

## WINTERPROOF RAILWAY TURNOUT

An entirely new concept railway turnout. Will function in winter conditions without a railway turnout point heater. No high energy bills and no CO2 emission anymore. Because of much troubles and problems every winter with turnouts and turnout-heaters of the Dutch Railways (Nederlandse Spoorwegen) which causes many train-traffic delays, we have developed a new mechanical working principal (a new design) for railway-turnouts during the last 3 years. This new design turnout is not fitted with horizontal movable tongues, and because of that, snow and ice have no impact on the correct working of the turnout ! and because of that it needs NO turnout heating at all ! The problem with horizontal movable tongues (a design of more than 100 years old) is that snow and ice can be falling in between the tongue and the fixed-rail. For that you need an expensive and reliable high power turnout-heating (10kW - 15kW) for every turnout which must stayed switched-on for two or three months every winter. That will result in high energy- and maintenance bills. Instead of open horizontal movable tongues, this new design turnout is fitted with vertical movable tongues which can slide up and down between four guides which forms a closed box around each tongue. Snow and ice have no chance to fall in or creep in between mechanical parts of the turnout. The vertical movable tongues are driven by a set of mechanical horizontal moving locking bars. The rail-tongues (points) and the locking-bars can be driven electro-mechanically or electro-hydraulically. The winterproof railway turnout will function in winter conditions without a railway turnout point heater. That means : No more train traffic delays in winter because of snow and ice disturbing correct functioning of railway turnouts. That saves much money. No high energy bills and no CO2 emission anymore for the high energy consuming heating systems which must stay working long time in winter periods. (15kW per turnout in some cases) Also disfunctioning heating systems are history now because there are no heating systems needed anymore ! Further there is no need for manufacturing, buying, installing, inspecting, maintaining, repairing and monitoring of heating systems because there are no heating systems needed anymore !

The winterproof railway turnout can replace conventional turnouts which fitted with a heating system. At this moment the winterproof railway turnout is discussed in The Netherlands with turnout manufacturers : Vossloh and Voest Alpine , The Dutch Railways NS and ProRail (owner of the Dutch railway infrastructure)

Below a calculation example of the savings which can be achieved with this turnout on one year basis (Deutsche Bahn DB) :

Electric Power one point heater : 10kW

Amount of heated railway turnouts in Germany : 22567

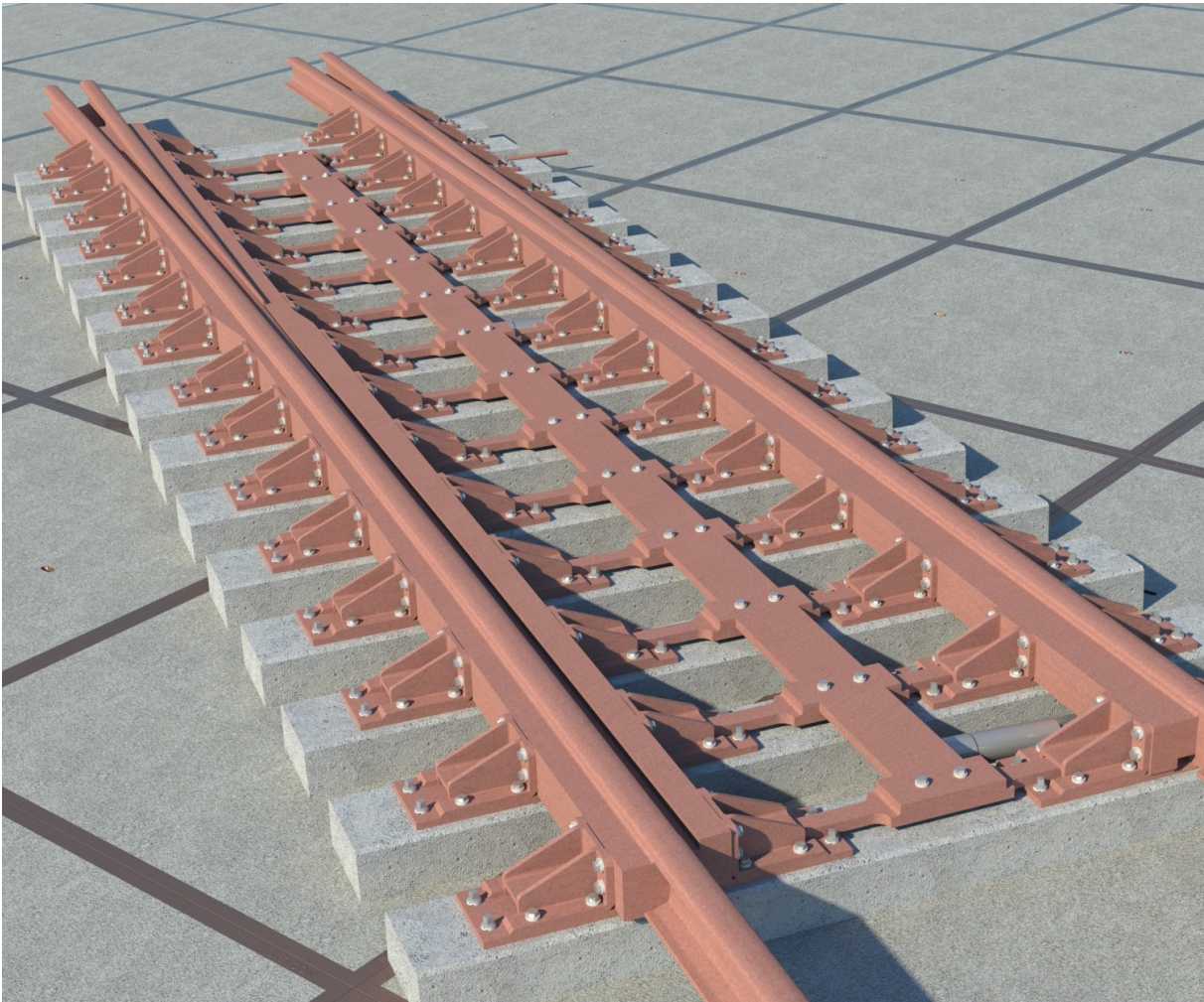
Average time in 2012 when pointheaters were switched on in Germany : 1440 hours

