

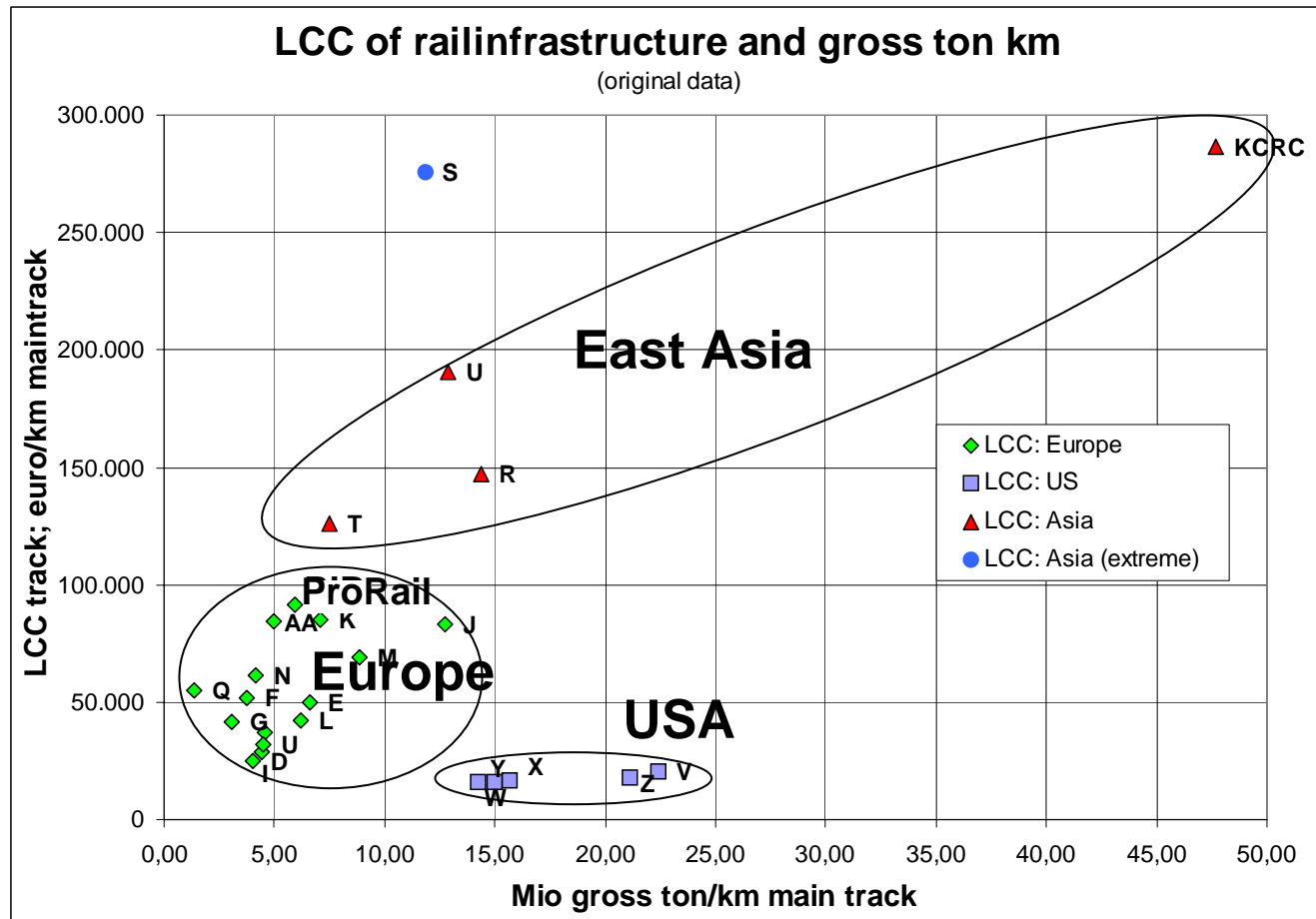
ProRail



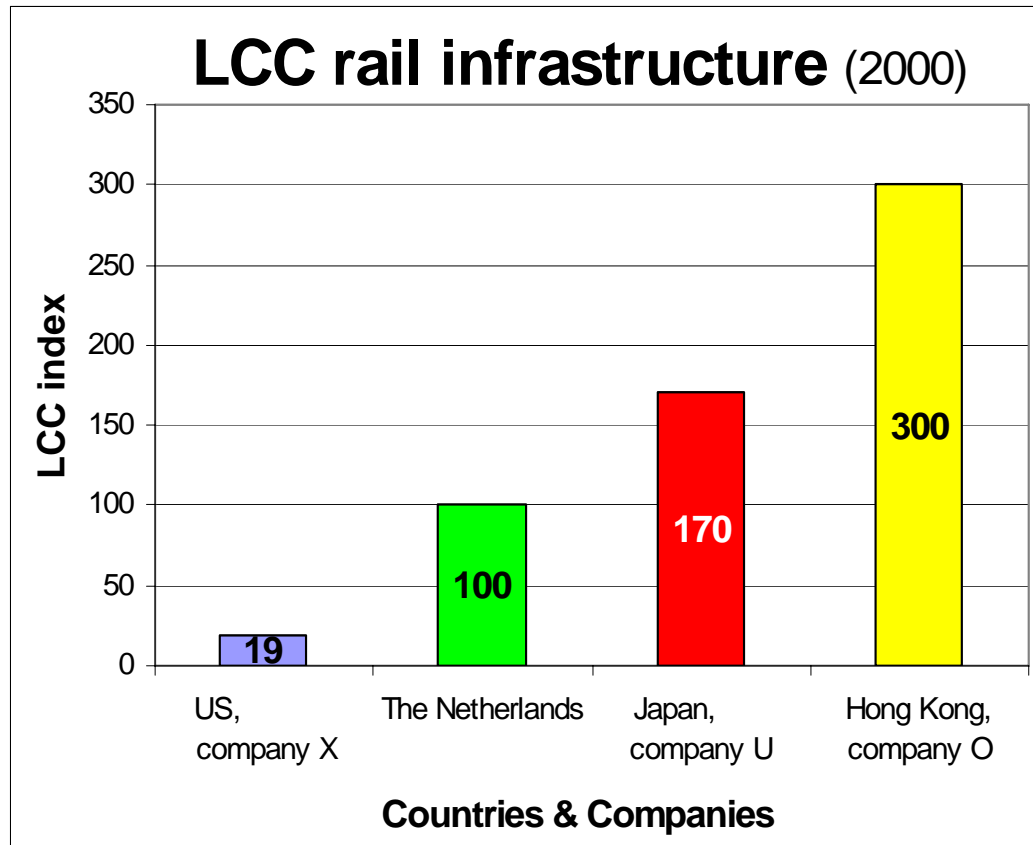
Cost Drivers analysis and development of a Business model

