BemoRail

OVER 50 YEARS OF WORLDWIDE EXPERTISE IN RAIL- AND SHUNTING SYSTEMS

BemoRail

Introduction Bemo

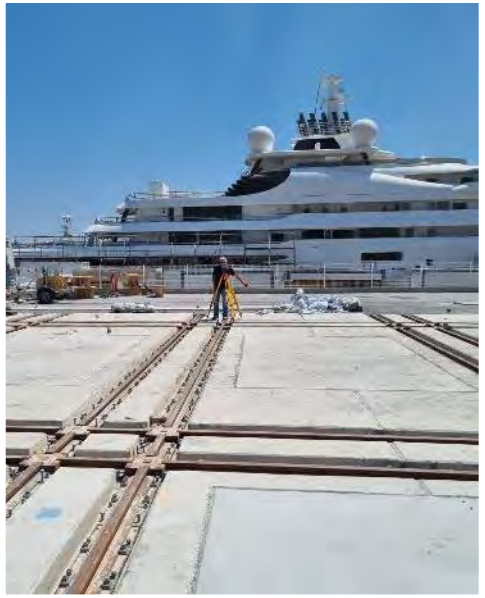
Temperature on rail

Corrosion on rail

TWO DEPARTEMENTS

BemoRail

RAIL TECHNOLOGY



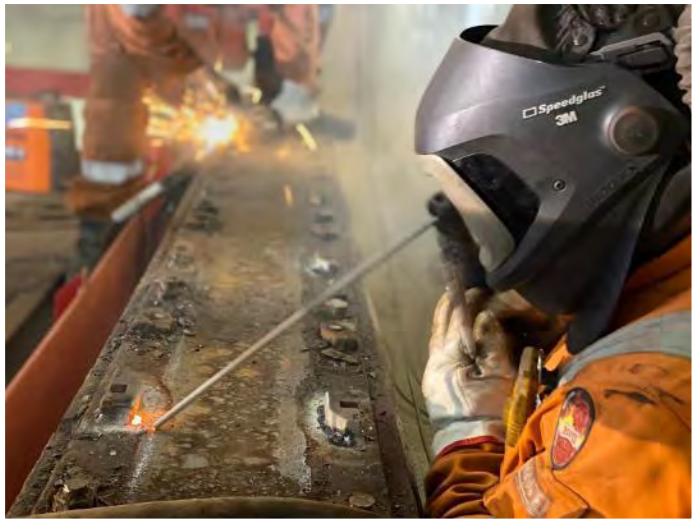
SHUNTING TECHNOLOGY

THE BEMO TEAM

TOGETHER WE ARE:

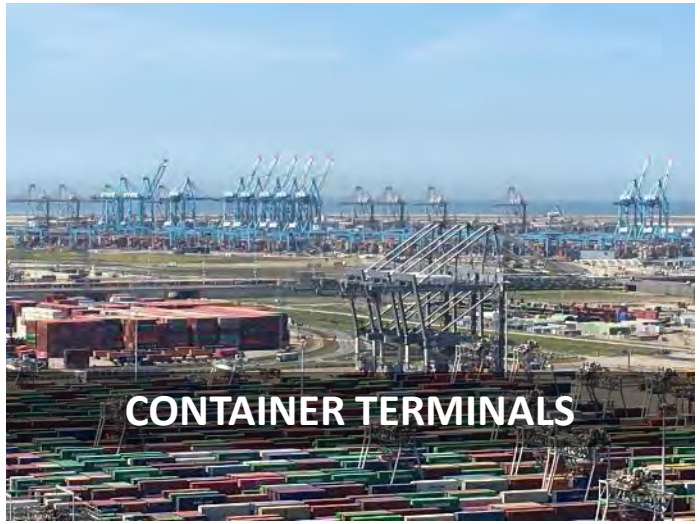
Specialized in the field of Crane Rail and Shunting Systems for more than 50 years;
A team of competent workers among which:

- Engineers
- Project managers & sales
- Production workers
- Assembly workers
- Maintenance workers



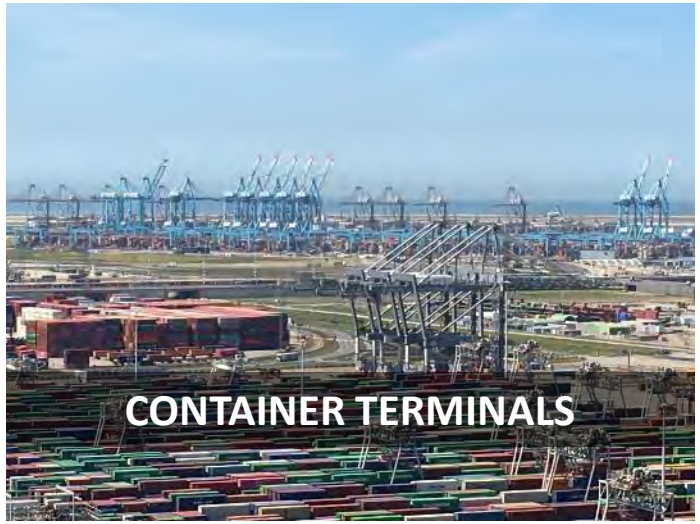
OUR CUSTOMERS

BemoRail



OUR CUSTOMERS

BemoRail


CONTAINER TERMINALS

SHIPYARDS


BULK INDUSTRY


STEEL AND MINING INDUSTRY


CONCRETE & CEMENT INDUSTRY

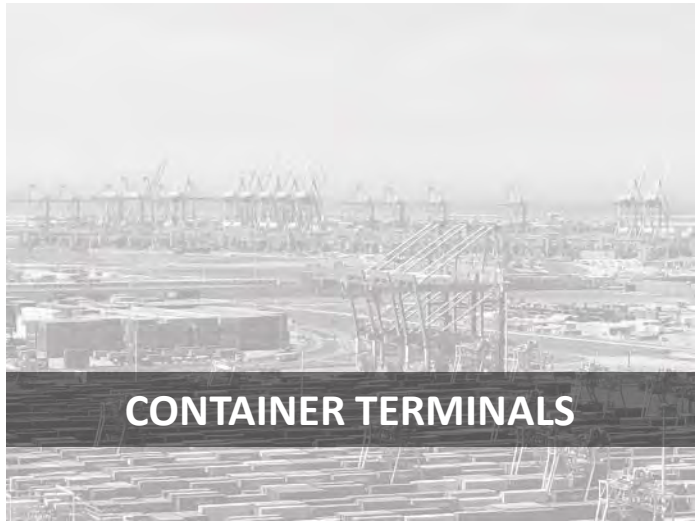

(PETRO) CHEMICAL INDUSTRY

CONTAINER TERMINALS

- DP World Antwerpen — 1905m AS86 rail
- APMT Tanger MED2 — 14600m MRS87A & 2400m A150
- ADP Khalifa Ports — 17000m AS86 stack renovation
- ECT Euromax Rotterdam — 18000m MRS87A rail
- Peel Ports Liverpool — 1950m MRS87A, 1386m AS86 rail
- EECV, Rotterdam — 7650m UIC54A rail
- BASF, Ludwigshafen an Rhein — 1010m AS86 rail
- PSA Singapore, TUAS phase I — 28000m CR73 Material supply
- Indonesia Makassar New Port — 3840m CR73 rail
- Indonesia Kijing Port Kalimantan — 1500m A150 rail

