PANGUARD™

In cases where it is necessary to attenuate noise and vibration levels in order to satisfy environmental requirements the Pandrol PANGUARD system provides an economical answer. The system provides exceptional noise and vibration reduction and is of particular value in tunnels, on bridges, elevated structures and on other concrete or timber applications.

The PANDROL PANGUARD system allows large vertical deflections while minimizing rail roll. The system suspends the rail from the web with resilient blocks.

PANDROL
TRACK SYSTEMS
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PANGUARD™

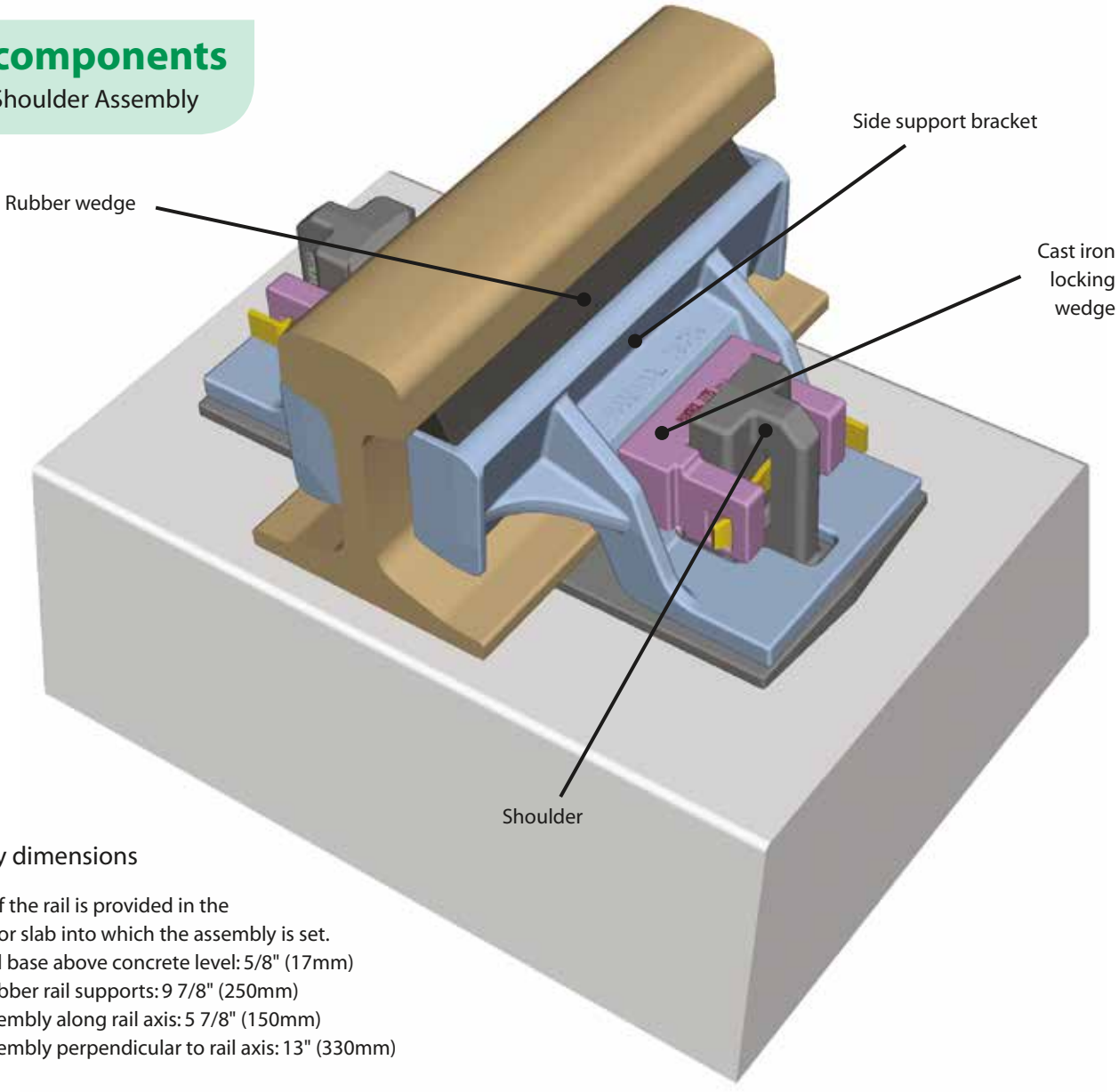
In vibration and noise sensitive areas, most track designs in use around the world work on one of two principles to reduce groundborne vibration – either by increasing the mass of the resiliently supported track structure or by reducing the stiffness of the support. The lower the track stiffness which can be achieved, the lower the resonant frequency becomes, and the better the vibration attenuation which results. But before the Pandrol PANGUARD system, large vertical deflections also resulted in unacceptable lateral movement of the rail head.

