

Railway Noise

The European Perspective

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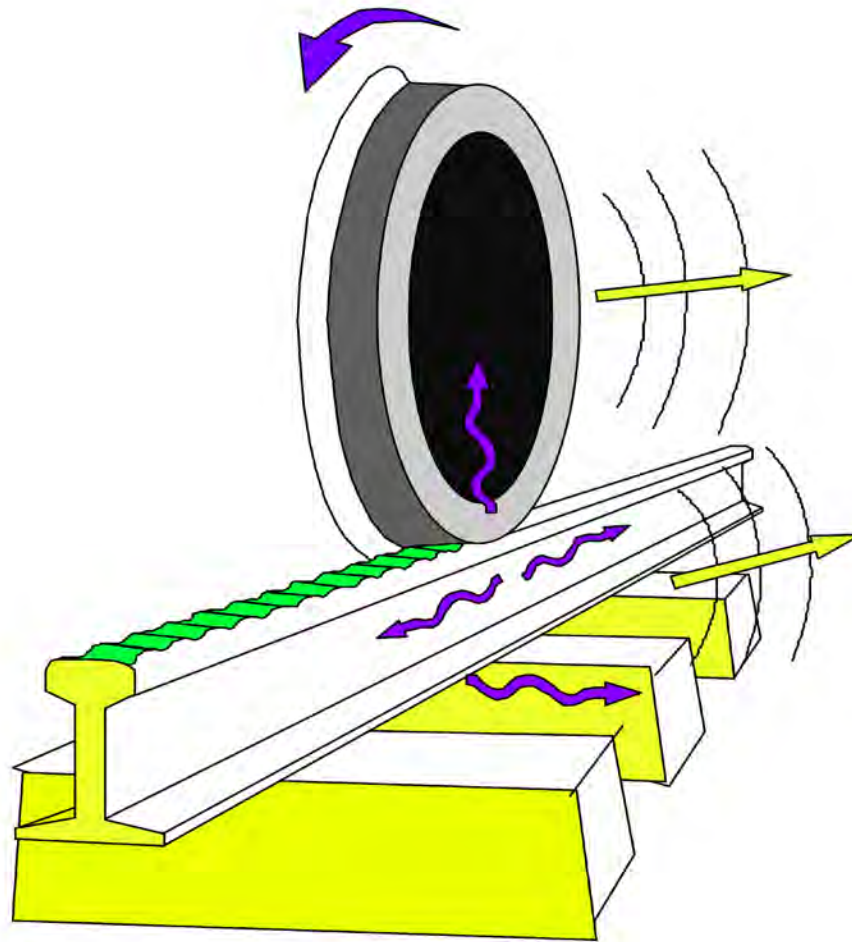


