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Bemo Rail projects in Indonesia

Bemo Rail Projects Indonesia

Tahun	Project	Q'ty (meter)	Rail type	Contractor
1988	Pelindo I Belawan, Rail Dermaga	1000	BSC 101	PT Panca Sempurna Yuda
1992	North Pulau Laut Coal Terminal	480	UIC54	PT Ballast Indonesia Construction
	Ship Unloader Rail			
1993	Tursina Harbour, East Kalimantan	660	UIC54	PT Dharma Subur Satya
		540	UIC60	
1993	North Pulau Laut Coal Terminal	1380	UIC60	PT Ballast Indonesia Construction
	Stacker Reclaimer Rail			
1995	PT Indochlor Jetty	280	A75	PT Pratama Sejati Guna
1996	Scrap Steel Jetty, Dermaga Pelsus Cigading	456	A100	PT Pembangunan Perumahan
1996	Gresik Copper Smelter Jetty	416	A100	PT Ballast Indonesia Construction
1997	Surabaya Ocean Container Port / TPS	900	A100	PT Alam Cipta Gemilang
1997	Gresik Copper Smelter Jetty	276	A100	PT Ballast Indonesia Construction
1997	PT Indominco Mandiri	1925	S49	PT Thiess Contractor Indonesia
1997	Precasting Yard Toll Road	468	S49	PT Yala Perkasa - Billfinger J.O
2001	Surabaya Flour Mill / Bogasan	104	MRS87A	PT Multi Karya Develindo

Year	Project	Q'ty (meter)	Rail type	Contractor
2013	Bagendang Multipurpose Terminal phase 1	240	A100	PT Wijaya Karya
2014	Bagendang Multipurpose Terminal phase 2	200	A100	PT Gedio Makmur
2016	PT IKI Bitung Slipways (just supply)	1560	UIC54	PT Brantas Abipraya
2017	PT Krakatau Bandar Samudera	600	A100	PT Jakarta Prima Cranes
2018	Pelabuhan Gilimas, Lombok	880	A100	PT Jakarta Prima Cranes
2018	PT Krakatau Bandar Samudera	800	A100	PT MHE Demag Indonesia
2018	Bagendang Multi Purpose Terminal phase 3 and Bumiharjo Terminal	660	A100	PT Jakarta Prima Cranes
2019	Indonesia Pagkalan Bun New Wharf for Container Crane at Bumiharjo Port	2x 130	A100	PT Jakarta Prima Cranes
2019	Indonesia Sampit, Wharf extension for container crane at Bagendang Port	2x 200	A100	PT Jakarta Prima Cranes
2019	Indonesia Petrokimia Gresik, New Warf for Ship Unloader at PT Petrokimia Gresik	864	A100	PT MHE Demag Indonesia
2020	Makassar New Port, supply of fastening system STS16	3840	CR73	PT MHE Demag Indonesia
2020	Kijing Port, West Kalimantan	2x 750	A150	PT MHE Demag Indonesia
2020	Teluk Lamong MRS87A renovation	Y7B Bemo Rail Clip		

Just installation

Year	Project	Q'ty (meter)	Rail type	Contractor
2018	Pontianak RMGC rail	180	A100	CV Antariksa
2018	Slipways PT IKI Makassar	2040	UIC54	MHE Demag Indonesia
2019	Petrokimia Gresik	800	A100	MHE Demag Indonesia

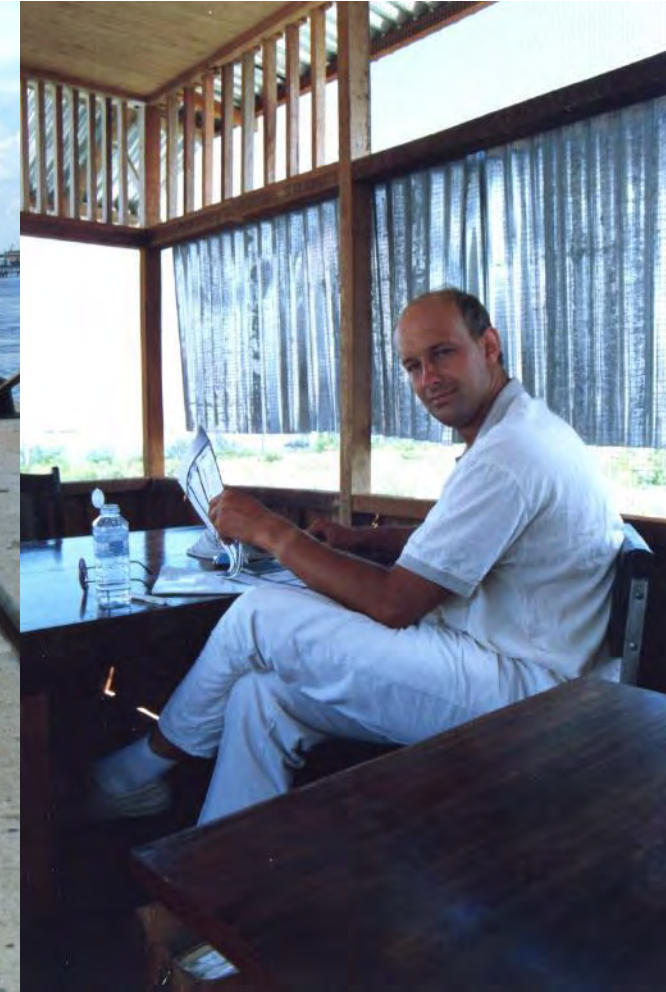
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Indonesia Pelindo 1 Belawan, Rail Dermage
1988 1000m BSC 101 rail



