

Selected topics in railway mechanics with focus on deterioration

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The lectures will be held via Zoom and will be in English. Each lecture is planned for two times 30–45 minutes with a 15-minute break in-between. The course has no examination and will give no credit points. It is possible to participate only in parts of the course. Those who attend the whole course may get a certificate of course participation.

For L1–L4 the knowledge prerequisites a general understanding of the meaning of basic solid mechanics concepts (stress/strain, plasticity, wear, fatigue)

For L5–L6 the knowledge prerequisites are comparable to a basic course in solid mechanics

L1 Introduction to the course and to railway mechanics (2020-06-23: 10–12)

Course overview and participants. Practical info.

Train–track interaction: Involved components. Forces, stresses in different parts of the system. Influencing factors.

L2 Short intro to mechanical deterioration (2020-06-23: 13–15)

Mechanical deterioration phenomena (plastic deformation, wear, fatigue). Overview and introduction to some relevant aspects of railway mechanics.

L3 Deterioration of track (2020-06-24: 10–12)

Mechanisms for deterioration of track components. Health assessment and influencing parameters.

L4 Deterioration of running gear (2020-06-24: 13–15)

Mechanisms for deterioration of running gear components. Health assessment and influencing parameters.

L5 Advanced prediction of deterioration 1 (2020-06-25: 10–12)

Plastic deformation and wear (with subsequent consequences), track buckling. Criteria, numerical modelling, potential pitfalls. Examples of applications.

L6 Advanced prediction of deterioration 2 (2020-06-25: 13–15)

Crack initiation, growth and fracture under different load conditions – numerical predictions and examples.