

TWINS

Track Wheel Interaction Noise Software



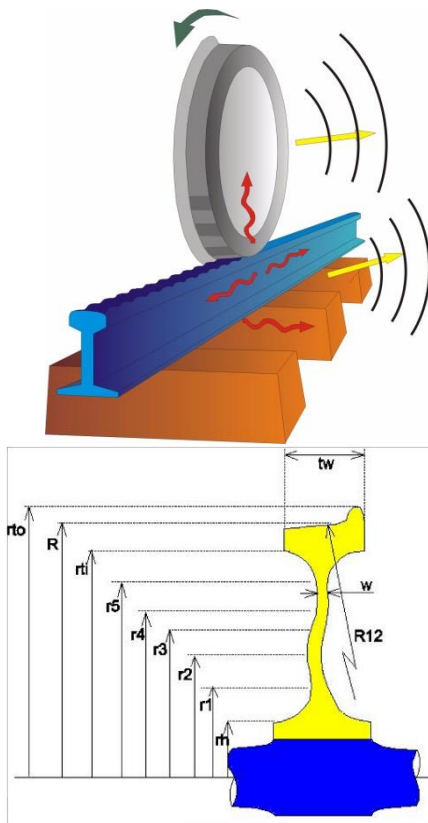
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A TOOL FOR LOW NOISE DESIGN OF TRAINS AND TRACKS

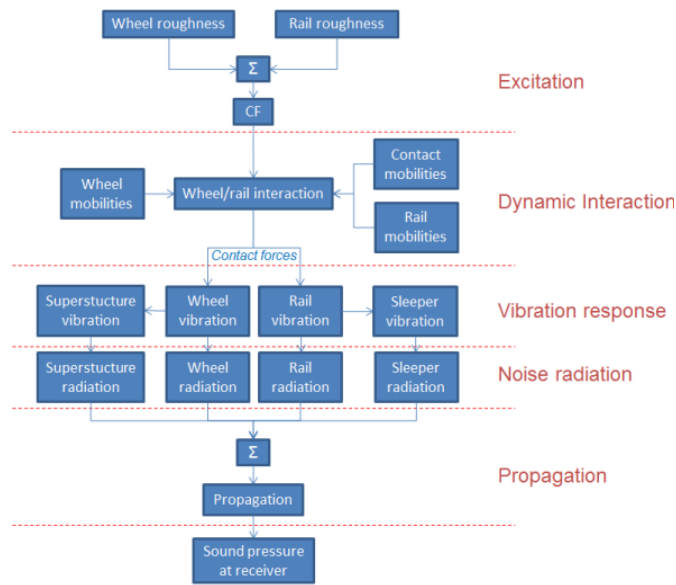
TWINS is currently the most comprehensive and widely used calculation model for assessing the acoustic effects of wheel and track design on railway rolling noise.

In the TWINS software, the user can specify the design of wheels and track, using numerical inputs including finite element data. TWINS calculates vibration levels and sound emission of wheels, rails and sleepers during a train pass-by. Wheel and track surface roughness spectra are also inputs. The resulting sound power and sound pressure levels can be presented in one-third octave plots. As well as this, more detailed calculation results on wheel/rail dynamics and acoustics are available, such as dynamic contact forces, wheel vibrations and track decay rate.

- TWINS is a unique software package pointing the way ahead in designing wheels and track systems to minimise noise generation.
- TWINS enables railways, the supply industry, consultants and researchers to optimise component performance in the development of quiet railway systems.
- TWINS is internationally acknowledged and fully validated for a wide range of railway operations and available under license.
- TWINS predicts railway rolling noise by combining surface roughness with the dynamic properties of wheels, rails and track systems.
- TWINS results are compatible with noise measurement standards such as EN ISO 3095:2005 and others.



Generation, transmission and radiation of wheel/track rolling noise, the TWINS model and wheel geometry



EVALUATING ROLLING NOISE

The noise during the pass-by of a rail vehicle can generally be a mixture of rolling noise, traction and auxiliaries noise and aerodynamic noise. In many situations, however, the rolling noise is the predominant sound source. Rolling noise is generated by the wheel and rail surface roughness or waviness, which causes dynamic interaction forces in the wheel/rail contact patch.

The dynamic interaction forces generate vibrations in both wheels and track. The vibrating wheels and the track in turn radiate sound. The strength of the sound generated in this way by the wheels and the track depends on the design of both.

EVALUATING DESIGN

Using TWINS, the effects of many design parameters can be assessed:

- Wheel and rail geometry
- Materials
- Effects of train speed
- Rail fastener system

- Wheel/rail surface conditions
- Damping of wheels and rails
- Shielding close to wheels and track

DEVELOPMENT

TWINS was developed mainly in the 1990s and extensively validated by various research institutes in cooperation with a number of European railway and rolling stock companies.

The main partners are UIC, DeltaRail Group Limited, SNCF, ISVR and TNO. The development was performed in a series of research projects funded by ERRI and later in European Projects such as Silent Track and Silent Freight.

TWINS is currently maintained as commercially available software by TNO. The current version of TWINS is 3.3, available for Windows 7(x64).

CONTACT DETAILS

TNO.NL

TNO
Oude Waalsdorperweg 63
2597 AK Den Haag
The Netherlands

Erwin Jansen
T: +31-888 666 345
E: erwin.jansen@tno.nl

Michael Dittrich
T: +31-888 666 544
E: michael.dittrich@tno.nl