The Pandrol PANGUARD system provides an assembly with very low vertical stiffness and minimal rail roll while delivering exceptional vibration and noise reduction.

In the Pandrol PANGUARD assembly, the rail is supported under the head and in the web with large rubber wedges, leaving the foot of the rail suspended. The rubber wedges are held in place by cast-iron side brackets which are in turn fastened either to a shoulder cast into a concrete tie or block, or to a baseplate fixed to the track base using either bolts or screwspikes.

Key components

Cast in Shoulder Assembly

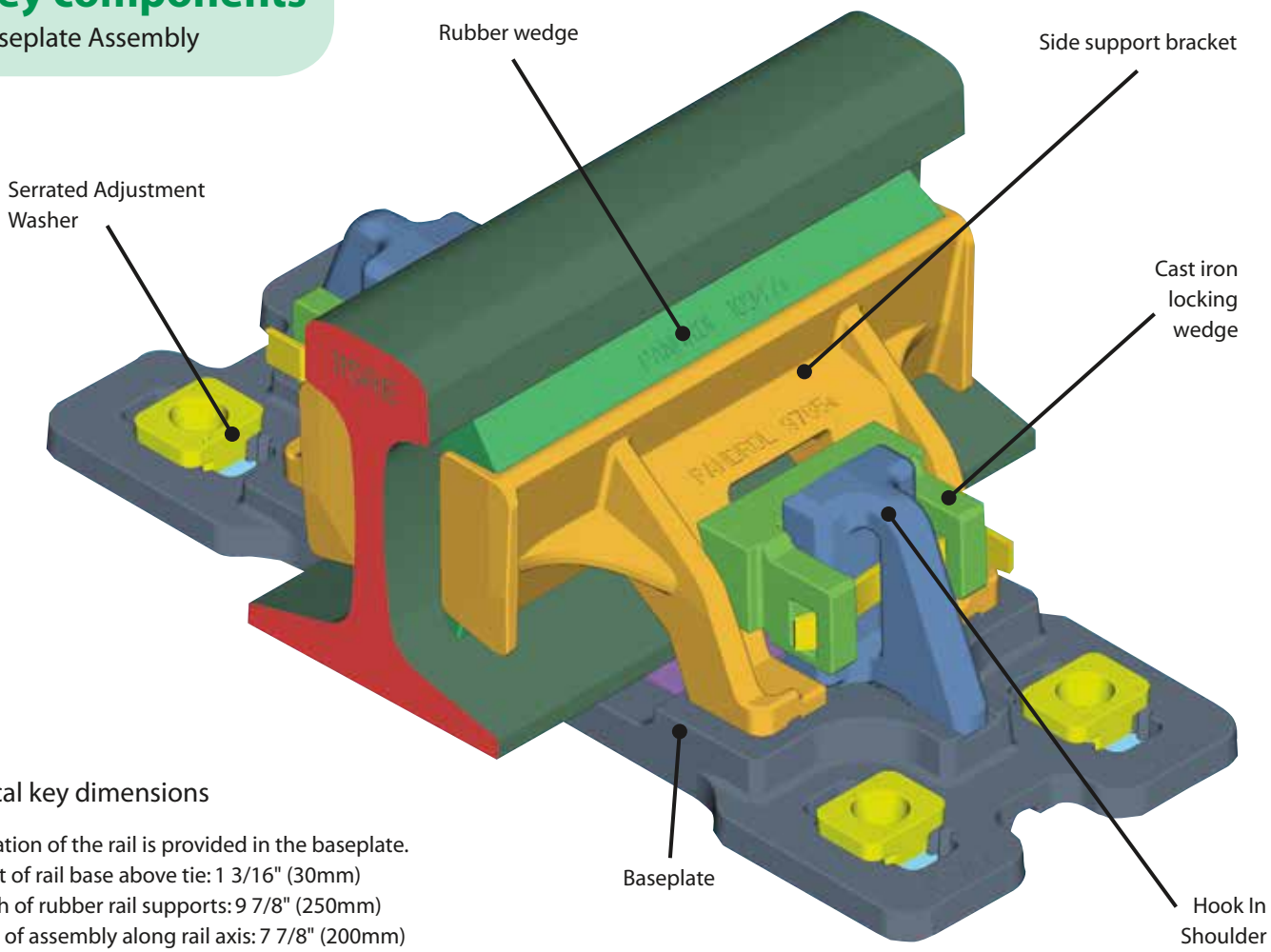


Typical key dimensions

Inclination of the rail is provided in the concrete tie or slab into which the assembly is set.
Height of rail base above concrete level: 5/8" (17mm)
Length of rubber rail supports: 9 7/8" (250mm)
Width of assembly along rail axis: 5 7/8" (150mm)
Width of assembly perpendicular to rail axis: 13" (330mm)