OUR CUSTOMERS

BemoRail

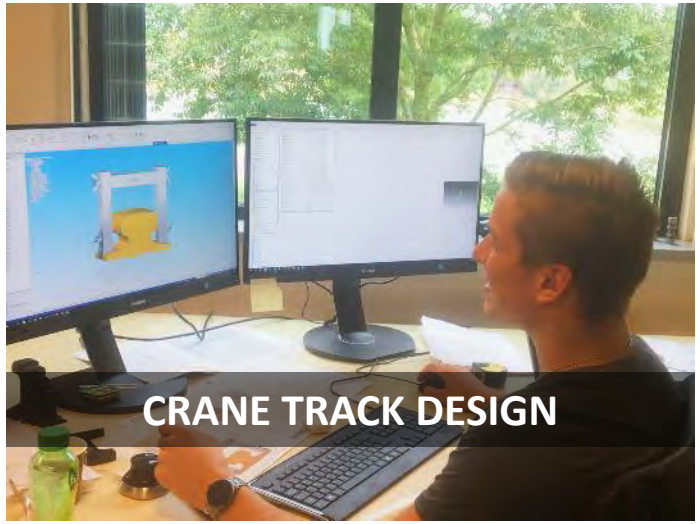


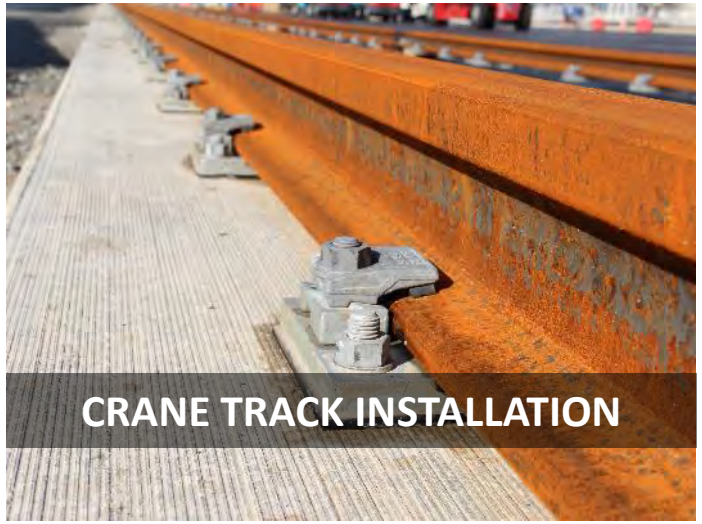
SHIPYARDS

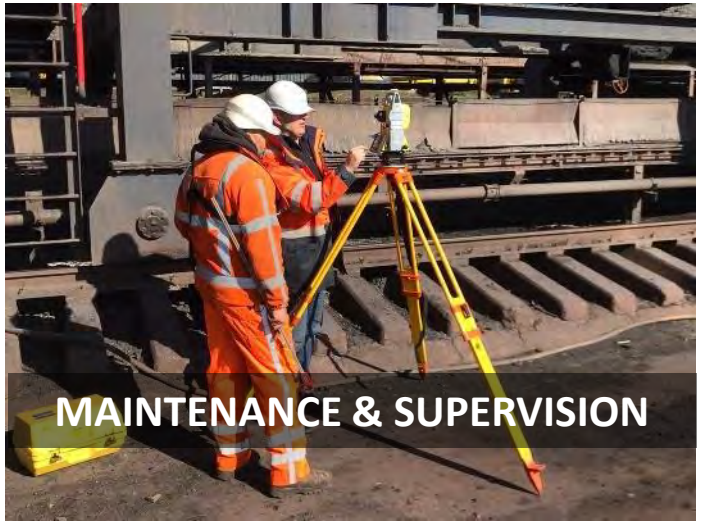
- La Ciotat Shipyards — 5,6 km of A75 rail
- Changi Naval Base Singapore — 2,5 km of A75 rail
- Karachi Shipyards Pakistan — 17 km of QU70 rail
- Türkmenbashi Int. Seaport — 11 km of A100 rail
- Sima Shipyard Callao Peru — 5 km of A65 rail
- LDPL India
- L&T India
- Volkswerft Stralsund Germany
- Weserwind Bremerhaven Germany

RAIL TECHNOLOGY

BemoRail







RAIL TECHNOLOGY

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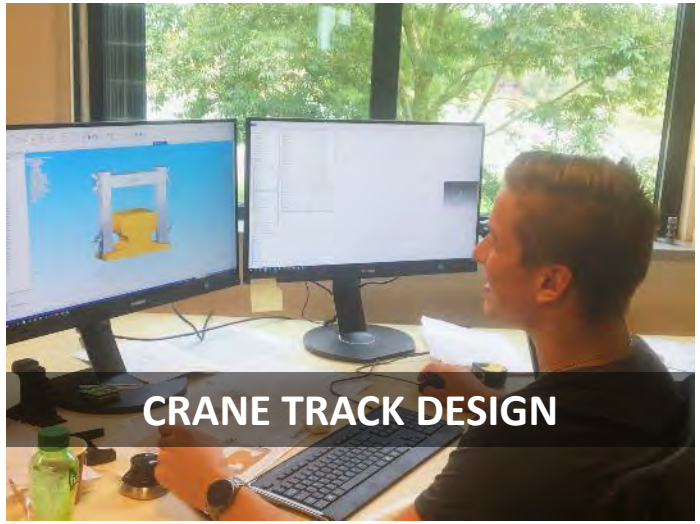
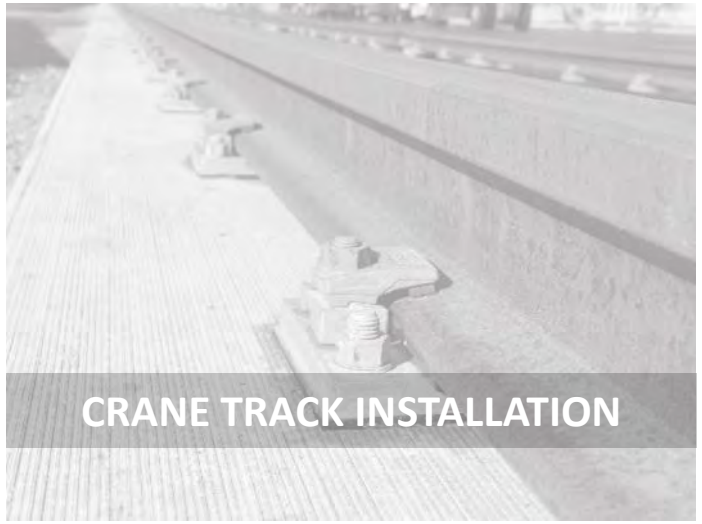
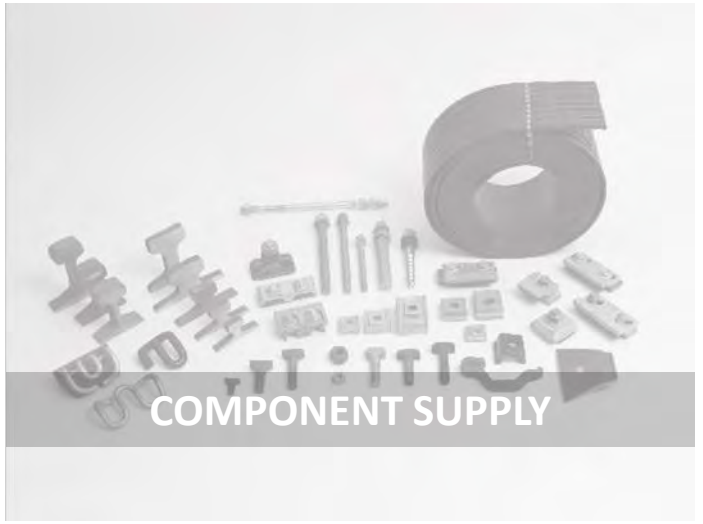
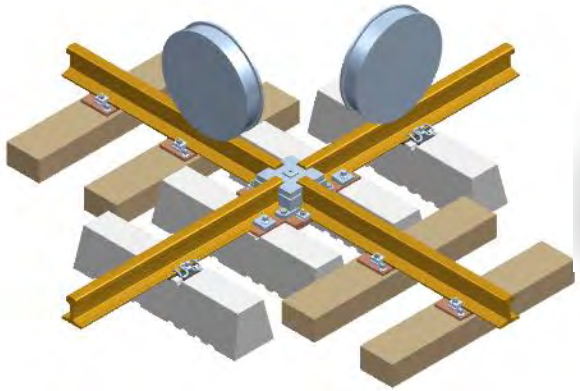


