



Business area Community

References

Listed below are some assignments where ÅF have been involved in noise and vibration predictions, measurements and reduction of vibration and structureborne noise from railbound traffic:

Arlanda Line Stockholm, Sweden

Prediction of structureborne sound levels in "Sky City" caused by trains in tunnels. Design of necessary measures in building constructions and rail vibration isolation in order to reduce noise.

New National Theatre Station Oslo, Norway

Measurement of vibration insertion loss for different rail suspension constructions in a train tunnel and a underground train tunnel at the National Theatre. Design of technical solutions for the reduction of structureborne sound and vibration from tracks for heavy trains in order to fulfil theatre performance requirements.

Southern Station Stockholm, Sweden

Design of sound/vibration reduction measures on existing train tracks and for a planned residential building above. The supporting constructions for the building are forming a tunnel including a railway station below the house. Resilient damping pads are used to completely separate the upper parts of the building construction from the vibrations in the supporting columns and beams. Very low sound levels (< 30 dBA) from passing trains are measured in apartments.

Train Tunnel ("City tunnel"-project) Malmo, Sweden

Preliminary study of noise and vibration impact on existing buildings for a planned train tunnel under the central parts of Malmo. Residential buildings, a large number of hospital institutions, hotels and Malmo Musical Theatre are located immediately above the tunnel. Two separate tubes will be bored in the limestone rock substructure. Design of alternative vibration isolation constructions for the rail support (ballastless tracks) has been made to will meet the required structureborne sound limits for different types of buildings. Cost calculations are included.

Train Tunnel project Copenhagen, Denmark

Project studies for capacity increase of railway line Copenhagen - Ringsted including a tunnel connection in drilled or cut-and-cover design. Prediction was performed of expected vibrations and structureborne noise in existing buildings above the tunnel and compared to ground vibrations from traffic on rail at grade. Where vibration reduction is needed, the appropriate measure is specified.

Metro in Bilbao, Spain

An analytical/empirical prediction method has been developed; expected vibrations and structureborne sound levels in existing buildings could be calculated. The Metro train tunnel is bored in sandstone substructure, also supporting the buildings.

Gardermo Line Oslo, Norway

Planning of a new high-speed railway line. Prediction of ground vibrations in the vicinity of the tracks, using analytical and empirical prediction models. Comparison between predicted and measured vibration propagation results for different types of soil. Compilation of available methods for reducing low frequency ground vibrations from trains.

The Soderstrom bridge Stockholm, Sweden

Studies of a new bridge construction in order to optimize the acoustical design. SEA analysis was made of the bridge as a steel or concrete construction resp. Testing and compilation of damping methods using viscoelastic products or construction features.

"Kringen" tramway tunnel Gothenburg, Sweden

A tramway tunnel is built under a central area of Gothenburg, passing very vibration sensitive institutions at Chalmers University of Technology (i. a. the Micro Electronics Laboratory), a hospital and a large number of residential houses. The two tunnel tubes are running through the bedrock substructure; nearly all buildings are founded on the rock. Predictions of vibration and structureborne noise levels were using input data from measurement results in an existing tunnel. Advanced constructions for the isolation of wheel/track induced vibrations were needed and a floating slab-track solution was designed for the whole length of the tunnel (2 x 1100 m).



Furthermore, predictions and control of construction noise (structureborne noise from rock-drilling) has been included in the assignment.

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Residential houses Stockholm, Sweden

New residential houses are currently built above or close to underground railway tunnels in Stockholm. We are very often engaged to perform vibration and noise measurements in existing buildings which will be replaced by the new ones. The results are used as a basis for designing necessary vibration isolation measures so as to meet required limits for the new buildings. In this design we are taking account of the construction system of the new building (masonry floors and walls or lightweight framework etc).

Train tunnel (NÄL) Trollhättan, Sweden

Structureborne sound will be induced in the hospital near a planned train tunnel. In cooperation with the National Rail Administration and the County Council we have made an assessment of expected disturbances and a study of relevant criteria to apply in the planning process.

Train bridges at Drammen, Norway

SEA analysis and calculations of noise radiation from train bridges (trough construction in steel/concrete). Comparison with noise radiation from train passages on rails at grade.