history

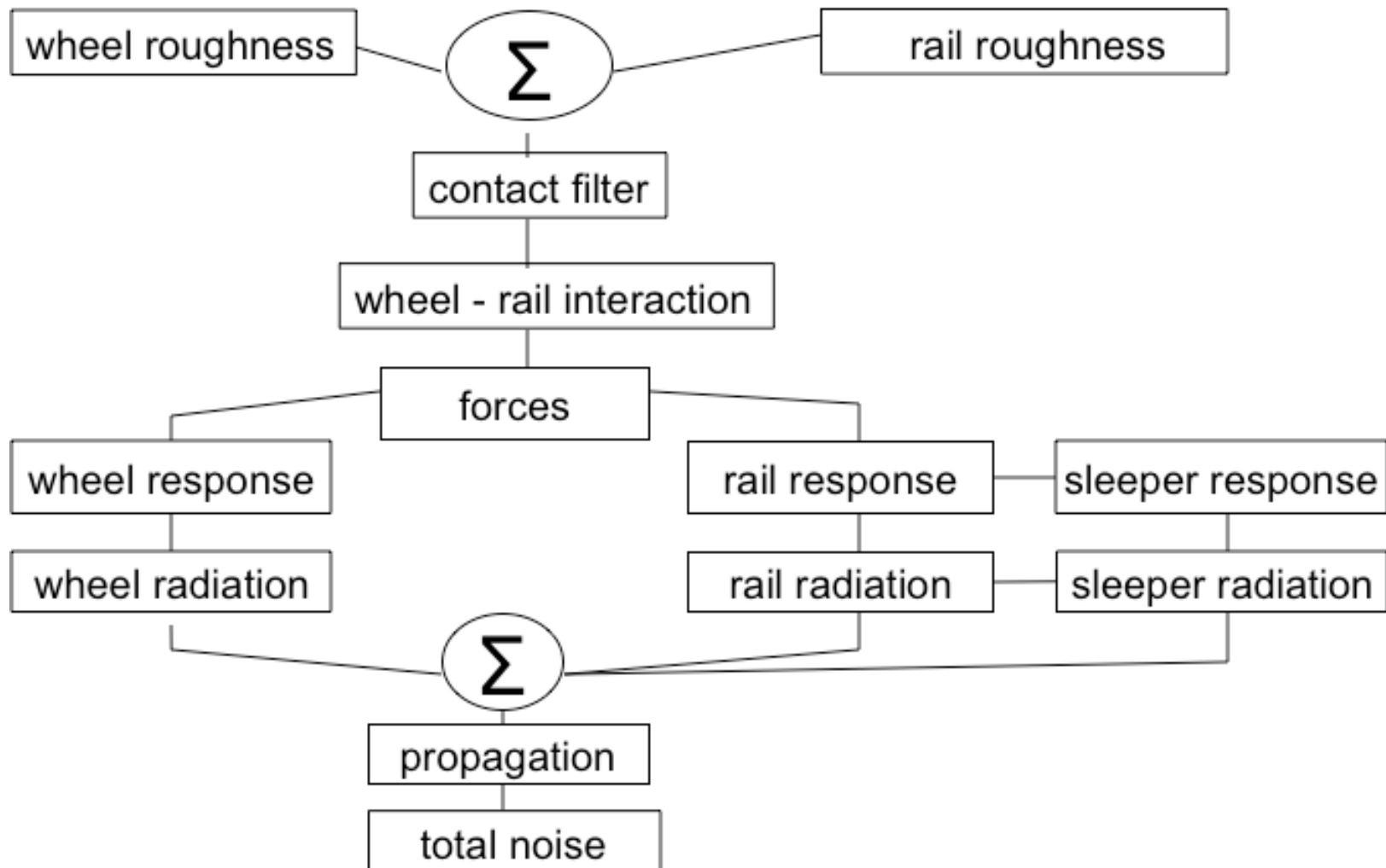
- ORE Committee C163 “Railway Noise” (1981 - 1996)
- EU Project “Silent Freight” (1996 – 1999)
- EU Project “Silent Track” (1997 – 2000)
- EU Project “Silence” (2005 – 2008)
- Dutch IPG Project (2002 – 2007)



rolling noise



TWINS Rolling Noise Model



rolling noise

Is it the wheel or is it the rail?



rolling noise control options

- reduce the force
- reduce the response
- reduce the radiation
- increase transmission losses



rolling noise control options

- reduce the force – smooth wheels and rails
- reduce the response
- reduce the radiation
- increase transmission losses