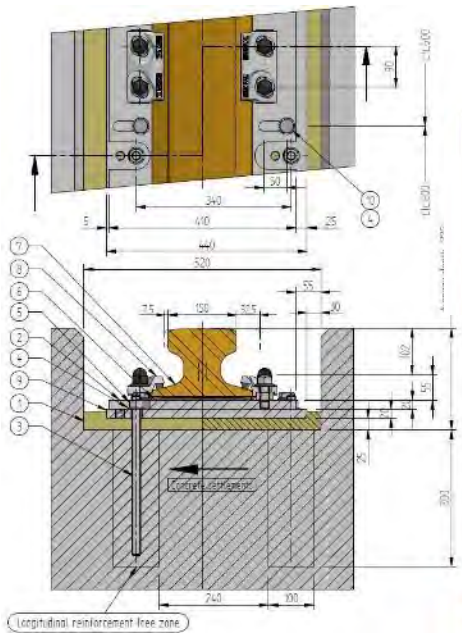


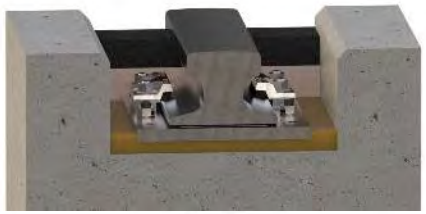


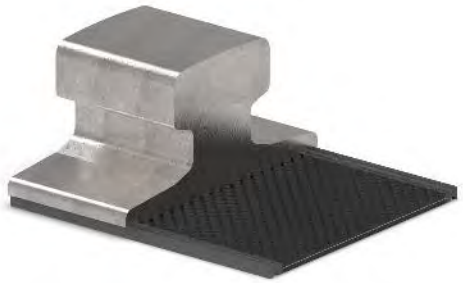
CRANE TRACK DESIGN

BemoRail



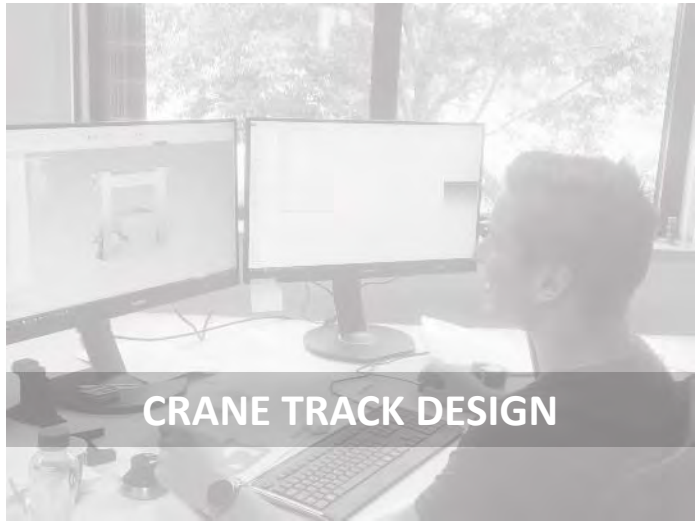


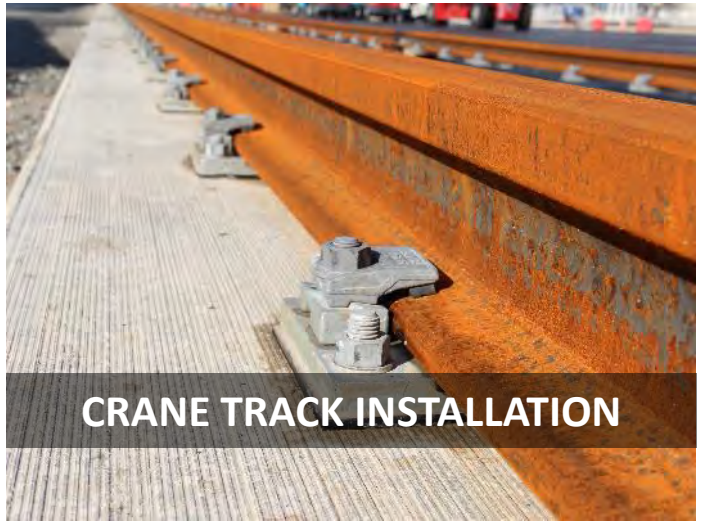


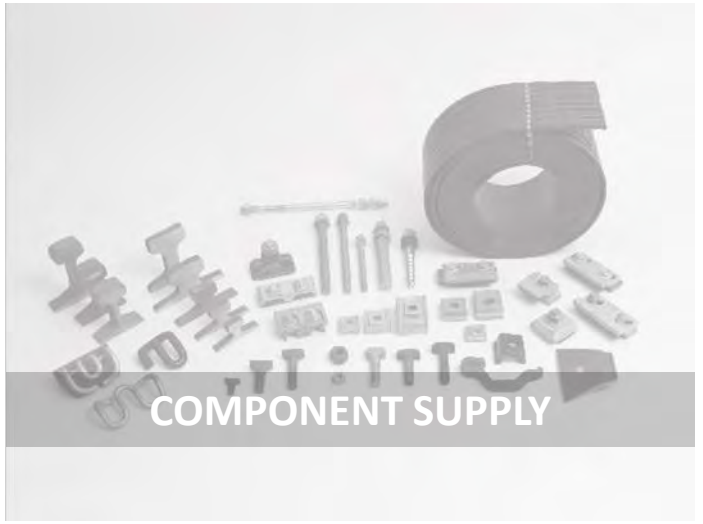


RAIL TECHNOLOGY

BemoRail



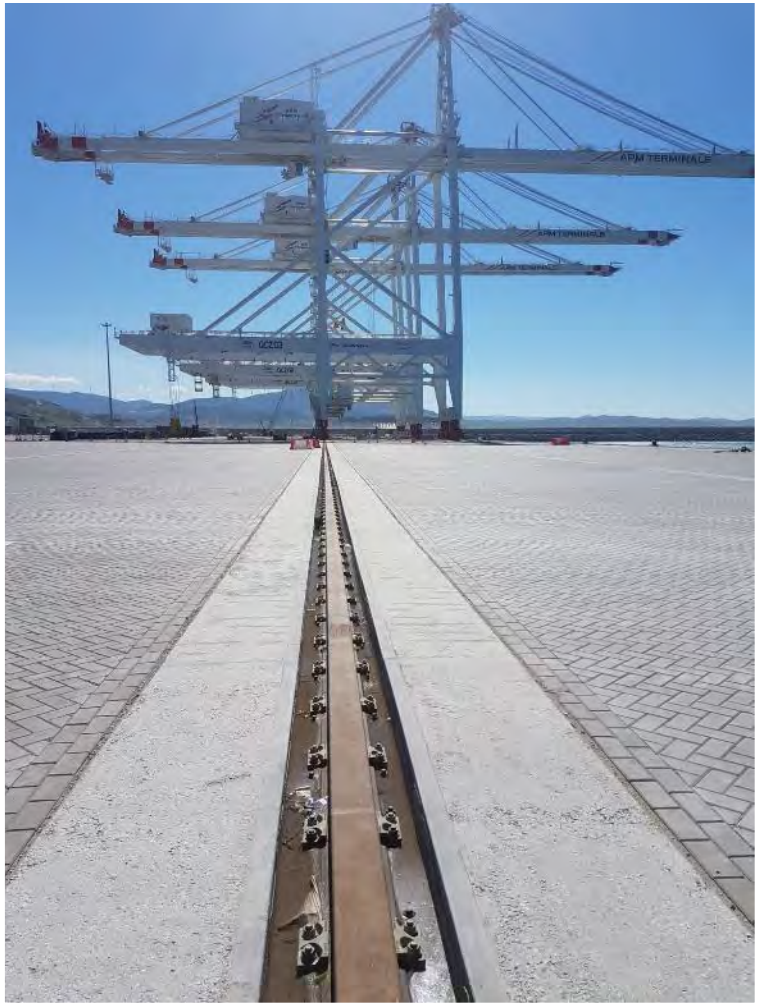


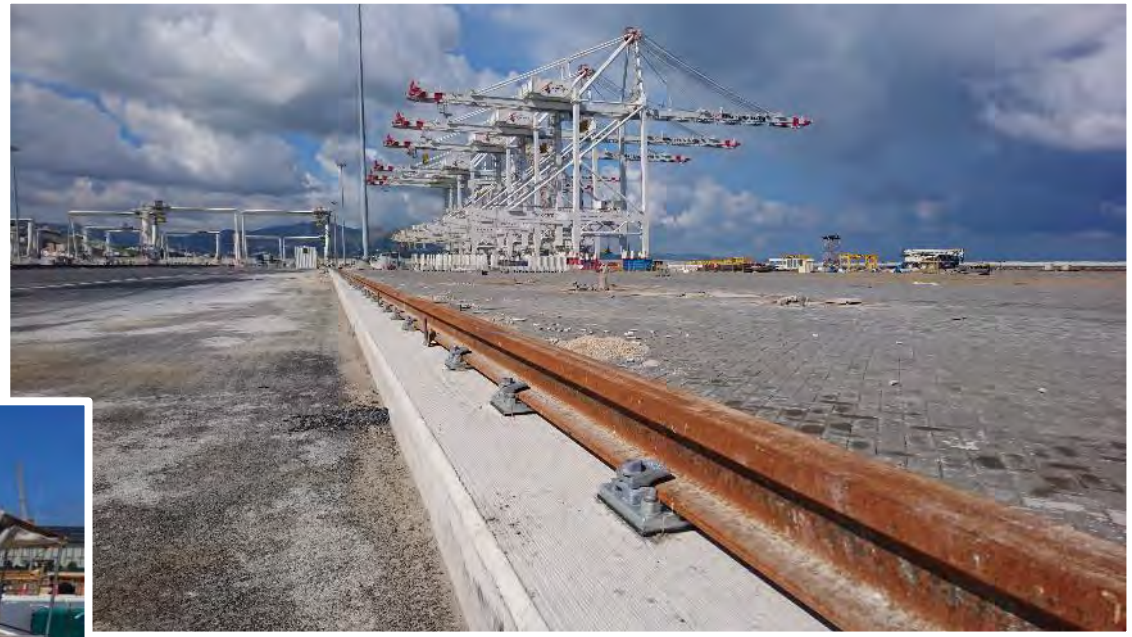


CRANE TRACK INSTALLATION

BemoRail

CONTINIOUSLY AND DISCONTINIOUSLY SUPPORTED CRANE TRACK





CRANE TRACK INSTALLATION

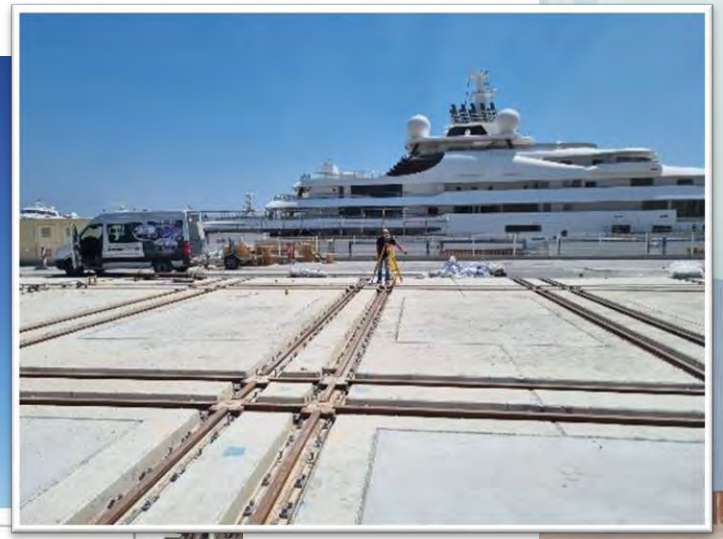