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Indonesia Pelindo 1 Belawan, Rail Dermage 1988 1000m BSC 101 rail



Indonesia Pelabuhan Gilimas Lombok 2018 880m A100 rail



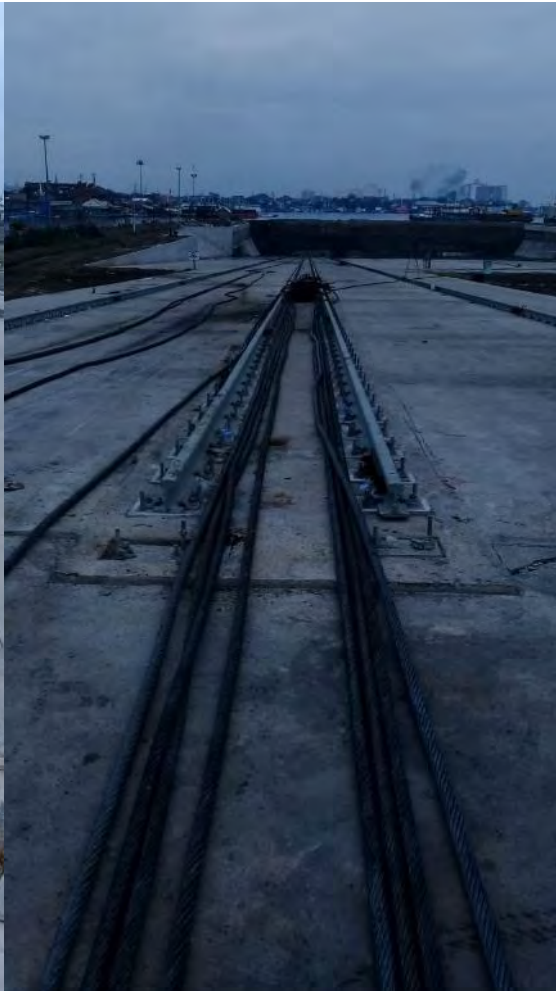
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Indonesia Pelabuhan Gilimas Lombok 2018 880m A100 rail



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Indonesia Slipways PT IKI Makassar 2018 2040m UIC54 rail



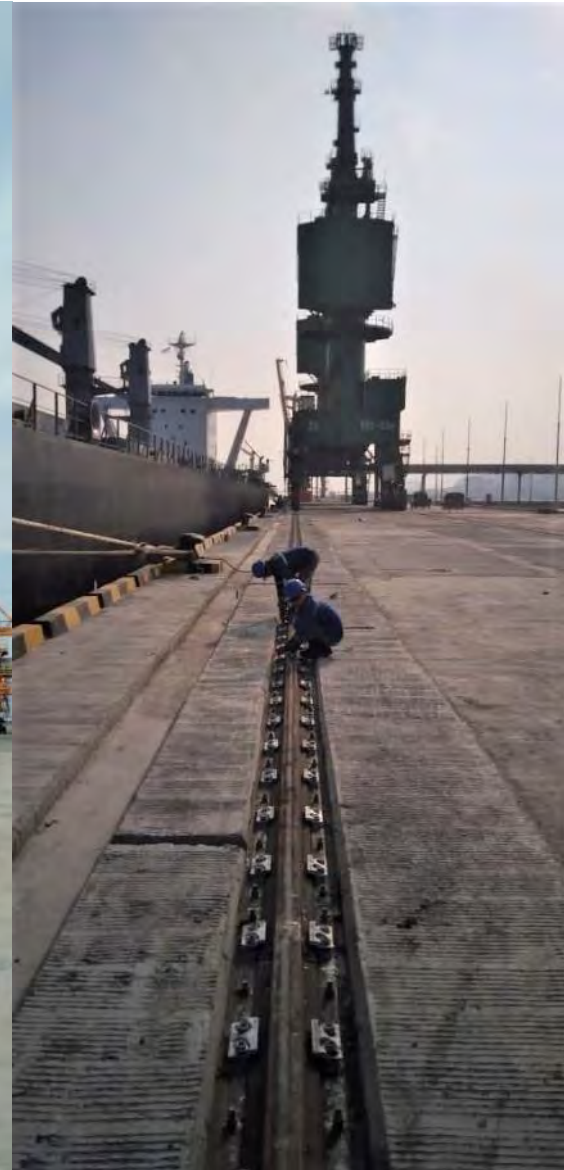
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Indonesia PT Krakatau Bandar Samudera 2018 800m A100 rail