wheel roughness



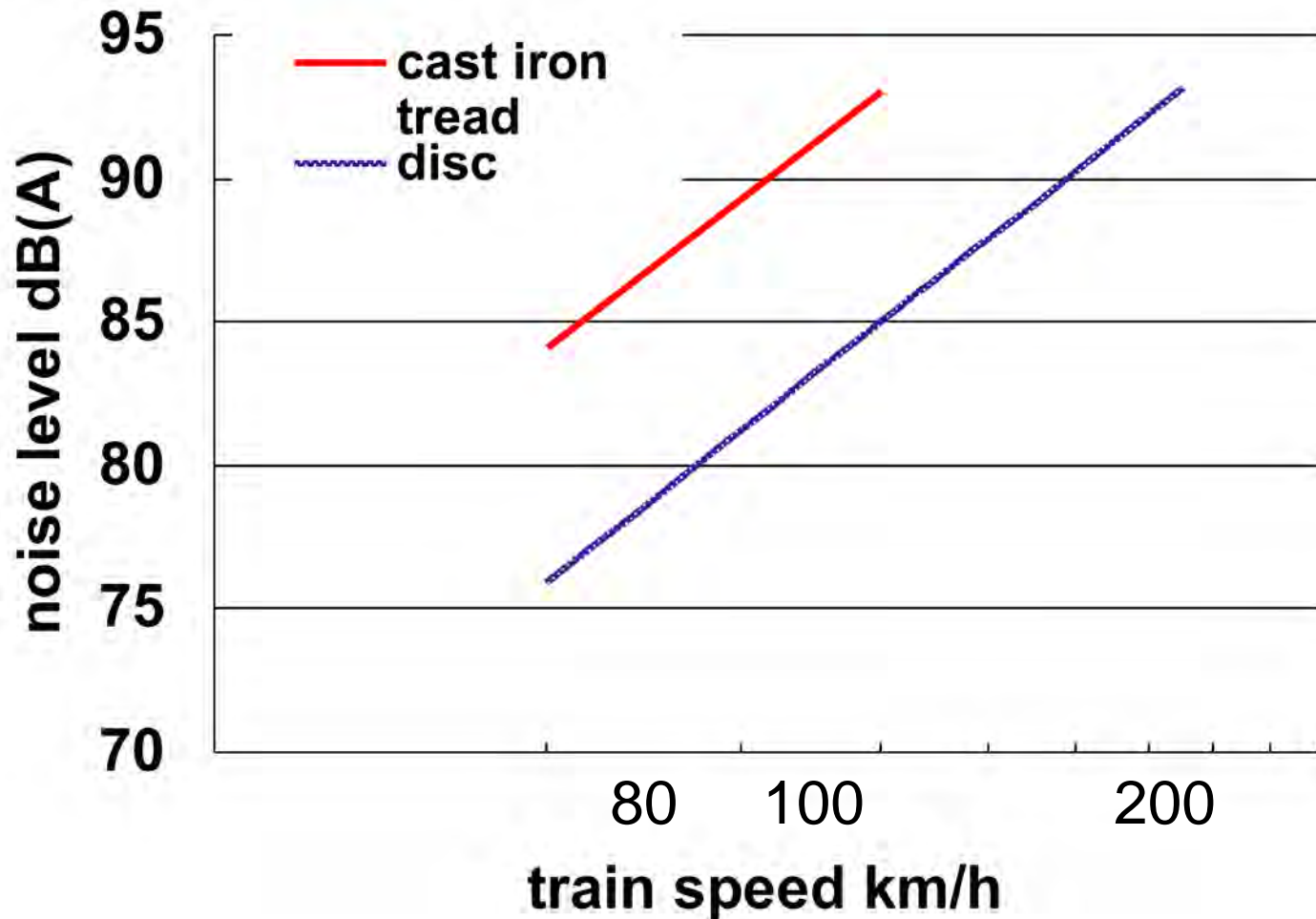
cast iron tread braked



disc braked



Rolling Noise



rail roughness

assume it is naturally forming and not controlled by design features

corrugation can increase noise levels by up to 20 dB(A) for smooth wheeled vehicles

retention of smooth rails – I leave that to the grinders!



rolling noise control options

- reduce the force – smooth wheels and rails
- reduce the response – increased damping
- reduce the radiation – shape factors
- increase transmission losses



methodology

- Define required dynamic properties with TWINS
- assess/review designs with laboratory tests
- validate the process with full scale testing of prototype designs



