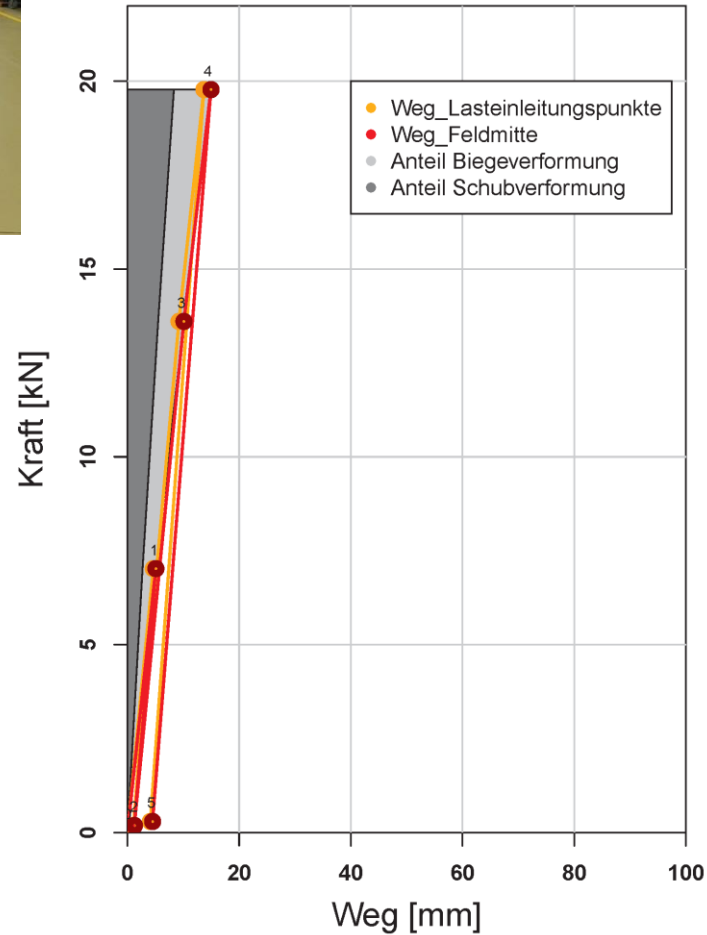
ZSX Concrete Sleeper



ZSX Concrete Sleeper



05.05.2017, ZSX, 1435 mm, 46E1, Skl14, 200 Nm, 600 mm

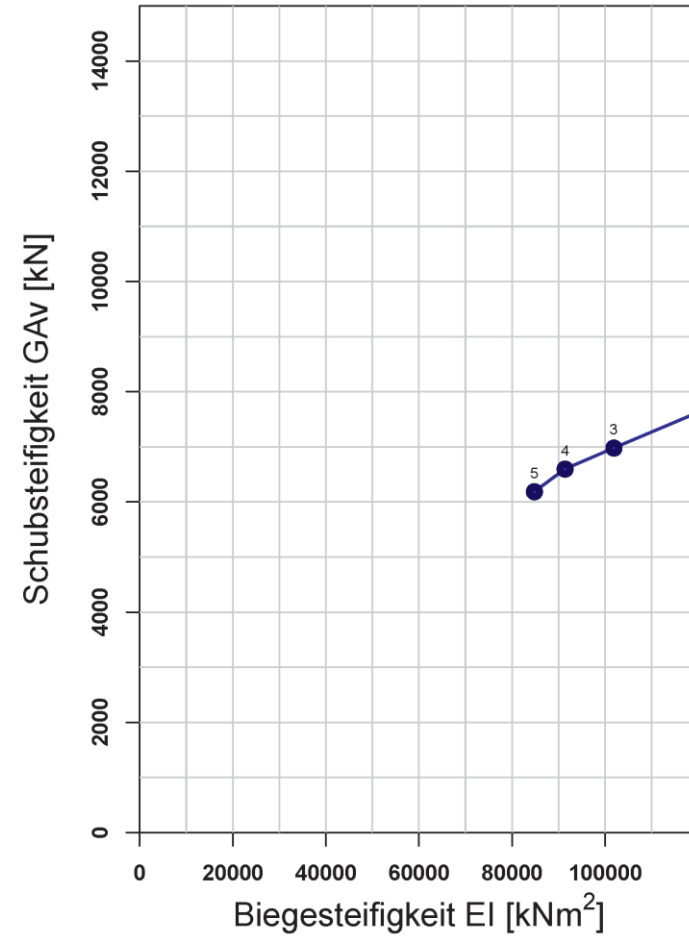