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Indonesia PT Krakatau Bandar Samudera 2018 800m A100 rail



Indonesia Pangkalan Bun 2019

New Wharf for Container Crane at Bumiharjo Port, Pangkalan Bun, Central Kalimantan, length 2x 130m



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Indonesia Pangkalan Bun 2019

New Wharf for Container Crane at Bumiharjo Port, Pangkalan Bun, Central Kalimantan, length 2x 130m



Indonesia Petrokimia Gresik 2019

New Wharf for Ship Unloader at PT Petrokimia Gresik, Gresik East Java



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Indonesia Sampit 2019

Wharf extension phase 3 for Container Crane at Bagendang Port, Sampit, Central Kalimantan, length 2x 200m



POCOPHONE
SHOT ON POCOPHONE F1

2019/8/3 17:06

Indonesia Sampit 2019

Wharf extension phase 3 for Container Crane at Bagendang Port, Sampit, Central Kalimantan, length 2x 200m

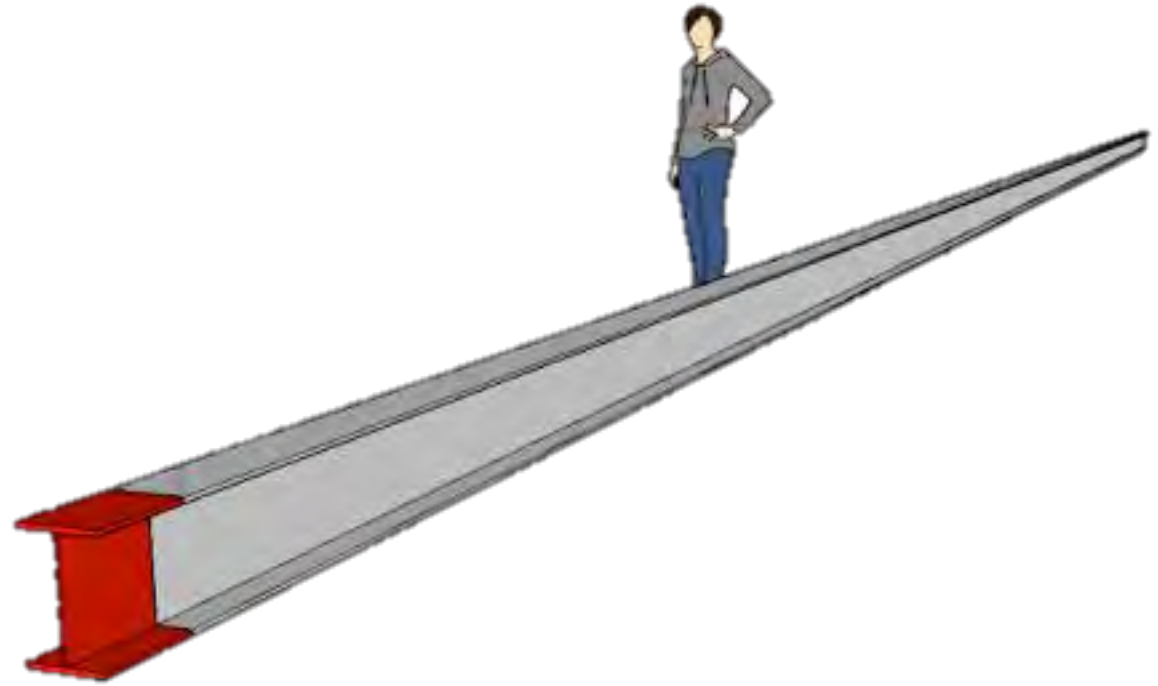


Indonesia Sampit 2019

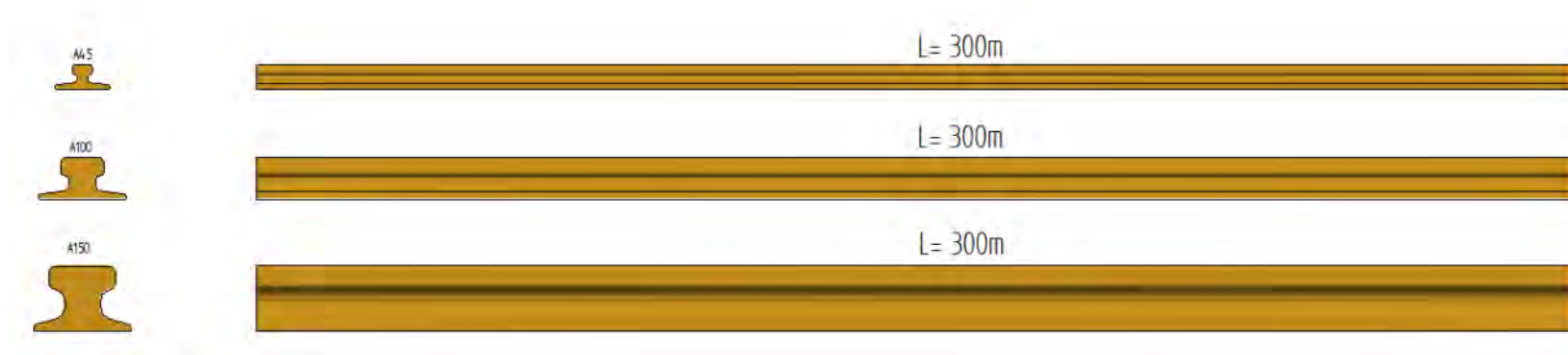
Wharf extension phase 3 for Container Crane at Bagendang Port, Sampit, Central Kalimantan, length 2x 200m