wheel tuned absorbers

- reduce wheel web vibration



wheel tuned absorbers

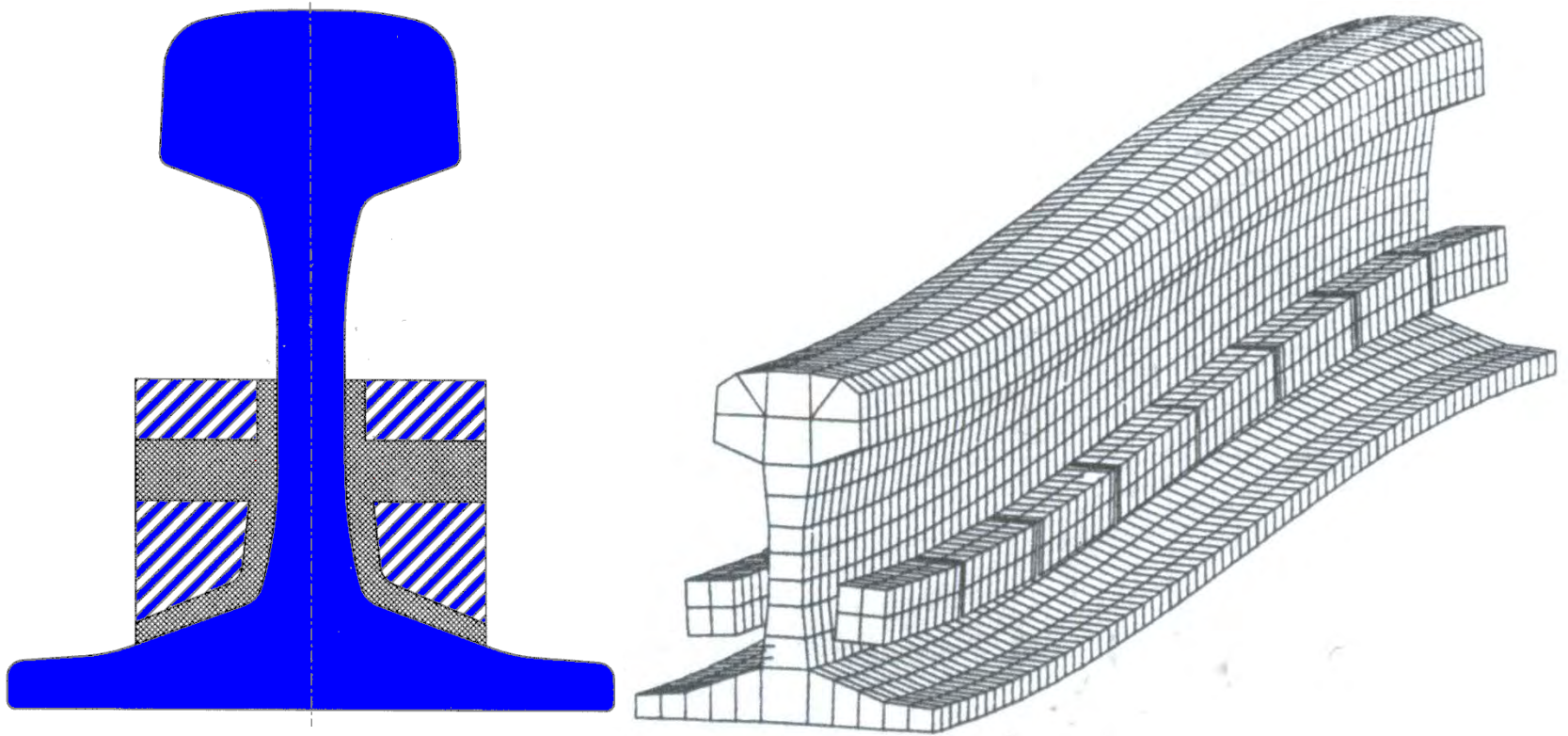


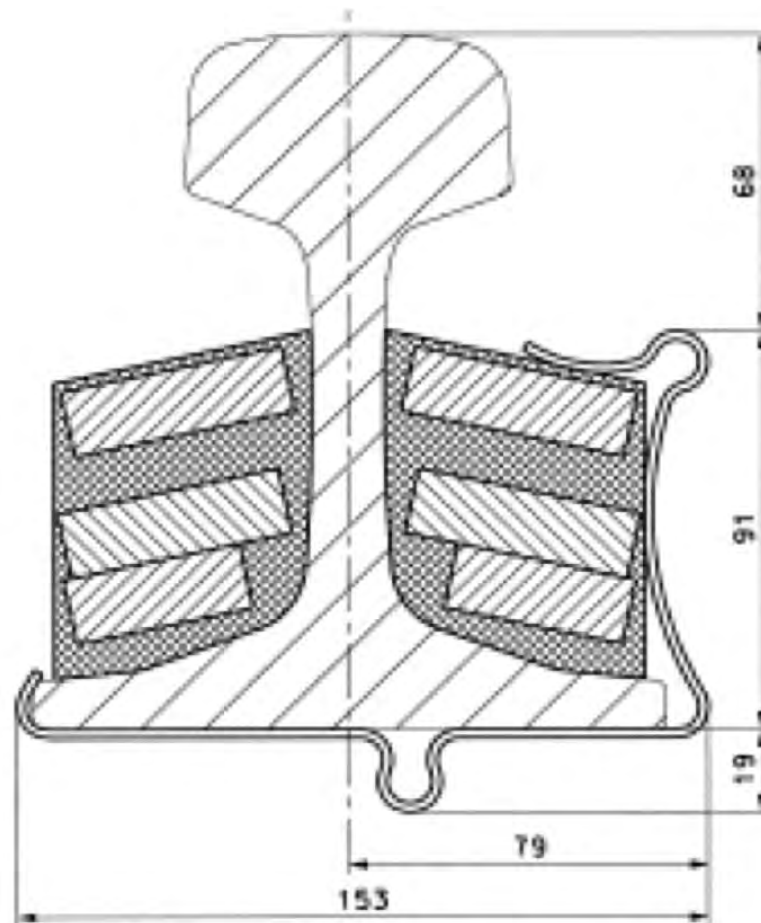
rail tuned absorbers

- increase decay of vibration away from contact point



rail tuned absorber





**SECTION THROUGH 54E1 RAIL AND DAMPER
SHOWING CLIP ONE SIDE ONLY FOR CLARITY**