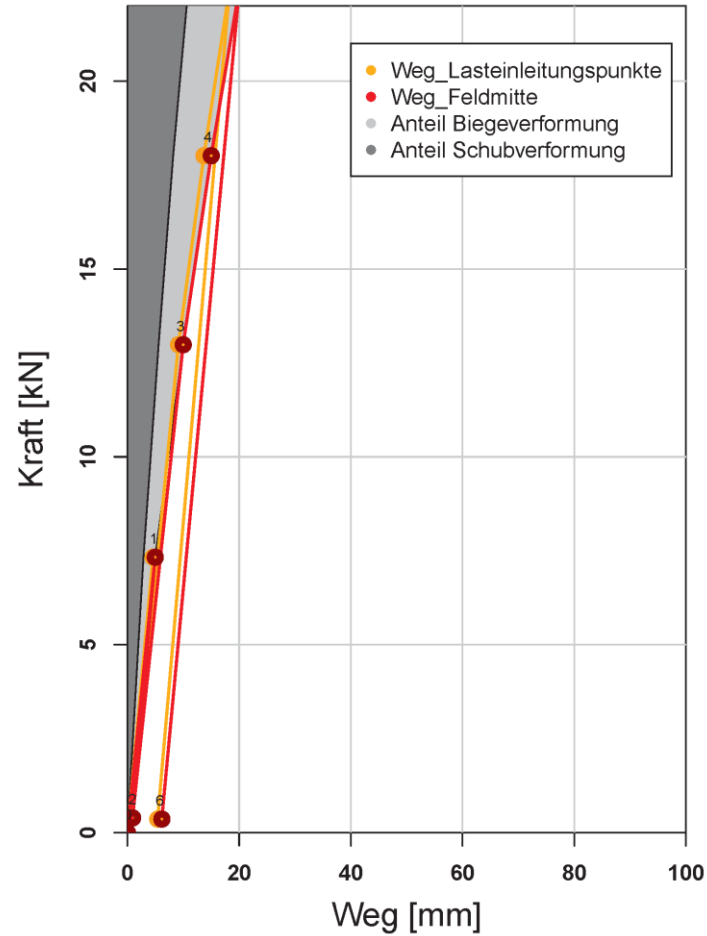


SDS – Steel double sleeper





31.05.2017, SDS, 1000 mm, 46E1, Kpo3, 200 Nm, 600 mm



Have a good ride!