Thermal expansion rails



Thermal expansion rails



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

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

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

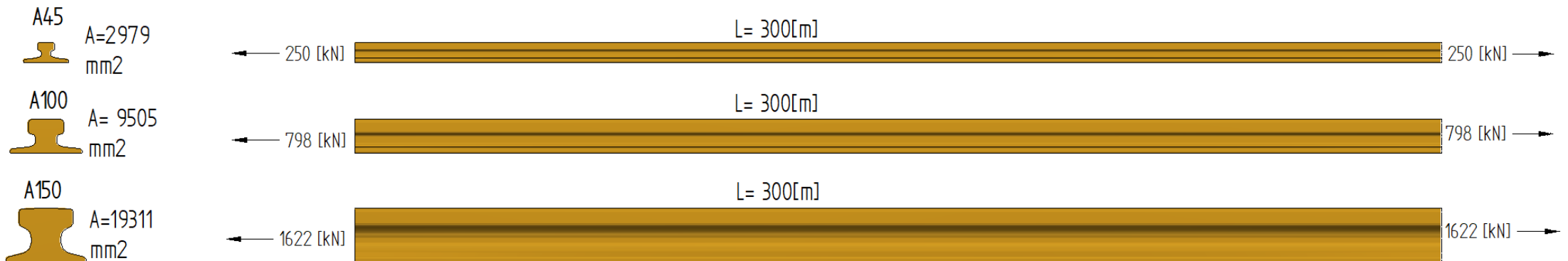
Extension is independent from rail size!

Required tensile force to expand

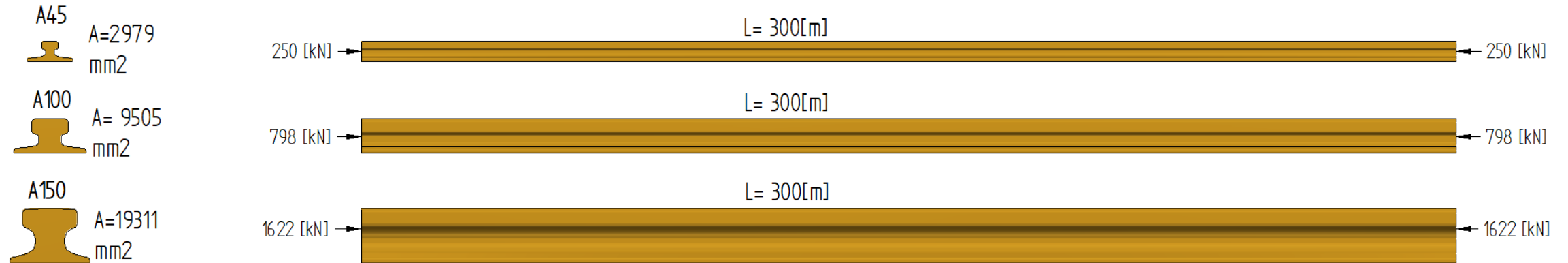
$$\Delta L = \frac{F \cdot L}{A \cdot E} \rightarrow F = \frac{(A \cdot E) \cdot \Delta L}{L} \quad F = \frac{(A \cdot E) \cdot (\alpha \cdot L \cdot \Delta T)}{L} \rightarrow \frac{(A \cdot E) \cdot (\alpha \cdot L \cdot \Delta T)}{L} \rightarrow \text{Force is independant from rail length!}$$

(Law of hooke)

ΔL	Extension length	[m]	F_{A45}	$2979 \cdot (200 \cdot 10^3) \cdot 0,000012 \cdot 35 \rightarrow$	250 [kN]
F	Force	[N]	F_{A100}	$9505 \cdot (200 \cdot 10^3) \cdot 0,000012 \cdot 35 \rightarrow$	798 [kN]
L	Rail length	300 [m]	F_{A150}	$19311 \cdot (200 \cdot 10^3) \cdot 0,000012 \cdot 35 \rightarrow$	1622 [kN]
A	Surface area rails	[mm ²]			
E	Modulus of elasticity	200 [Gpa]			
a	Thermal expansion coefficent steel	0,000012[1/K]			



Compressive force in rails



$$F_{clamp_total} = \mu \cdot F_{friction}$$

F_{clamp} Clamp force [N]

$F_{friction}$ Friction force [N]