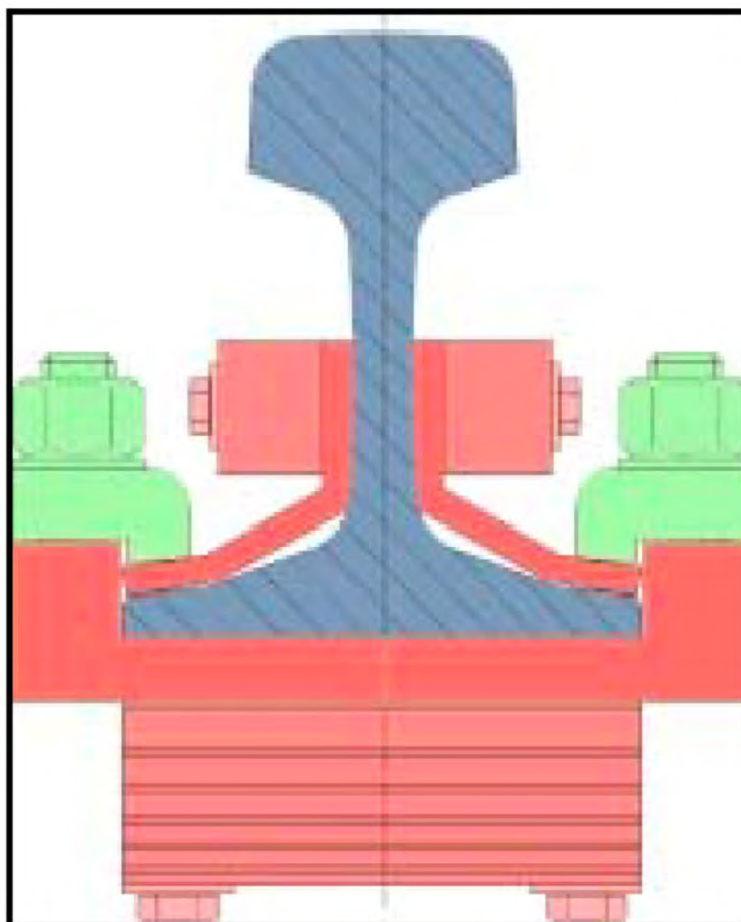


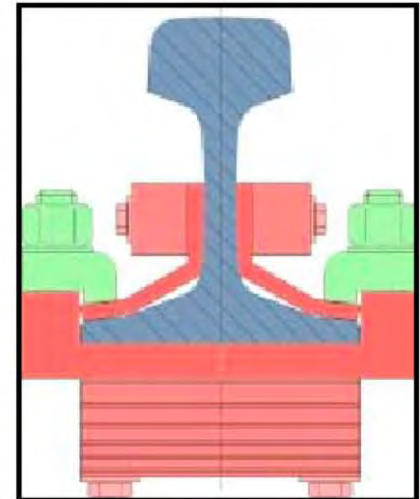
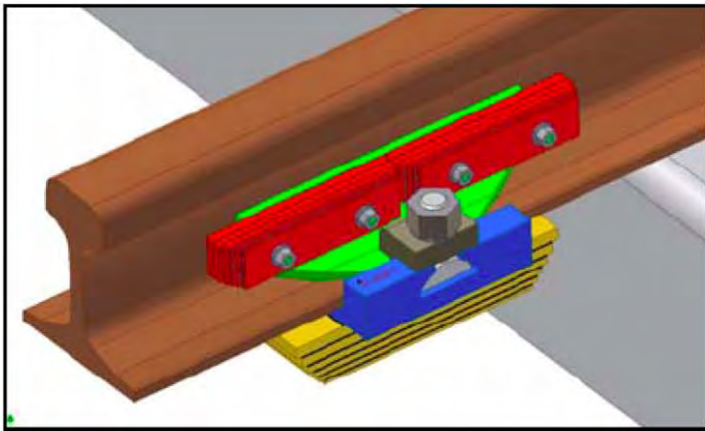
clipped rail tuned absorber



rail dampers in use







rolling noise control options

- reduce the force – smooth wheels and rails
- reduce the response – increased damping
- reduce the radiation – shape factors
- increase transmission losses