BemoRail

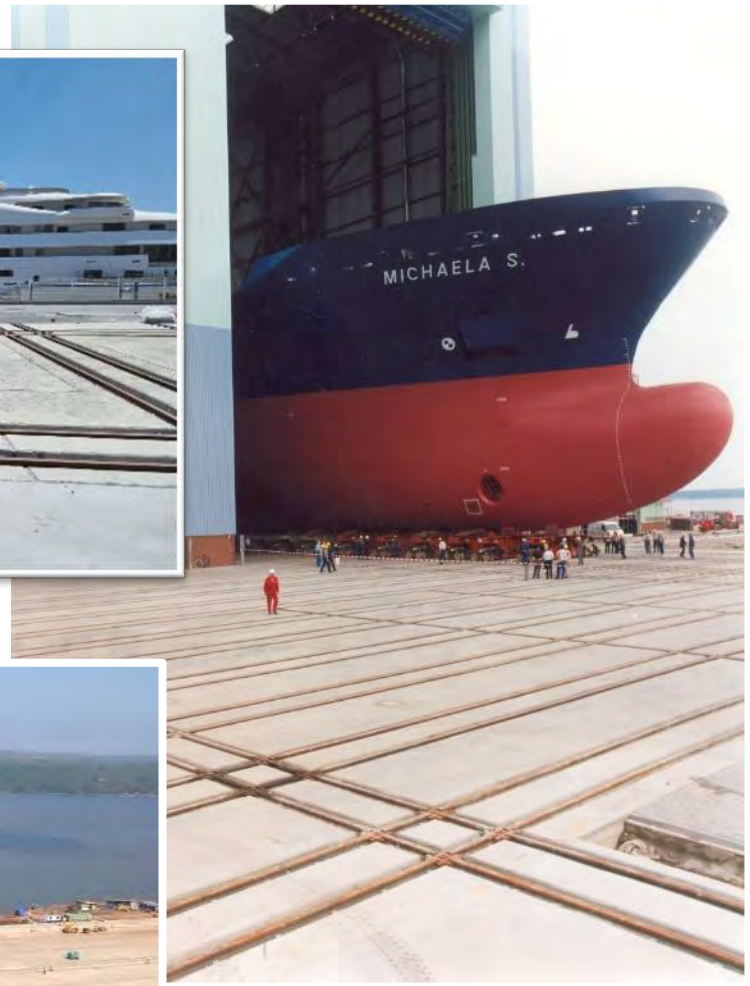
BALLAST CRANE TRACK

CRANE TRACK INSTALLATION

BemoRail

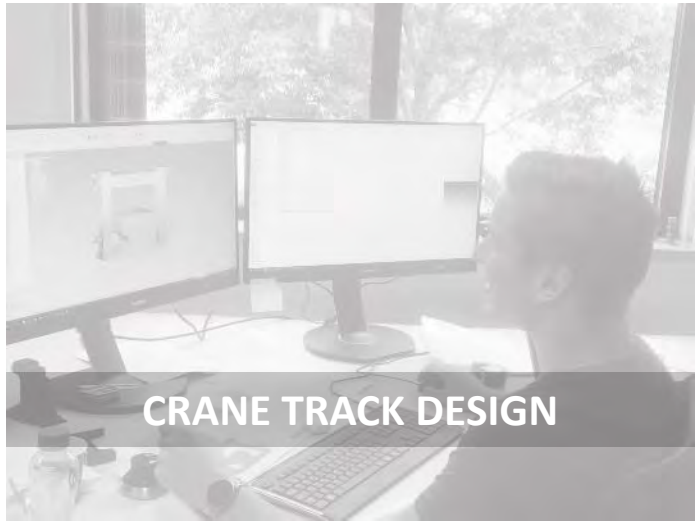
SHIPYARDS

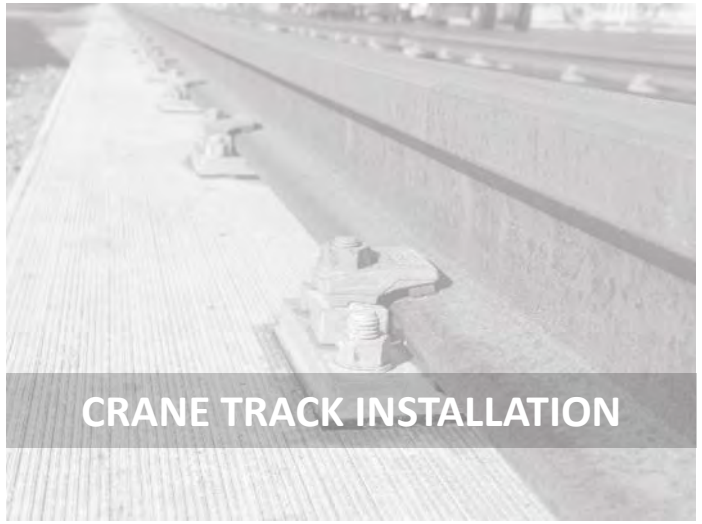




RAIL TECHNOLOGY

BemoRail

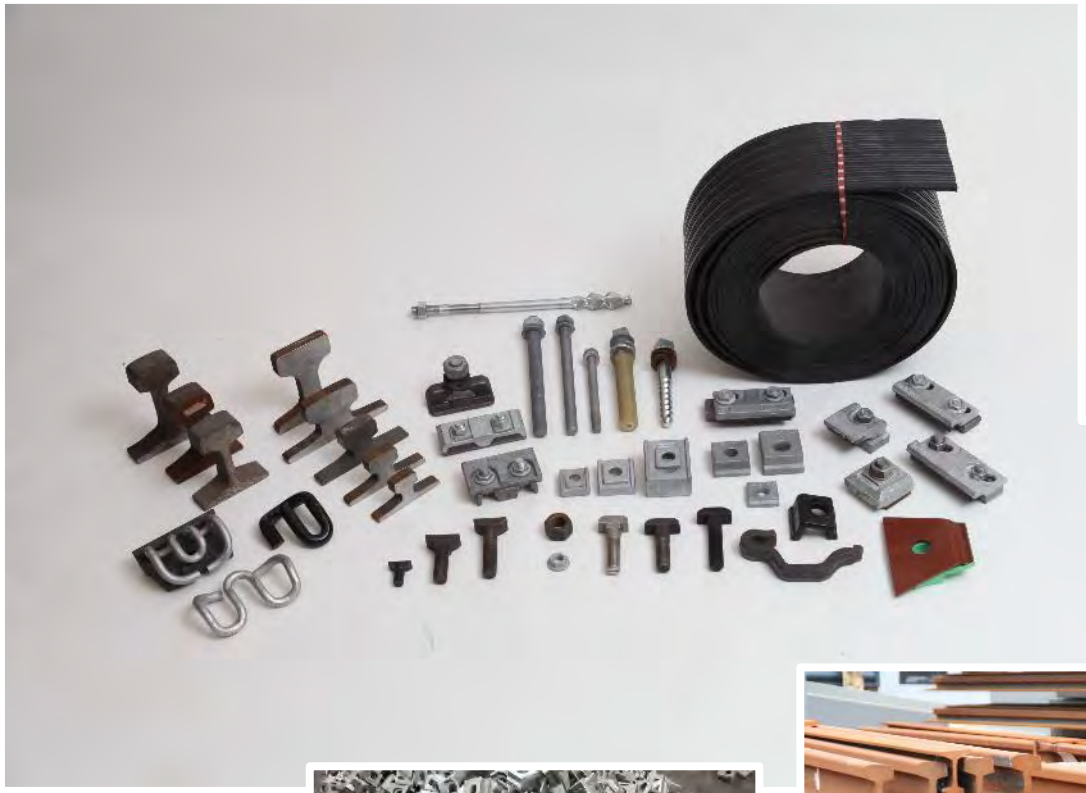




COMPONENT SUPPLY

BemoRail

COMPONENT SUPPLY

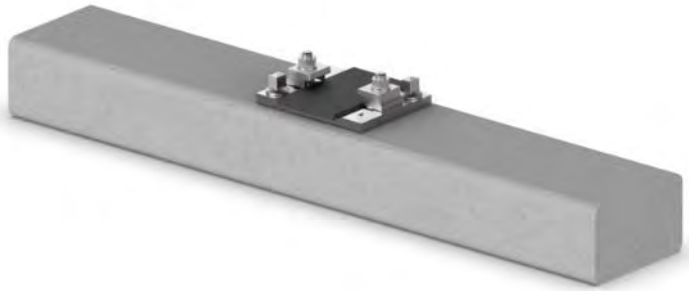


COMPONENT SUPPLY

BemoRail

NEW PRODUCTS

SULPHUR SLEEPERS



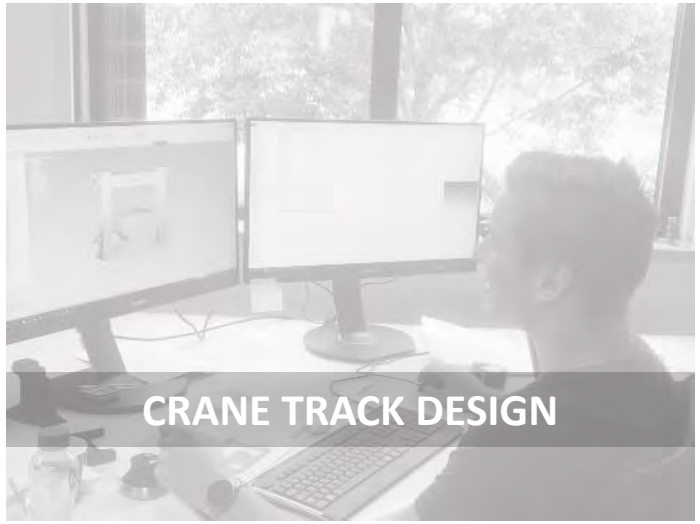
SYNTHETIC SLEEPERS

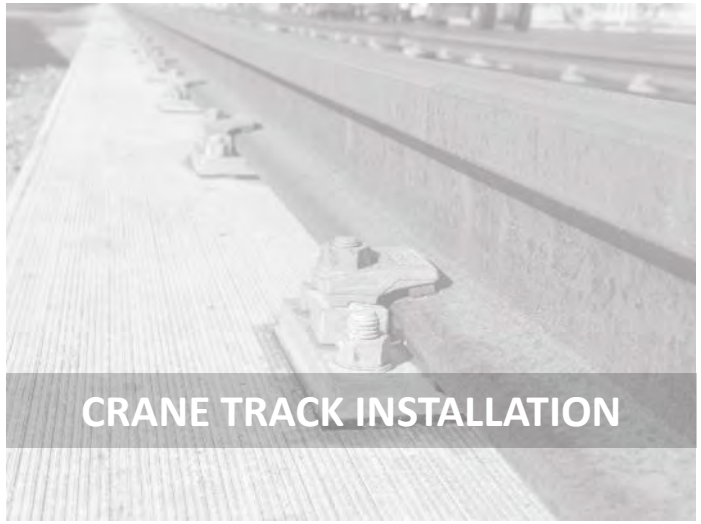
BEMO FLEX BELT