μ Friction coefficient 0,6

Rail F_{clamp_total}

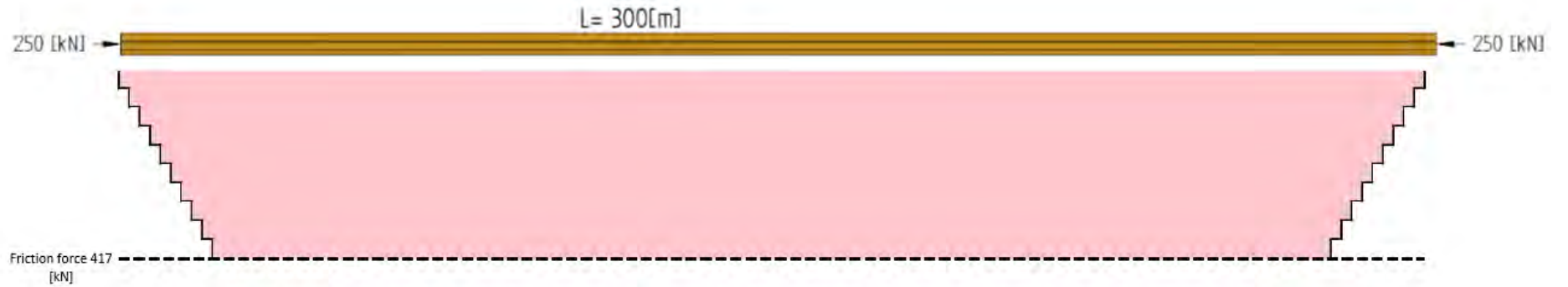
A45 417 [kN]

A100 1330 [kN]

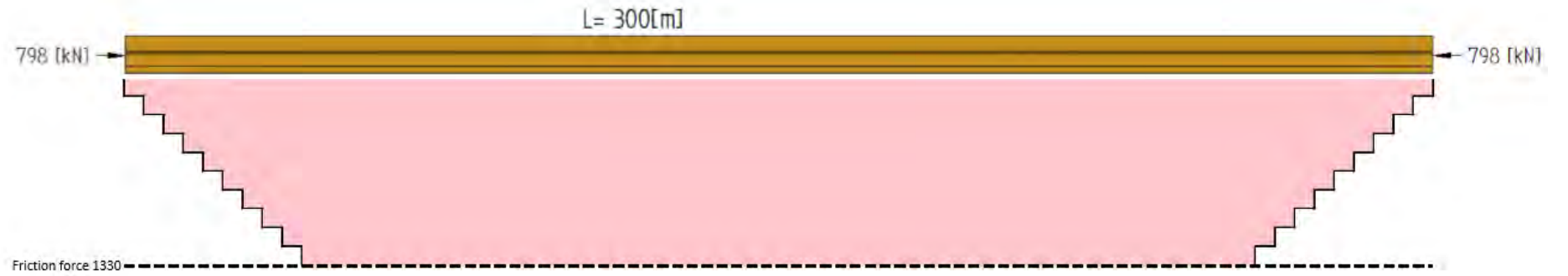
A150 2703 [kN]

Absorption of forces

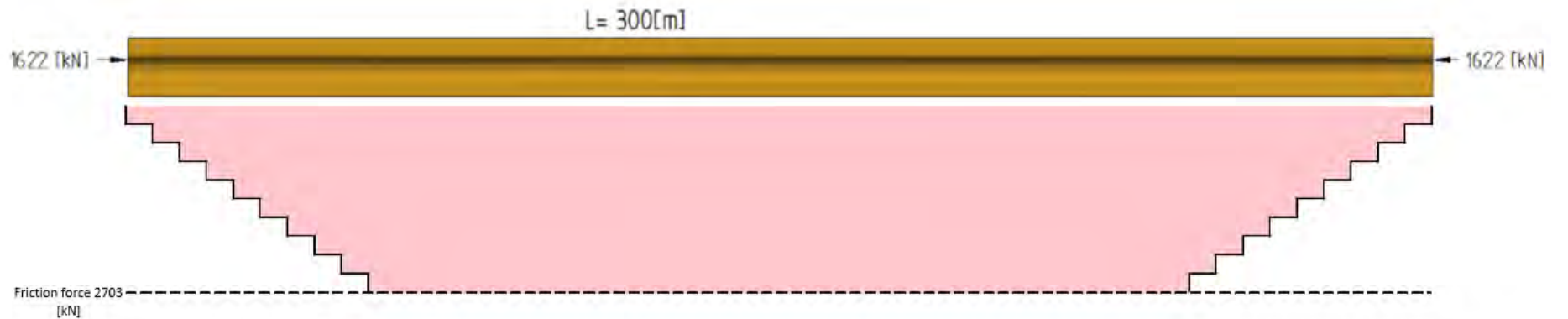
A45
A=2979
mm²



A100
A= 9505
mm²



A150
A=19311
mm²



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

Foto Kondisi Rail Pelabuhan Teluk Lamong



Gambar 1



Gambar 2



Gambar 3



Gambar 4



Gambar 5



Gambar 6



Gambar 7



Gambar 8

Keterangan dari user :