Contact information and credits

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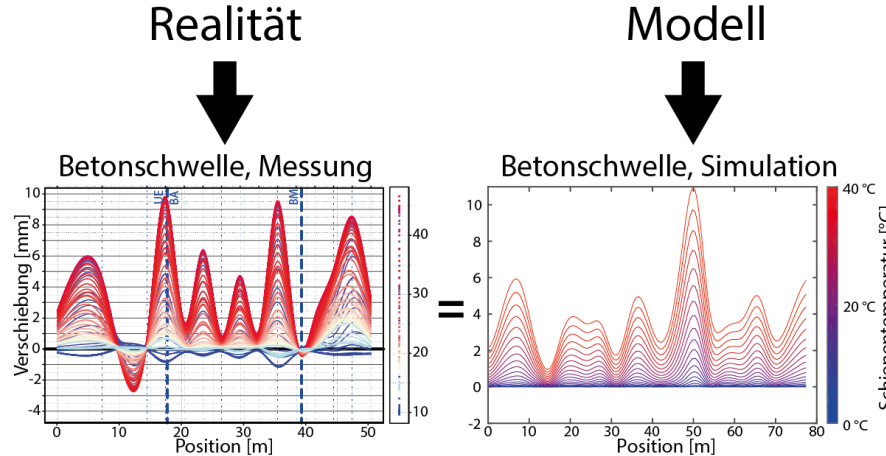
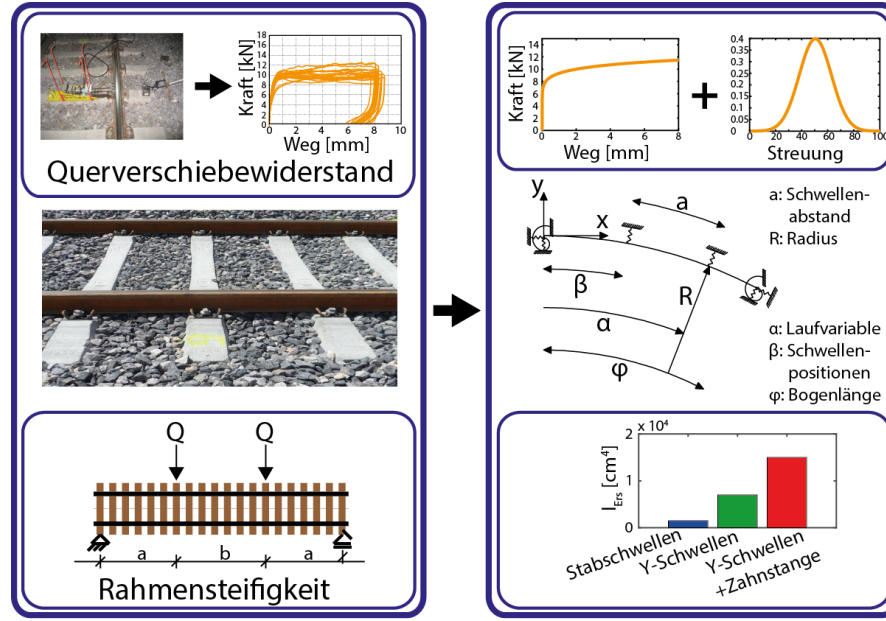
8093 Zurich

www.ivt.ethz.ch/

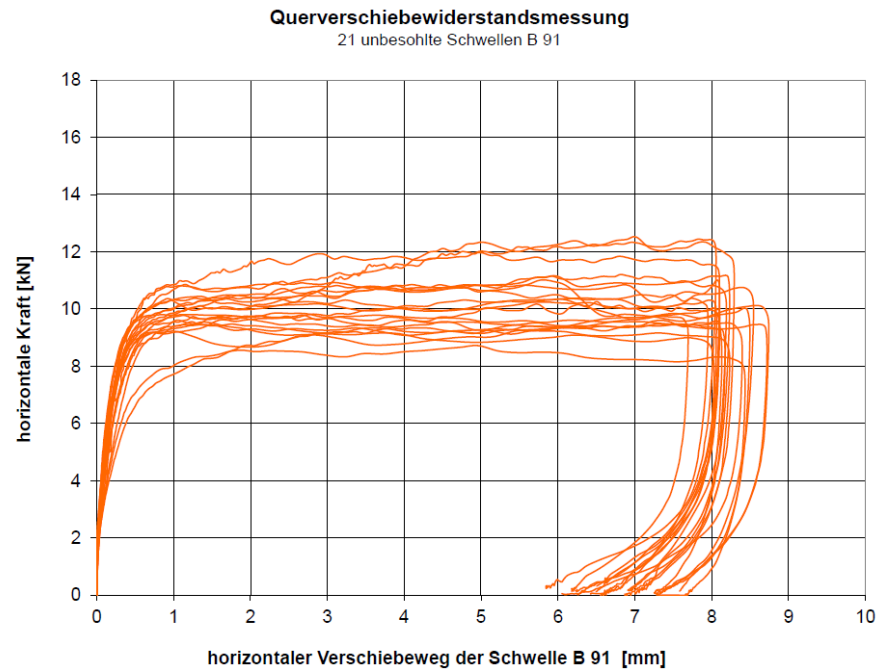
Images: All by author if not mentioned differently