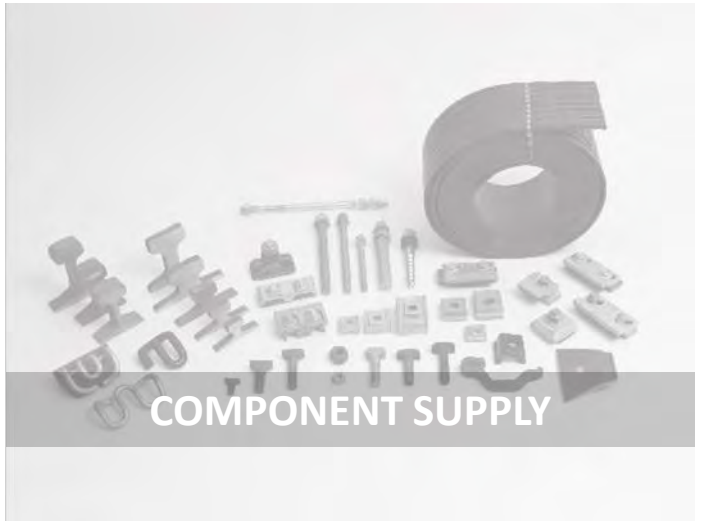
STS20DR RAIL CLIPS

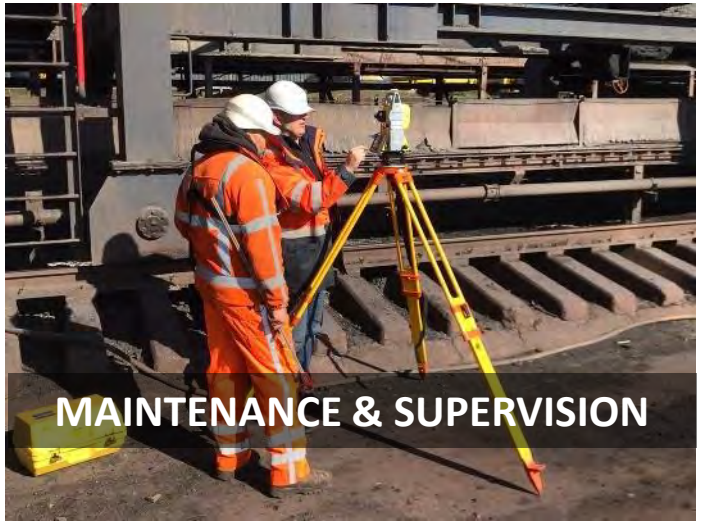
RAIL TECHNOLOGY

BemoRail



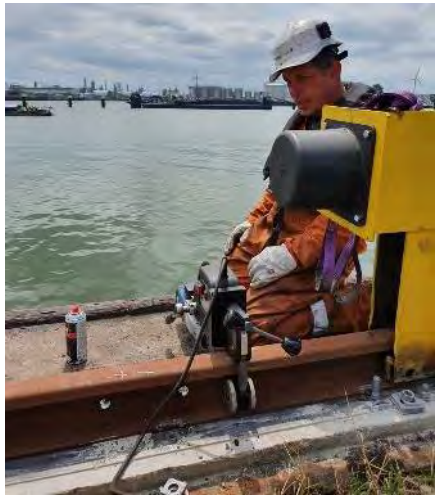


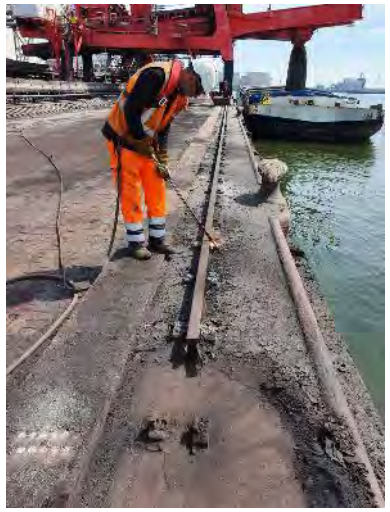




MAINTENANCE & SUPERVISION

BemoRail



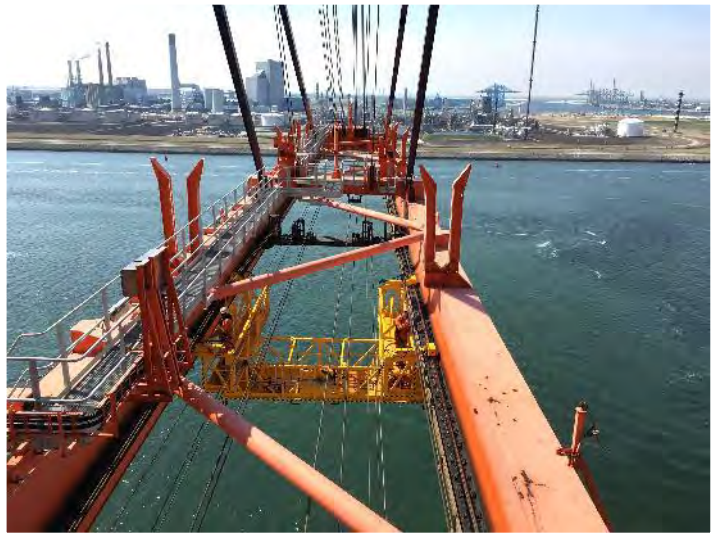


RAIL TECHNOLOGY

BemoRail

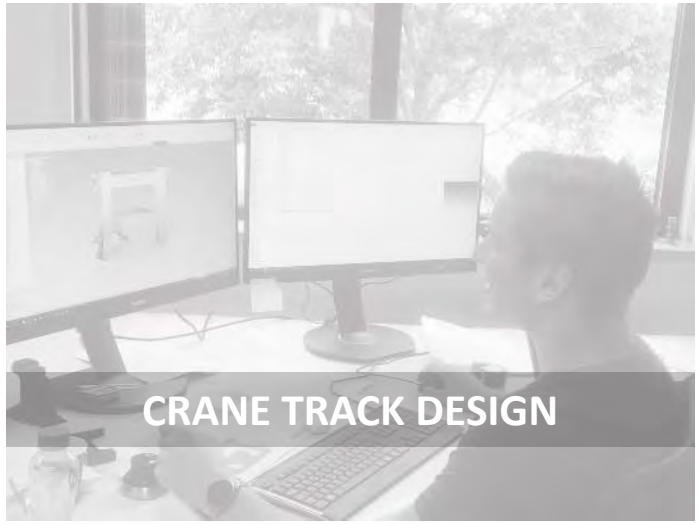
STS MAINTENANCE PLATFORM

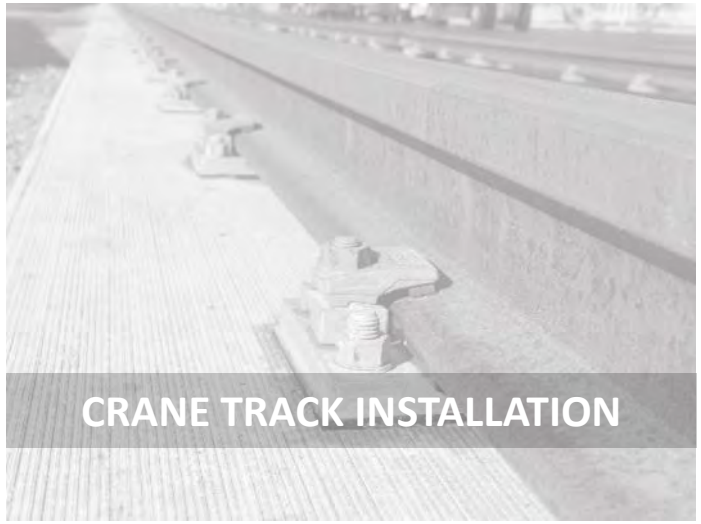
- No scaffolding
- Operational within 3 hours
- To hoist with maintenance crane in M-house
- Worldwide delivery in a 40ft container