Key components

Baseplate Assembly



Typical key dimensions

Inclination of the rail is provided in the baseplate.
Height of rail base above tie: 1 3/16" (30mm)
Length of rubber rail supports: 9 7/8" (250mm)
Width of assembly along rail axis: 7 7/8" (200mm)
Width of assembly perpendicular to rail axis: 19 1/4" (490mm)

Advantages

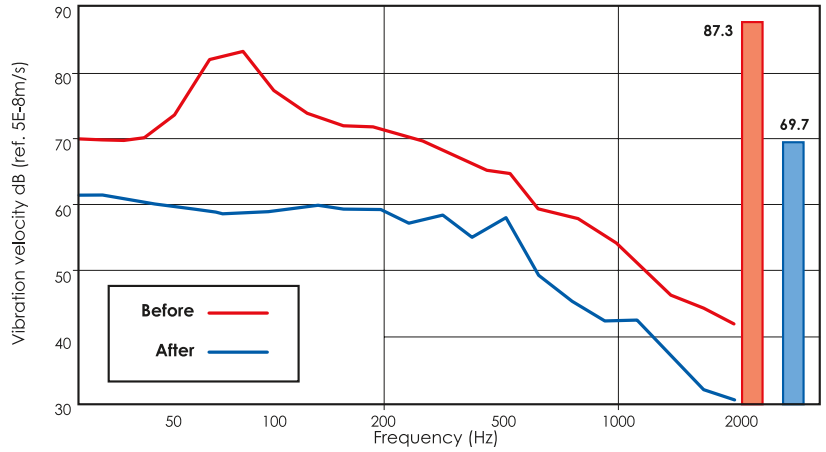
- Very low dynamic stiffness – 4.28 X104 lb/in (7.5kN/mm) or less leads to:
  - ✓ minimal rail roll
  - ✓ a low vibration performance similar to floating slab track but:
    - at a much lower cost and
    - with much better access for maintenance or adjustment
- Reduces vibration and secondary noise significantly
- Very low profile:
  - ✓ can fit within existing restricted rail heights to:
    - provide a retrofit solution in areas where space or cost prohibits the use of floating slab track
    - reduce tunnel diameters and costs for new track construction, giving very large savings in project costs
- All components are easily replaced for ease of maintenance
- Low longitudinal stiffness avoids load transfer between rail and bridge on thermal expansion
- Longitudinal creep resistance can be adjusted in situ to suit requirement
- Uses proven materials technology

PANGUARD™ Proven Results

The very high level of vibration attenuation achieved with the Pandrol PANGUARD system can be used to control ground vibration – for instance trains running in tunnels, or to reduce noise emitted from the vibration of structures such as bridges or viaducts.

The graphs below, from two PANGUARD installations, demonstrate the results that can be achieved.

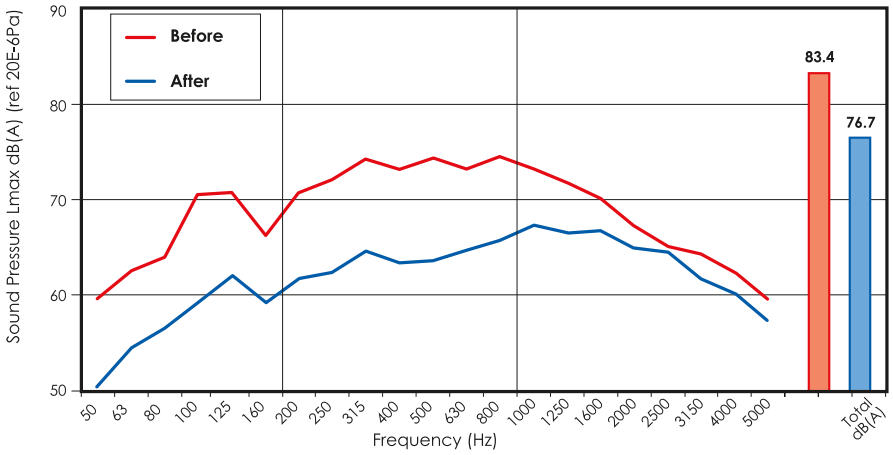
Installation in a tunnel



Insertion Loss – 17.6 dB

Note - Bars show total vibration levels

Installation on a ballasted steel bridge



Noise measured 4m below bridge

Insertion Loss – 6.7 dB(A)

Note – Bars show total sound pressure levels

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