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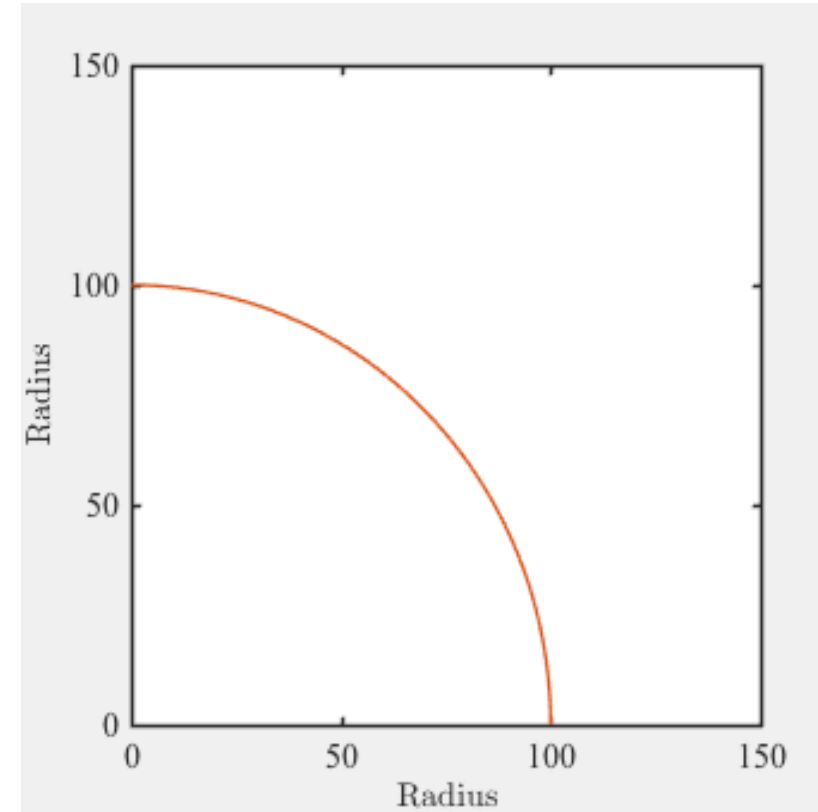
Theoretisches Modell