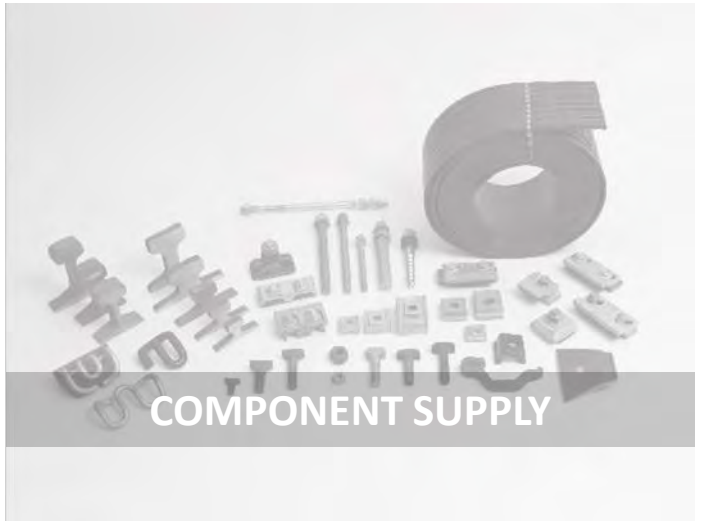


RAIL TECHNOLOGY

BemoRail





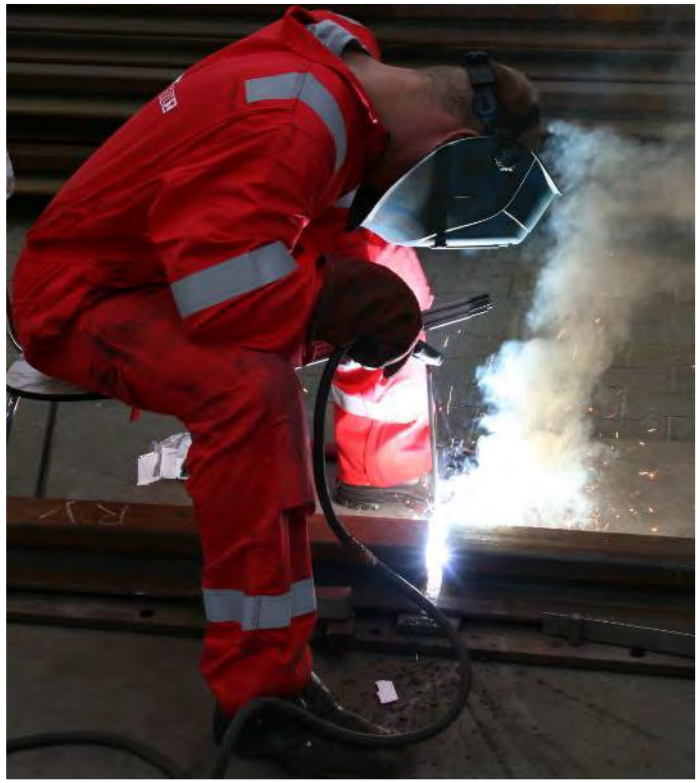


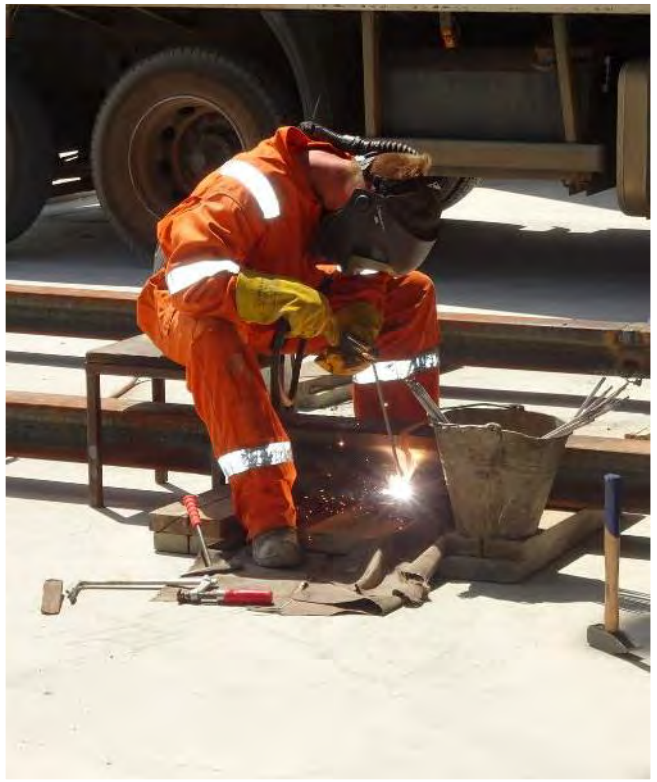
WELDING & GRINDING

PUDDLE ARC WELDING AND THERMITE WELDING

Bemo Rail has been certified for the highest standard welding level: ISO 3834-2

Test Puddle Arc Welding:
https://youtu.be/ggcsp81PxPQ
Test Thermite Welding:
https://youtu.be/TEHRTse7WTA





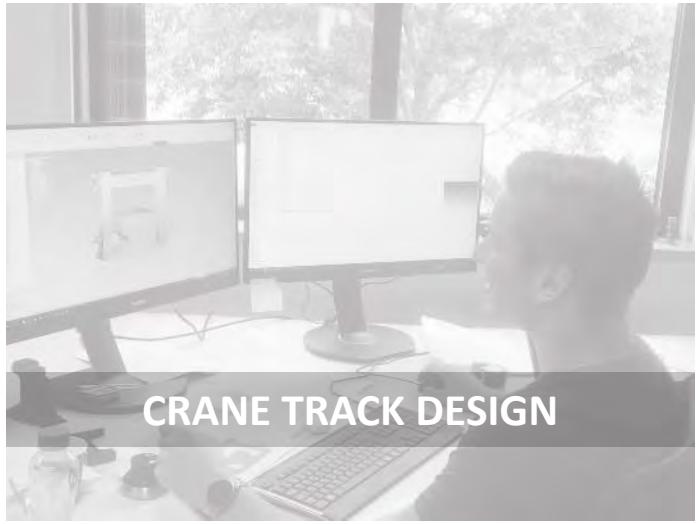
RAIL WELDING

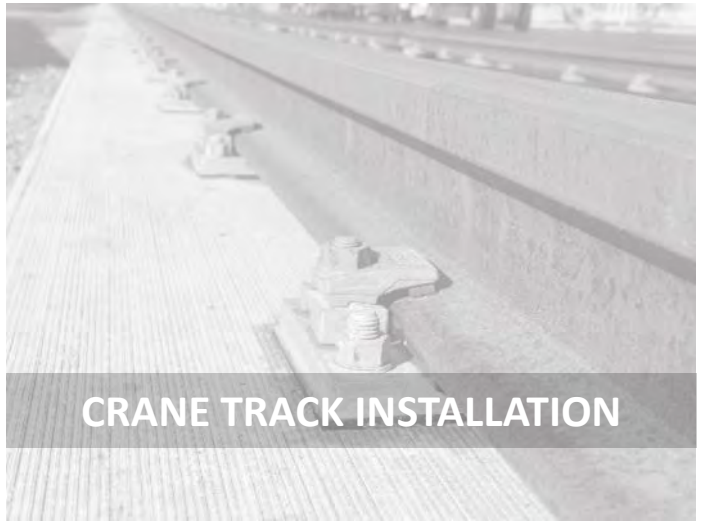
FLASH BUTT WELDING

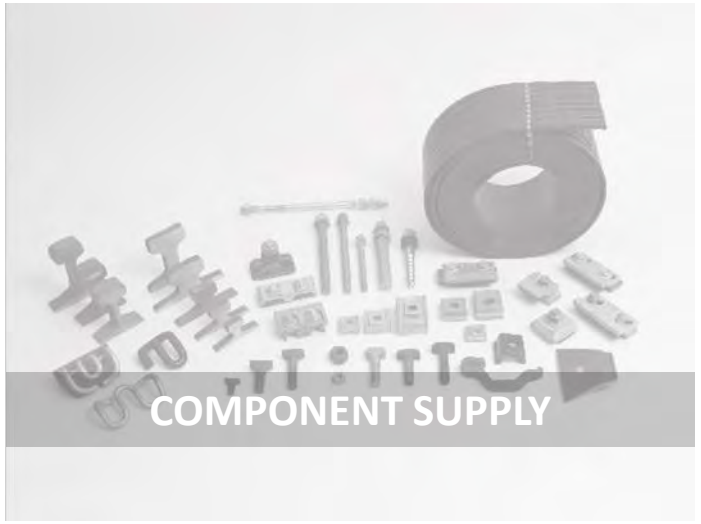
- ‘The best rail weld’
- Very suitable for large numbers of welds
- 100% result (no weld added material)
- Suitable for both ground and crane tracks at height
- No NDT required, 100% connection guaranteed