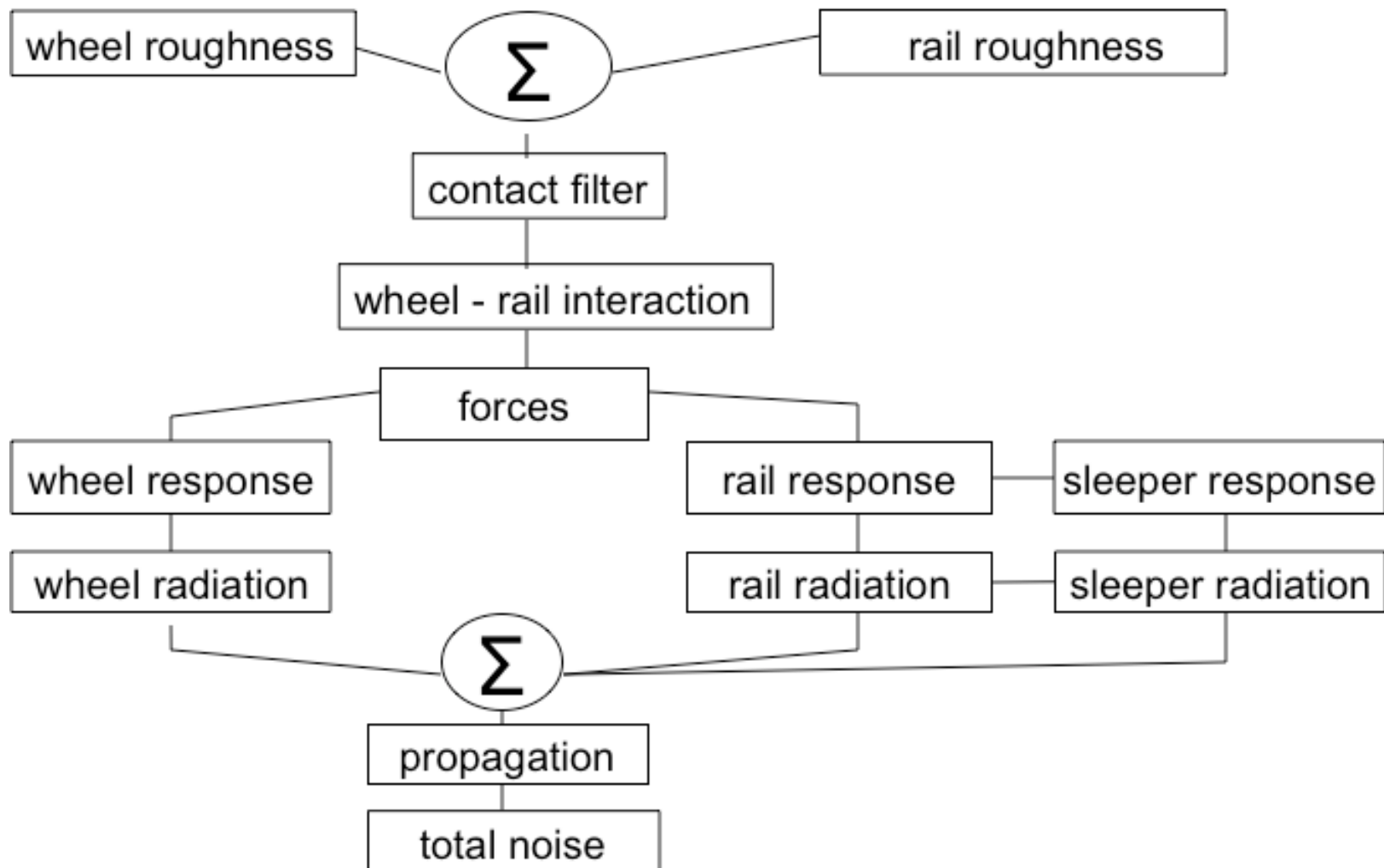
reduce the radiation – shape factors

- symmetrical wheel cross section
- reduced wheel diameter
- reduced rail cross section