Theoretisches Modell

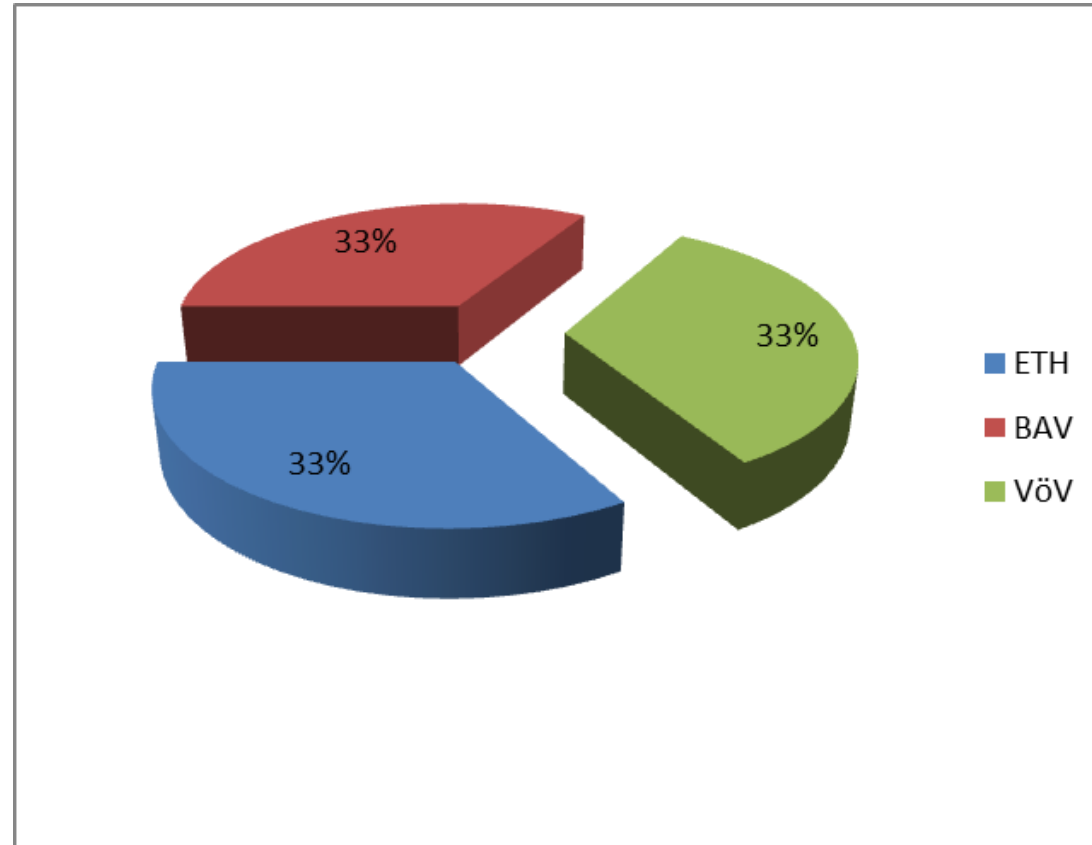


TU München, Bericht 3348

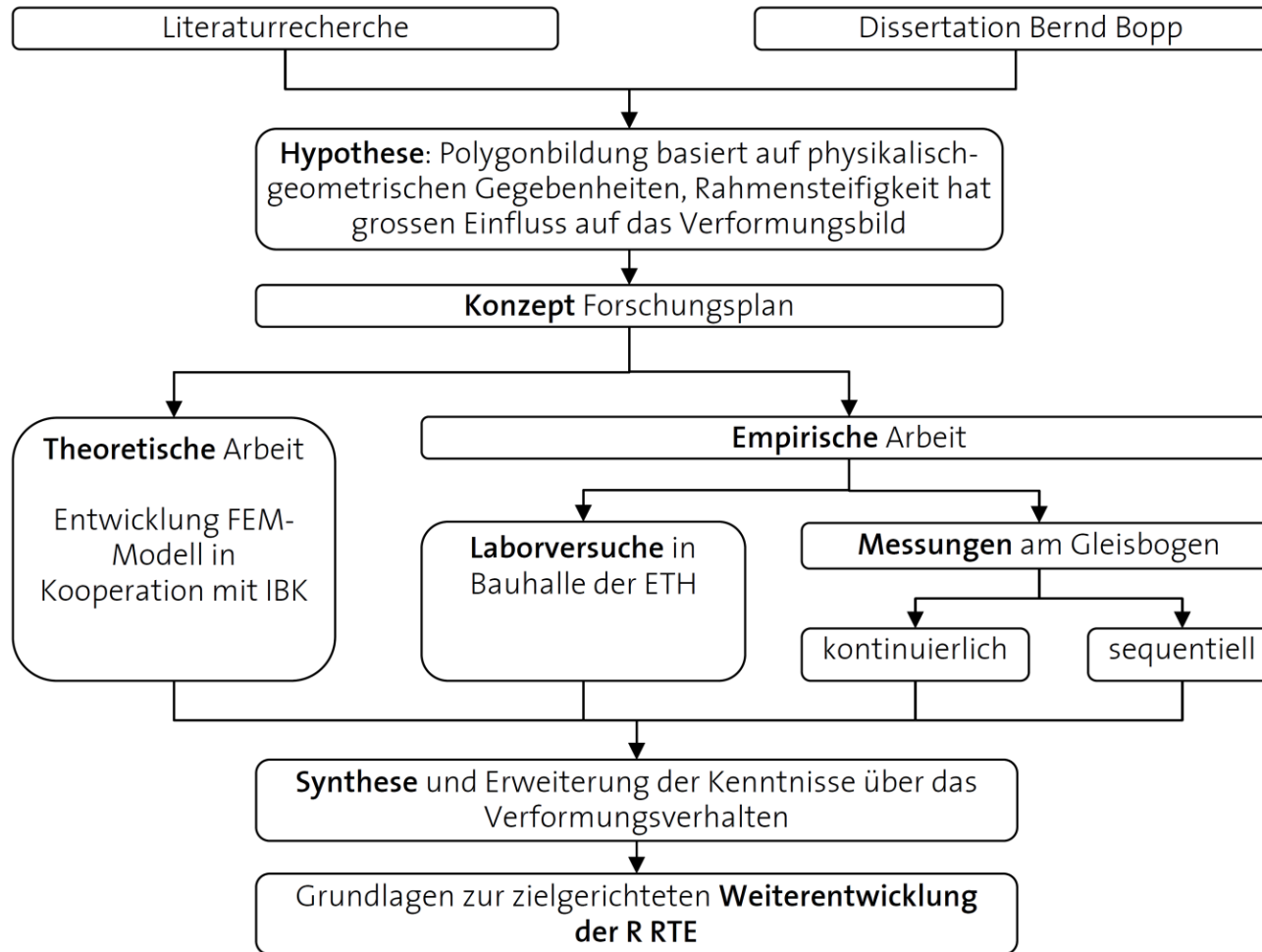


MA M. Zimmermann

Finanzierung

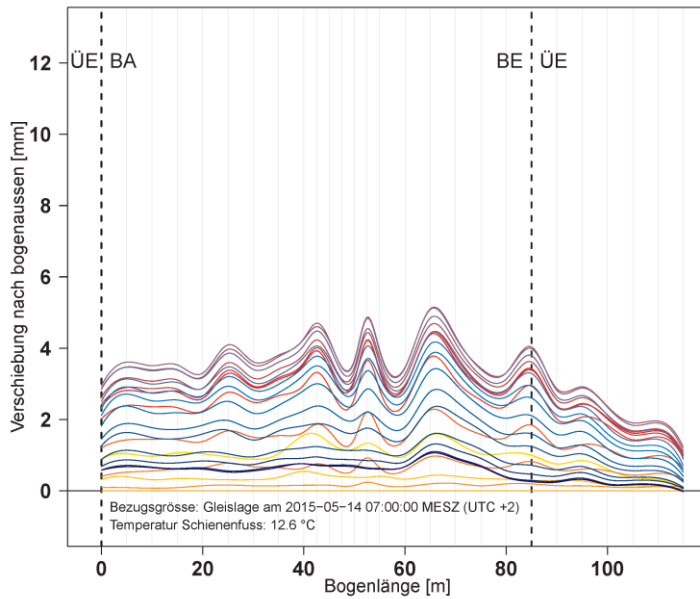


Forschungsplan