RAIL TECHNOLOGY

BemoRail



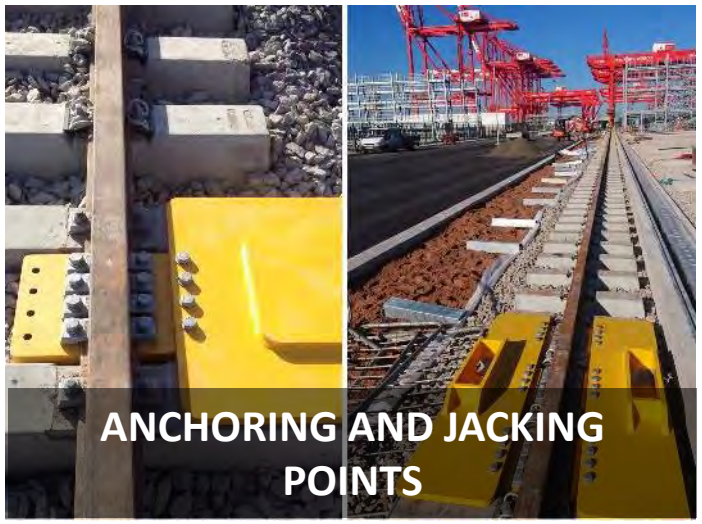




BEMO SPECIALS

NAVAL SCIENCE LABORATORY
VIZAG, INDIA

STADE ROLAND GARROS, PARIS

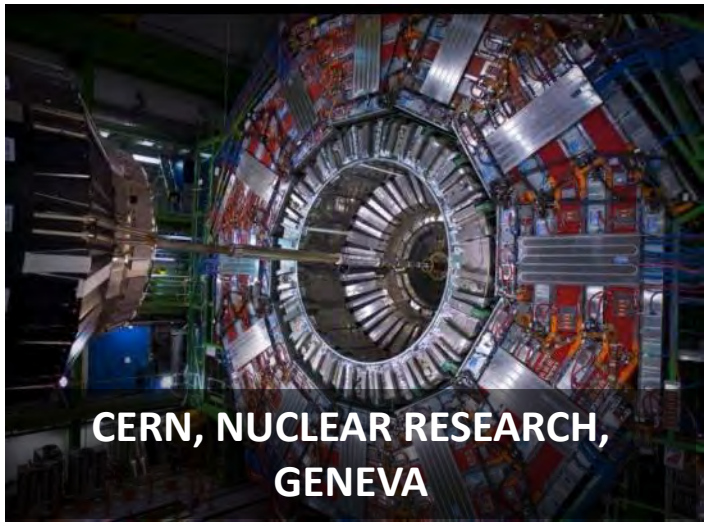


ANCHORING AND JACKING
POINTS

THE SHED, HUDSON YARD, NY

BEMO SPECIALS

THE NIGHT WATCH REMBRANDT



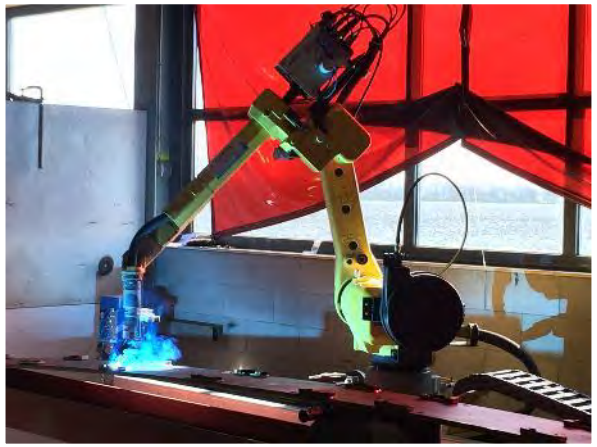
CERN, NUCLEAR RESEARCH, GENEVA

EUROPEAN SPACE AGENCY, FRENCH GUIANA

HEARTBEAT, PURMEREND

BEMO RAIL WORKSHOP

BemoRail






SHUNTING TECHNOLOGY

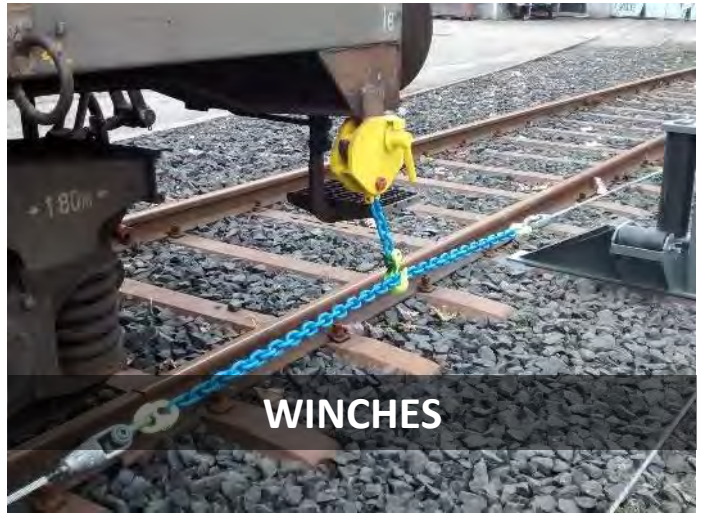
BemoRail

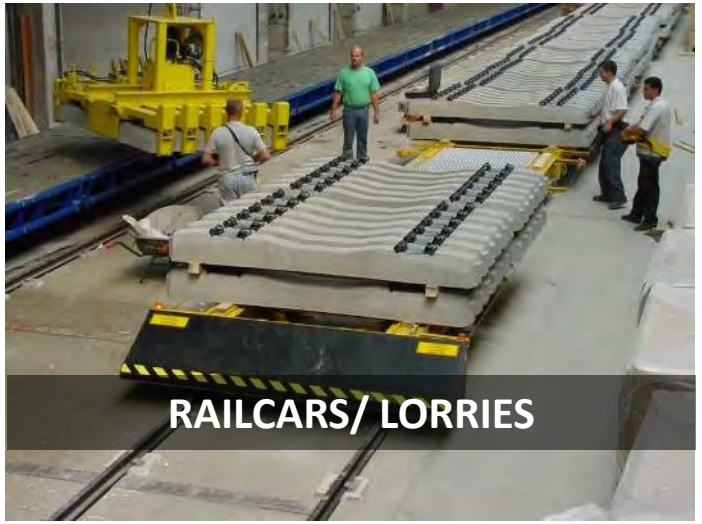

NEW LOCOMOTIVES

REBUILD LOCOMOTIVES


TRAIN TRAVERSE


BATTERY ELECTRIC LOCOMOTIVES


WINCHES


RAILCARS/ LORRIES

SHUNTING LOCOMOTIVES

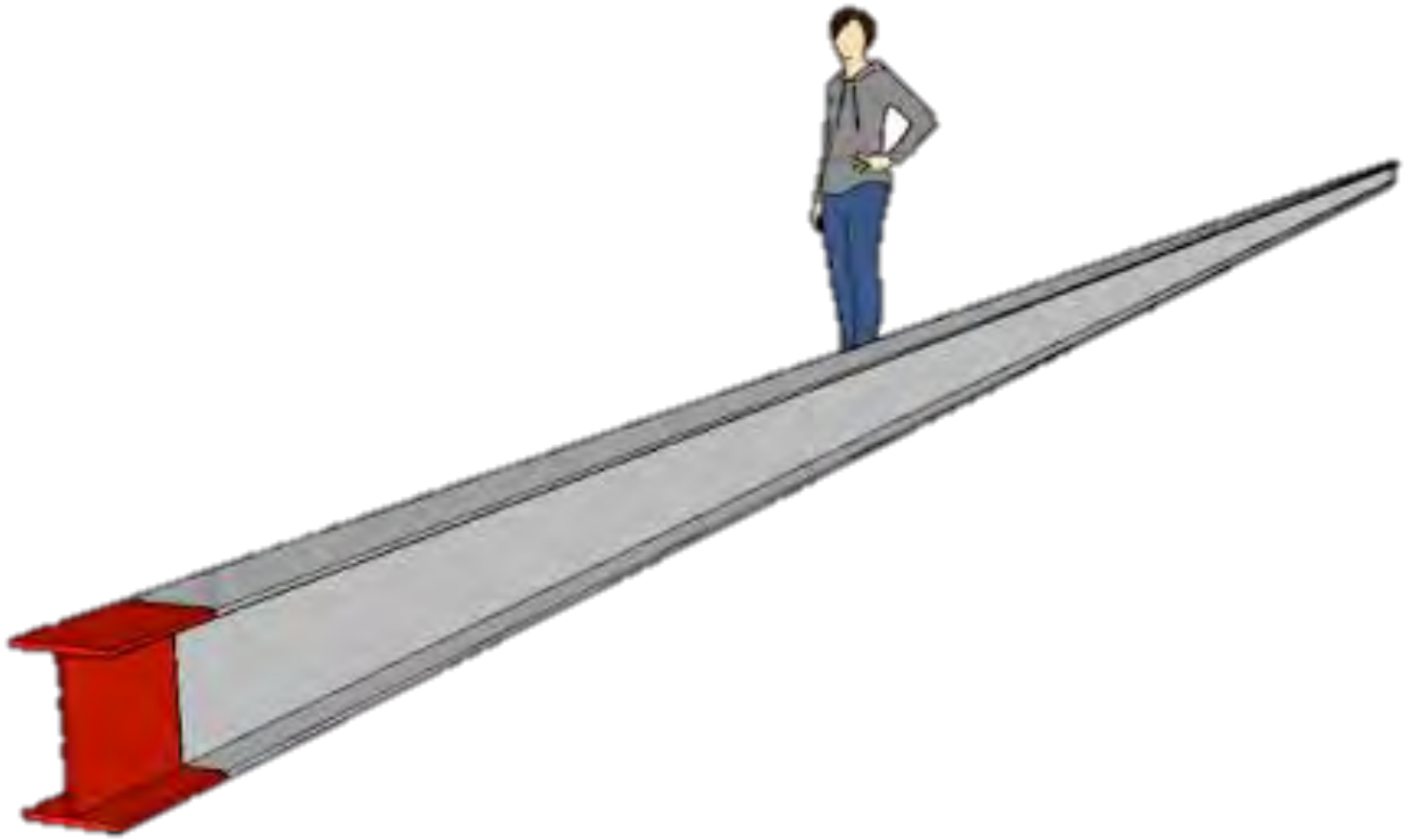
Eigen ontwerp, vervaardigd in eigen beheer, met eersteklas onderdelen.

The Bemo shunting locomotive, also called a rail shunter, is mainly used by companies that move wagons themselves over (internal) tracks, such as industry and transhipment companies. Our locomotives are applicable worldwide and extremely suitable for use in heavy-duty conditions.