1. Rail clip sudah tidak cukup kuat mencengkeram rail, sehingga terjadi pergeseran
2. Rubber pad, sudah keras dan getas
3. Antara rubber pad dan rail, terdapat sim plat besi yang sengaja dipasang karena proses alignment pada awalnya
4. Gambar #3 dipasang setiap jarak 10 m akibat rail yang miss-alignment
5. Akibat rail miss-alignment, roda RTG terkikis sebelah sisi, seperti tampak pada gambar #9 & #10

Permintaan user :

1. Analisa kekuatan rail clip
2. Jika rail clip existing perlu diganti (gambar #1), maka harus disampaikan dasar perhitungannya sampai timbul type rail clip yang sesuai
3. Pergantian rubber pad
4. Tidak ada sim plat besi lagi
5. Proses re-alignment rail bersamaan dengan pergantian rail clip dan rubber pad



Gambar 9



Gambar 10

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Gambar 1



Gambar 2



Gambar 3



Gambar 4



Gambar 5



Gambar 6

Keterangan user :

1. Kondisi sama / typical dengan yang terjadi di discontinue support
2. Diperlukan analisa perhitungan rail clip dan pergantian rail clip berdasarkan perhitungan
3. Pergantian rubber pad
4. Proses re-alignment rail



Gambar 7



Gambar 8

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Maintenance Platform ZPMC Cranes



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Bemo Rail Maintenance platform
supply and installation – trolley rails

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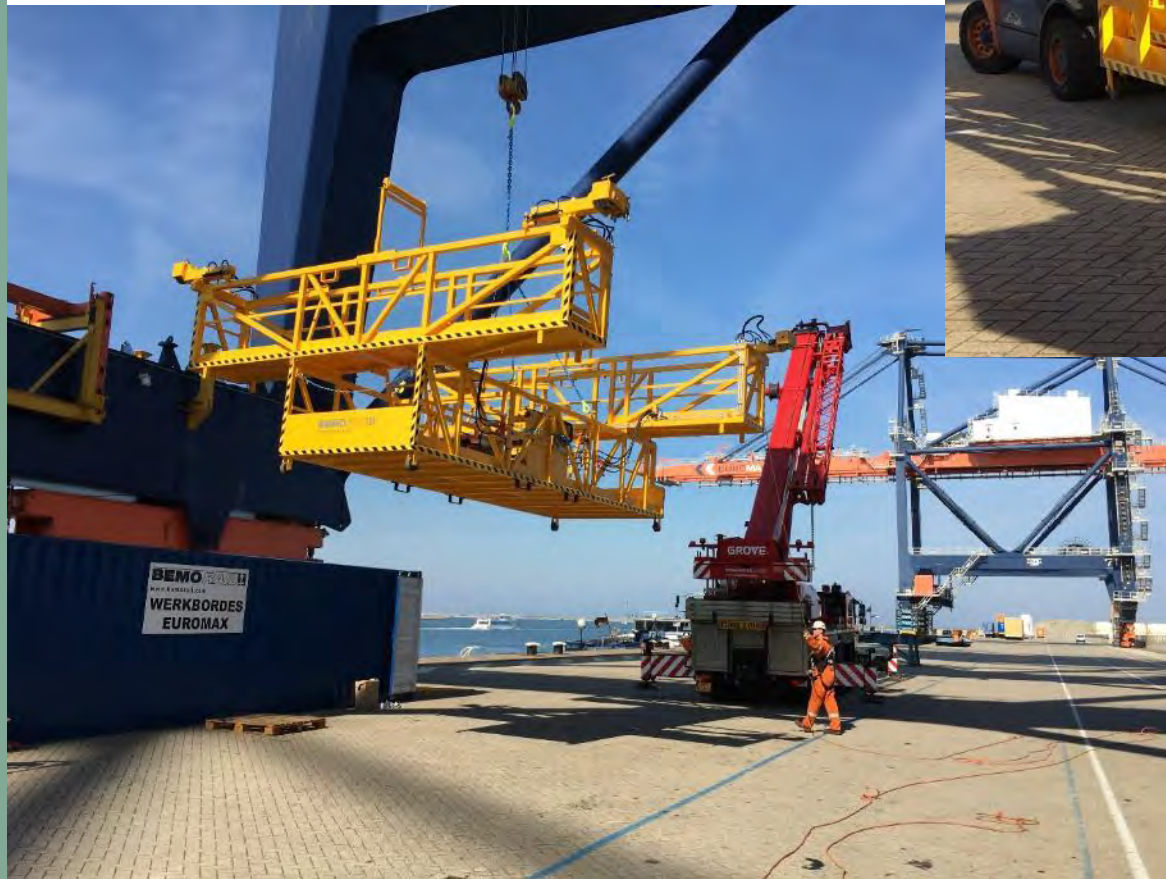


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Maintenance platform with driving device – 6 meter
Euromax Rotterdam NL

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Supply and installation
milled short rail end pieces
and rail clips