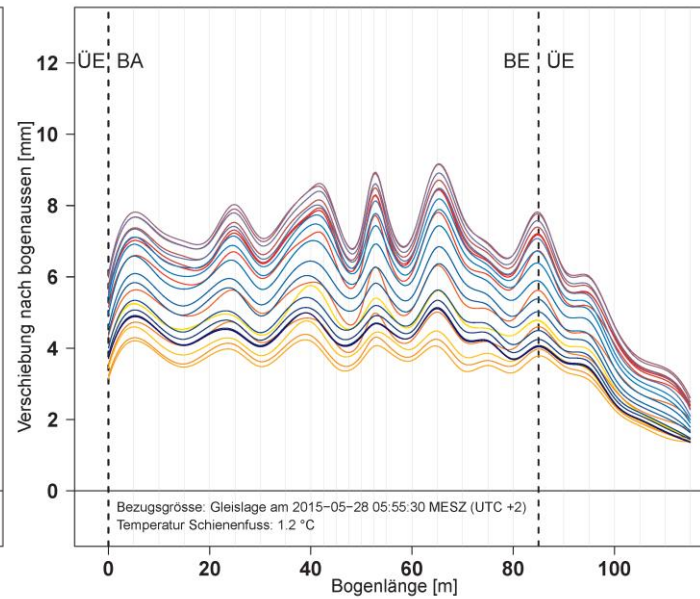


Suche nach der Nulllage...

Atmungszyklus 14.05. – 15.05.2015, stündlich, nach Stop



Atmungszyklus 14.05. – 15.05.2015, stündlich, nach Stop



Atmungszyklus 14.05. – 15.05.2015, stündlich, nach Stopfung