- Electric locomotive
- Diesel locomotive
- Hybrid locomotive
- Lease and rental constructions possible

BemoRail

Thermal expansion rails



Thermal expansion rails

$$\Delta L = a \cdot L \cdot \Delta T$$

ΔL	Expansion length	[m]
a	Thermal expansion coefficent steel	$0{,}000012$[1/K]
ΔT	Temperature difference	35 [°C]
L	Rail length	300 [m]

$$\Delta L = 126\ [mm]$$

Extension is independent from rail size!

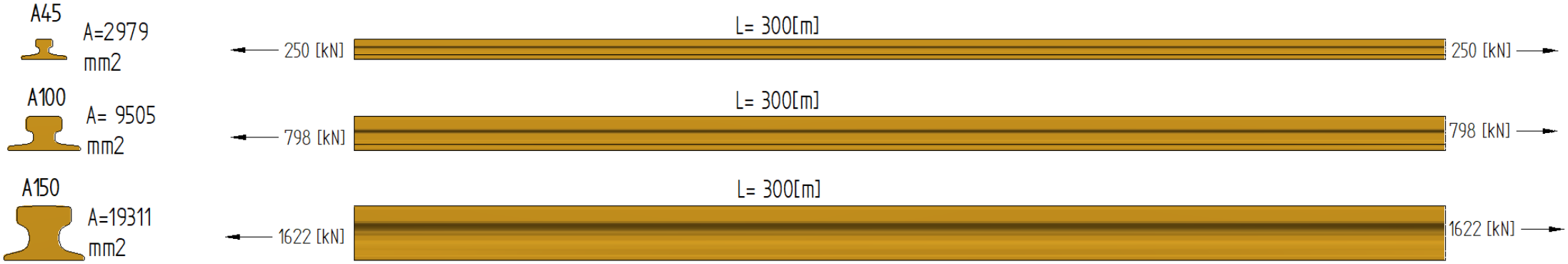
• Required tensile force to expand

$$\Delta L = \frac{F \cdot L}{A \cdot E} \rightarrow F = \frac{(A \cdot E) \cdot \Delta L}{L} \qquad F = \frac{(A \cdot E) \cdot (\alpha \cdot L \cdot \Delta T)}{L} \rightarrow \frac{(A \cdot E) \cdot (\alpha \cdot \cancel{L} \cdot \Delta T)}{\cancel{L}} \rightarrow$$ ***Force is independant from rail length!***

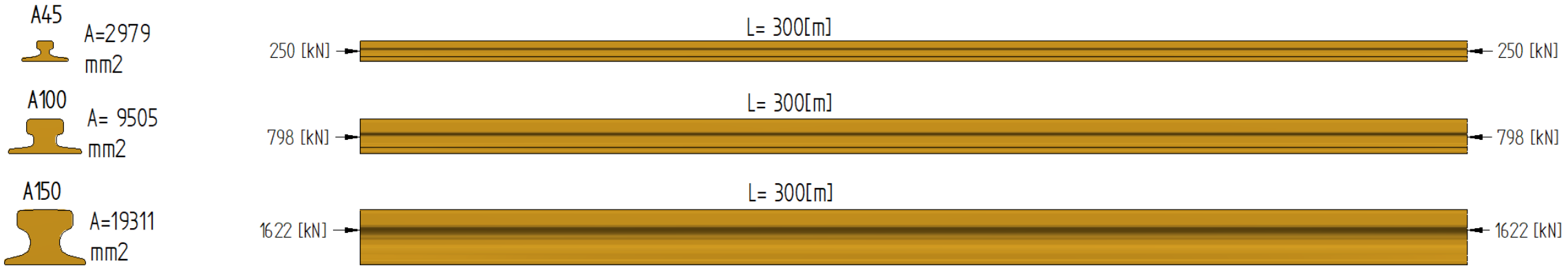
(Law of hooke)

ΔL	Extension length	[m]
F	Force	[N]
L	Rail length	300 [m]
A	Surface area rails	[mm2]
E	Modulus of elasticity	200 [Gpa]
a	Thermal expansion coefficent steel	$0{,}000012$[1/K]

F_{A45}	$2979 \cdot (200 \cdot 10^3) \cdot 0{,}000012 \cdot 35 \rightarrow$	250 [kN]
F_{A100}	$9505 \cdot (200 \cdot 10^3) \cdot 0{,}000012 \cdot 35 \rightarrow$	798 [kN]
F_{A150}	$19311 \cdot (200 \cdot 10^3) \cdot 0{,}000012 \cdot 35 \rightarrow$	1622 [kN]



Compressive force in rails

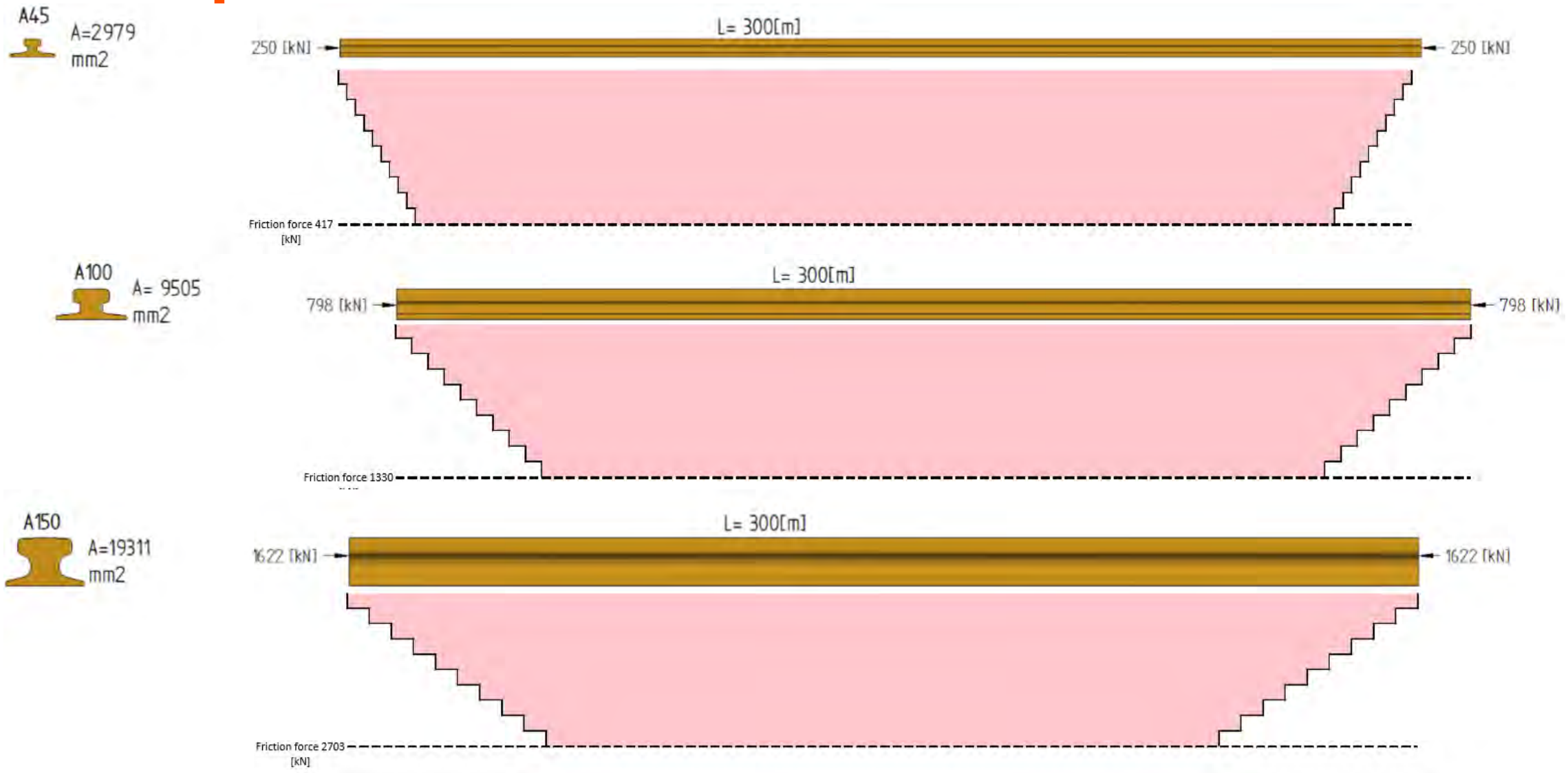


$$F_{clamp\_total} = \mu \cdot F_{friction}$$

F_{clamp}	Clamp force	[N]
$F_{friction}$	Friction force	[N]
μ	Friction coëfficiënt	0,6

$Rail$	F_{clamp_total}
A45	417 [kN]
A100	1330 [kN]
A150	2703 [kN]

Absorption of forces



Rail clamps

Rail	Clamp	Required number of clamps	
A45	WM16RS16(rubber)	20	5 – 6 Mtr
	FM16 H18	10	10 – 12 Mtr
A100	STS-DR-L14(rubber)	45	12 – 15 Mtr
	FM20 H25	22	6 - 8 Mtr
A150	STS20DR-S11(rubber)	60	15 – 18 Mtr
	FM24 H34	30	8 - 10 Mtr

Conclusion

- Rail extension is independent from rail size
- Rail extension is dependent from rail length
- Force is dependent from rails size
- Force is independent from rail length

Corrosion

- Basic materiaal
- Humidity and moisture
- Temperature
- Chemical and pollution
- Salt water

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Conclusion for temperature and corrosion

- Take a high quality of rails i.e allow steel
- Anti corrosion coating increases life time
- Hard nose clip fixing avoid movement of the rail
- Elastic pad that can resist high temperature
- Avoid direct contact with salt water
- Fixing material in high quality steel at least 8.8 and/or hot dip galvanising

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