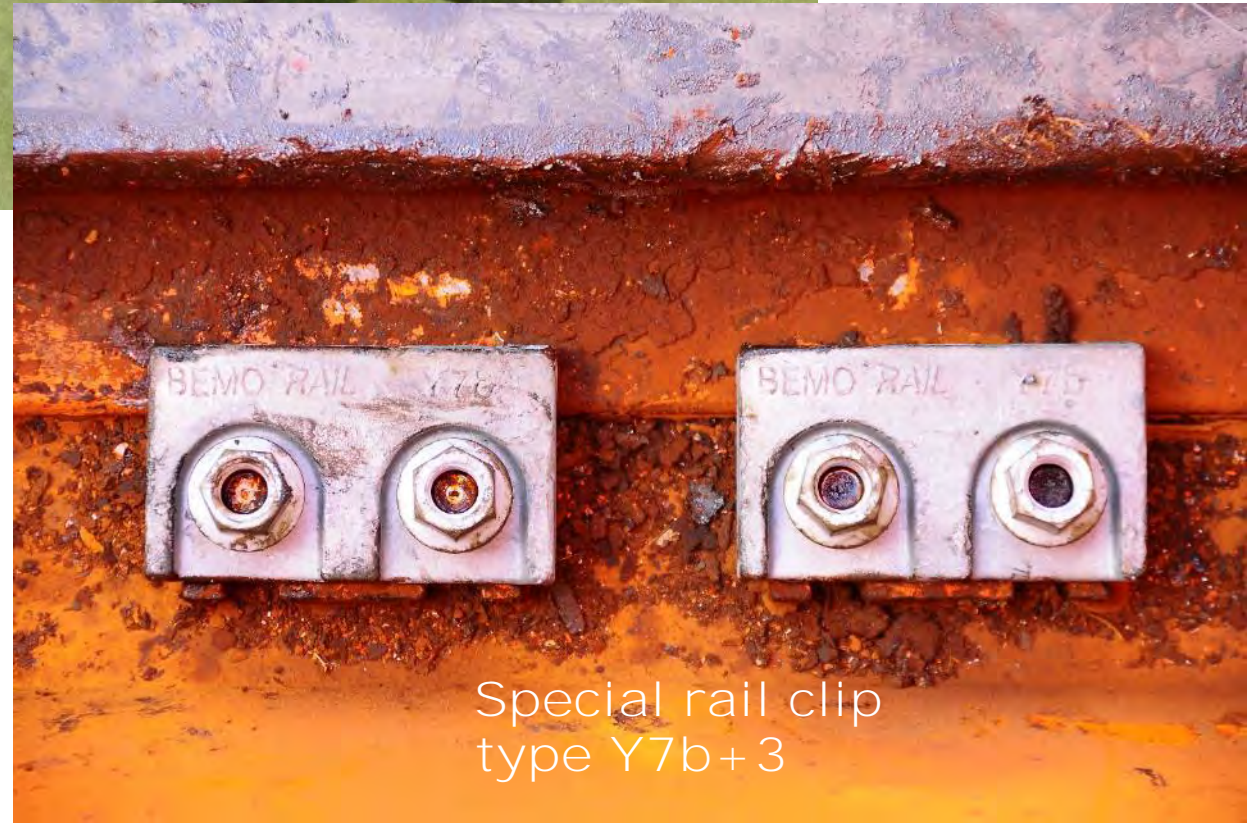
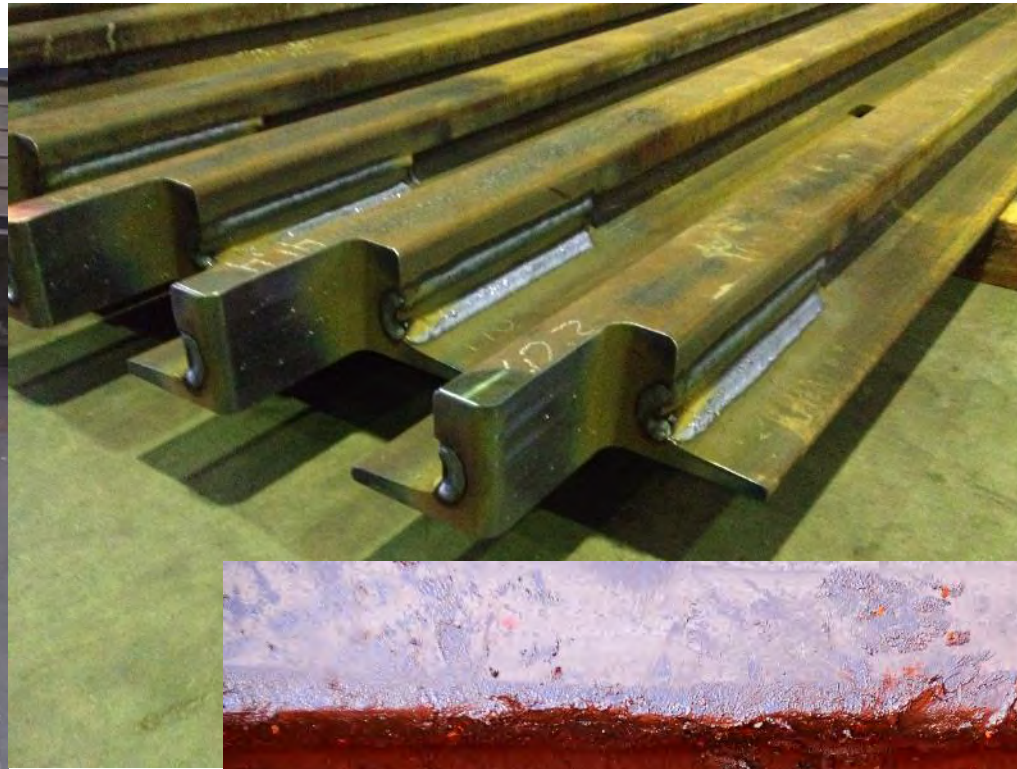
Euromax Rotterdam NL