Limited success compared to other options



TWINS Rolling Noise Model



rolling noise control

- reduce the force – smooth wheels and rails
- reduce the response – increased damping
- reduce the radiation – shape factors
- increase transmission losses - barriers



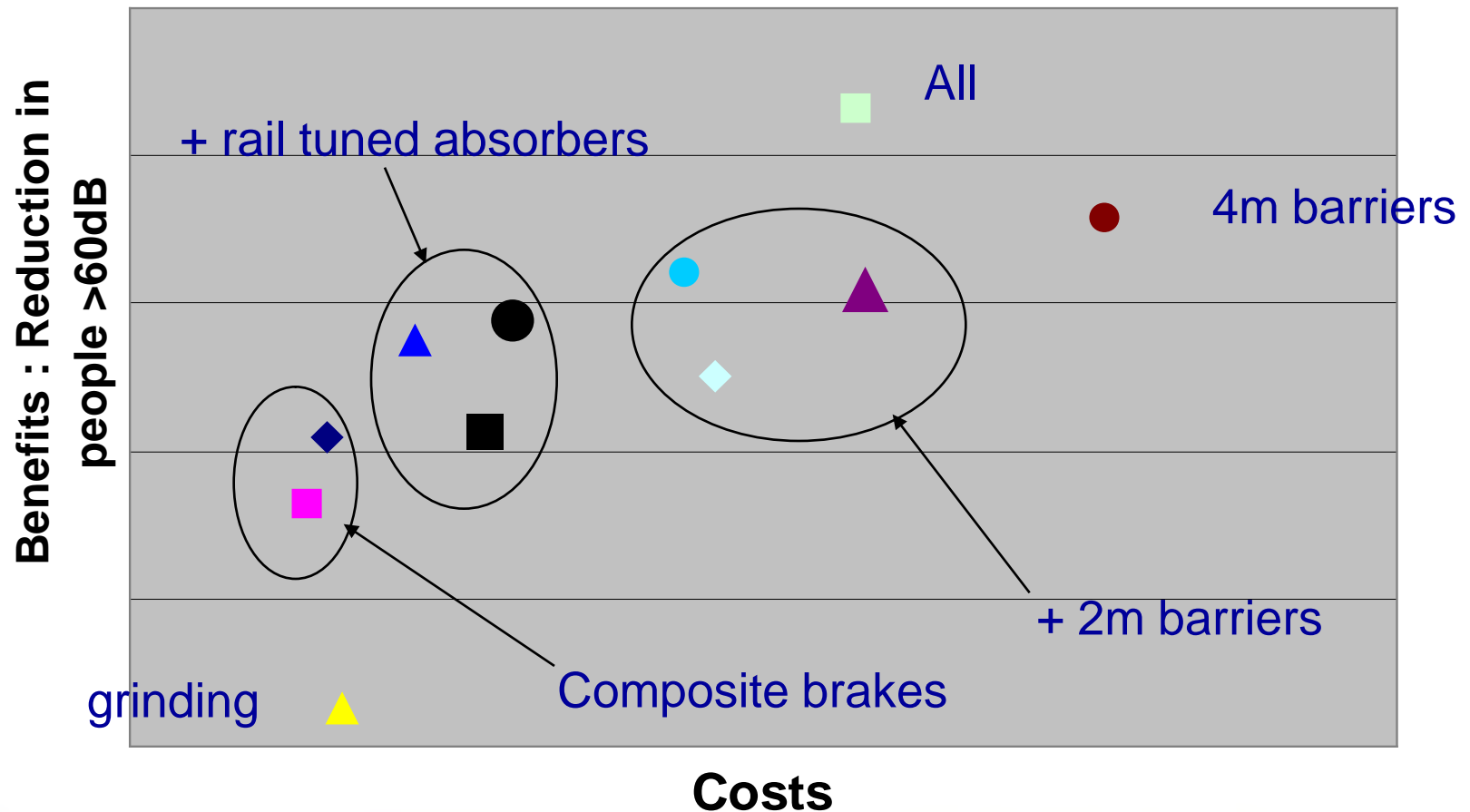
wheels web shields



bogie shroud and low barrier



Cost effectiveness analysis (STAIRRS)



If all else fails you may need to resort
to lineside barriers

they work (unfortunately)



Dutch road noise barrier



Thank you for your attention

