



Sweco\_6



## Thesis

### LCC for subsoil improvements for High Speed

#### Background

It is generally accepted that ballastless superstructure has a more advantageous life-cycle cost compared to ballasted track. This is due to the lower maintenance cost along the lifetime of the track, despite the higher initial cost of the ballastless systems.

However, it is less often discussed, that to construct ballastless track solutions, the subsoil quality must meet high requirements regarding stiffness. To achieve these conditions, extensive and expensive geotechnical improvements are necessary, such as piling the cost of which can easily be the dominant portion of the capital expenditure.

It is also often neglected, that in case of high-speed operations, the need for subsoil improvements are necessary in case of a ballasted track as well. These however are often of a lower cost, as the ballasted structure allows for more settlements compared to the ballastless track.

#### Aim and expected results

The thesis aims to create a comparison between these solutions and calculate life-cycle costs for essentially maintenance free ballastless track with costly geotechnical improvements and ballasted track with less expensive geotechnical solutions, but more maintenance expenses. A breakeven point is to be determined for different conditions.

Better reasoning for/against ballastless track or ballasted track supported by calculations.

Useful for any current and future High Speed projects.

The thesis is meant for two persons.

#### Company

Sweco plans and designs the communities and cities of the future. The results of our work are sustainable buildings, efficient infrastructure and access to clean water. With 15,000 employees in Northern Europe, we offer our customers the right expertise for every project. We carry out projects in 70 countries annually throughout the world. Sweco is Europe's leading architecture and engineering consultancy, with sales of approximately SEK 16.9 billion (EUR 1.8 billion). The company is listed on NASDAQ OMX Stockholm AB.

Sweco Rail collects Sweco's rail technology skills in track, electricity, signal and telecommunications. We provide design, design and specialist services - of all the components and technologies involved - for planning, construction, operation and maintenance of railroad traffic facilities.

#### Application

- *Period:* Spring or Autumn 2019

- *Scope:* 30 hp

- *Application deadline:* 2018-12-01

Send the application to [utvecklarail@sweco.se](mailto:utvecklarail@sweco.se) enter "Exjobb – LCC for subsoil improvements for High Speed" in the subject line.

#### Contact details

If you have questions contact: Veronika Sarik, [veronika.sarik@sweco.se](mailto:veronika.sarik@sweco.se) 070-376 38 19.

Examensarbeten och Master's Thesis inom järnväg är möjliga att genomföra på valfri högskola eller universitet. Gillar du något att uppslagen? Gör så här:

- 1) Identifiera en lämplig handledare på din högskola/ ditt universitet som vill ta sig an dig och ditt valda ämne.
- 2) Hör sedan dig till kontaktpersonen på företaget som ligger bakom uppsatsförslaget.

Välkommen till en bransch under stark utveckling där hållbarhet och samhällsbyggnad står i fokus.

*Om du är student på KTH; möjlig handledare*

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