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Milled short rail end pieces



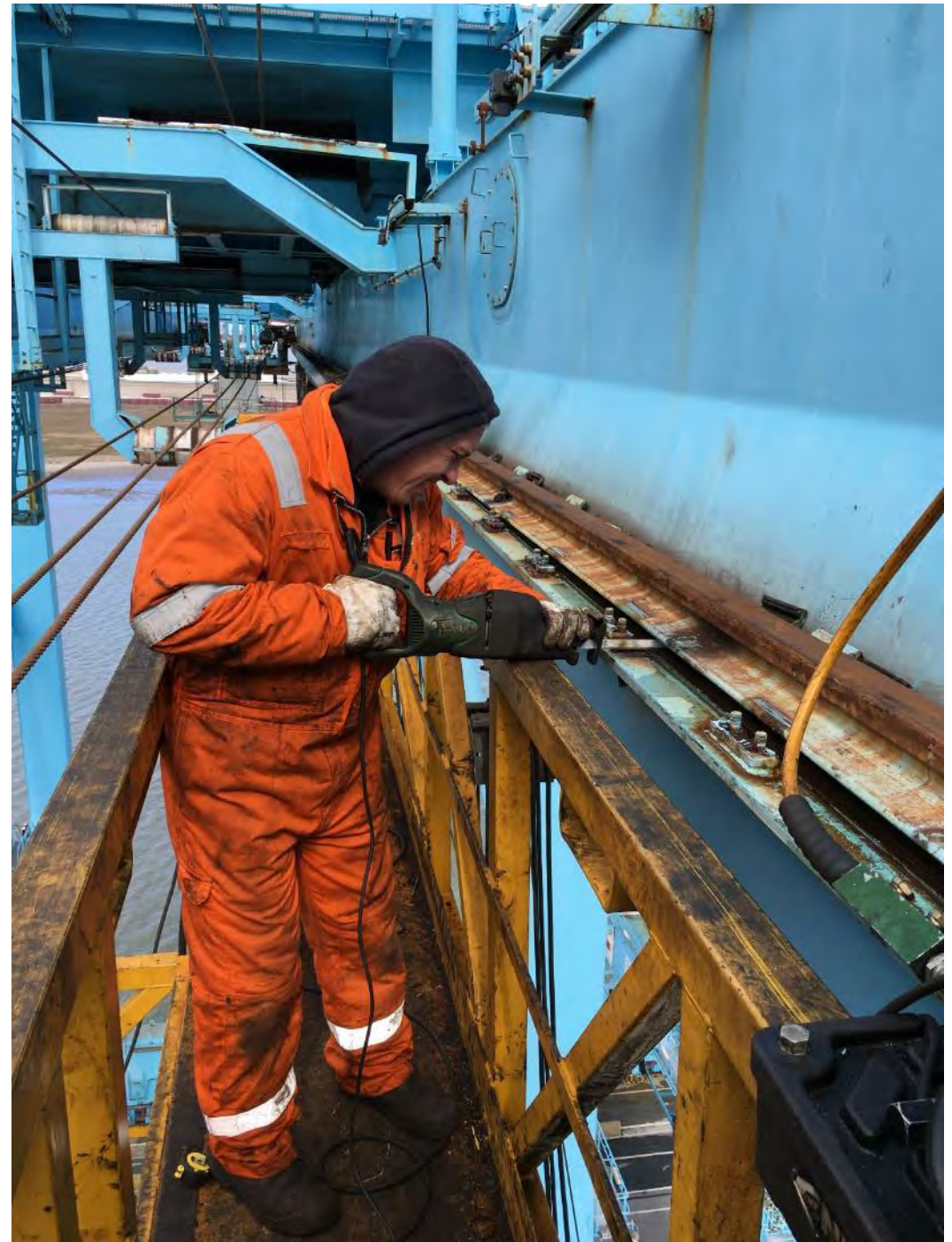
Special rail clip
type Y7b+3

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Replacement of rubber pad
APM Terminals

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References

PT BEMO REL INDONESIA

Certified **BEMO RAIL** Applicator



KRAKATAU STEEL



APM TERMINALS