Price for one kWh : Euro 0,07

For producing one kWh 0,7 kg CO2 is emitted.

When the Winterproof Railway Turnout will be applied in the DB Netz :

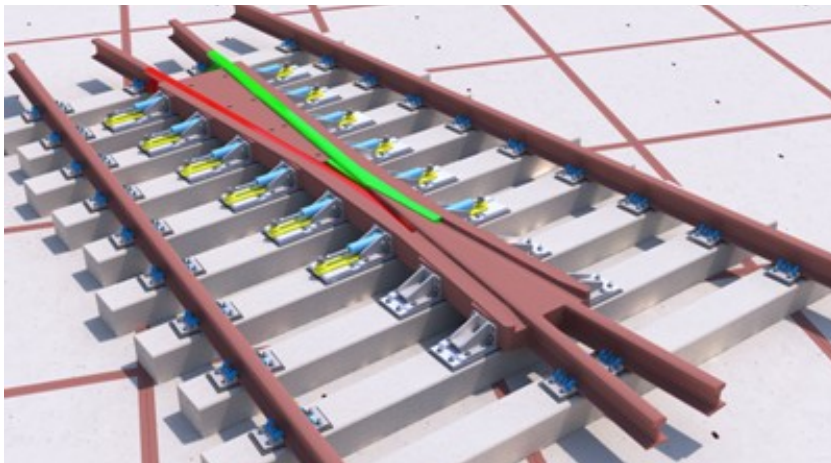
- Energy savings each year in Germany :  $10\text{kW} \times 22567 \text{ Turnouts} \times 1440 \text{ hours} = 324.964.800 \text{ kWh}$
- Savings in costs for electricity each year is  $324.964.800 \text{ kWh} \times 0,07 \text{ Euro} = 27.475.360 \text{ Euro} !$
- Savings in CO<sub>2</sub>-emission each year is  $324.964.800 \times 0,7 \text{ kg} = 227.475.360 \text{ kg}$
- Further huge saving can be made because DB Netz does not need to purchase, install, inspect, monitor, replace, and repair expensive point heaters anymore.
- But the most important : There are no train traffic delays anymore because of malfunctioning turnouts in winter. This turnout will function 100% in winter conditions !
- Serial production of this winterproof railway turnout is not more expensive than conventional turnouts as we use today. It has a very simple mechanical setup.



*WIRAS - Winterproof Railway Turnout*

### **The Winterproof Movable Frog**

The Winterproof Movable Frog can be included in the WIRAS Winterproof Railway Turnout, especially when the WIRAS Winterproof Railway Turnout is designed and build according to High Speed Railway Turnout specifications. The techniques applied for moving and locking the frog-legs of the Winterproof Movable Frog are very similar to the techniques for moving and locking the turnout main-points : Vertical moving frog-legs and horizontal-locking. Also the advantages for both the winterproof main points and winterproof movable frog, are the same, in comparisation with turnouts with horizontal moving points and frog-legs : The turnout is winterproof, No traintraffic-delays during winter, No point-heater and frog-heater needed, No high costs for heating-energy, No costs for purchasing, maintenance, monitoring, repairing and replacing of point- and frog heaters, No malfunctioning point- and frog-heaters and a Low wheel-rail contact noise. Combining both the winterproof main points and winterproof movable frog in one turnout, results in a very valuable and future-proof turnout. The WIRAS Winterproof Railway Turnout fitted with a Winterproof Movable Frog is very suitable for application in normal train-rail infrastructure, high-speed train-rail infrastructure and in tram-rail infrastructure.



*Winterproof Movable Frog*