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Benchmark of Rail Infrastructure Costs and Utilization



Major differences in Rail Infrastructure Costs

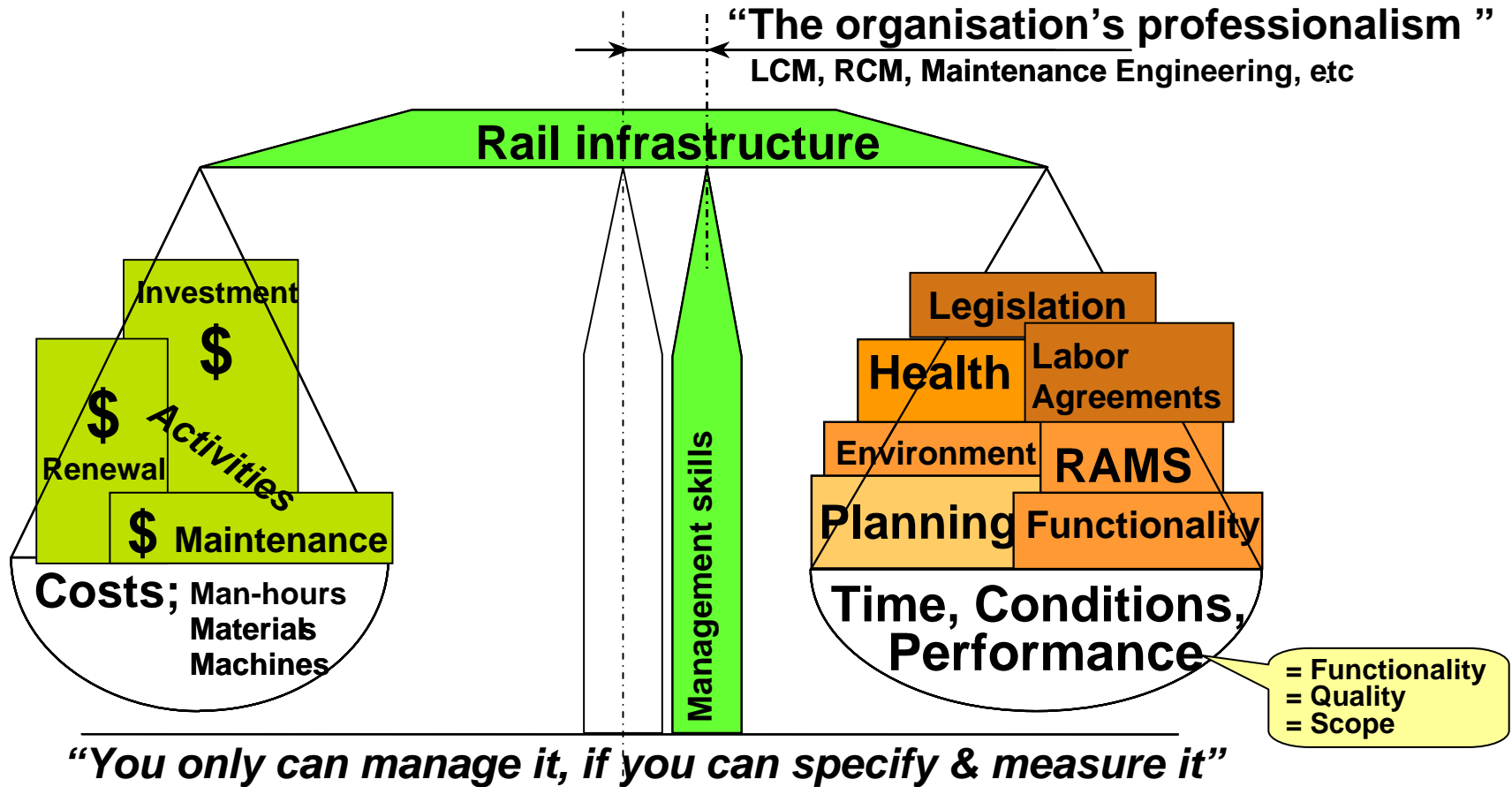


Differences in Functionality, Quality and Technique

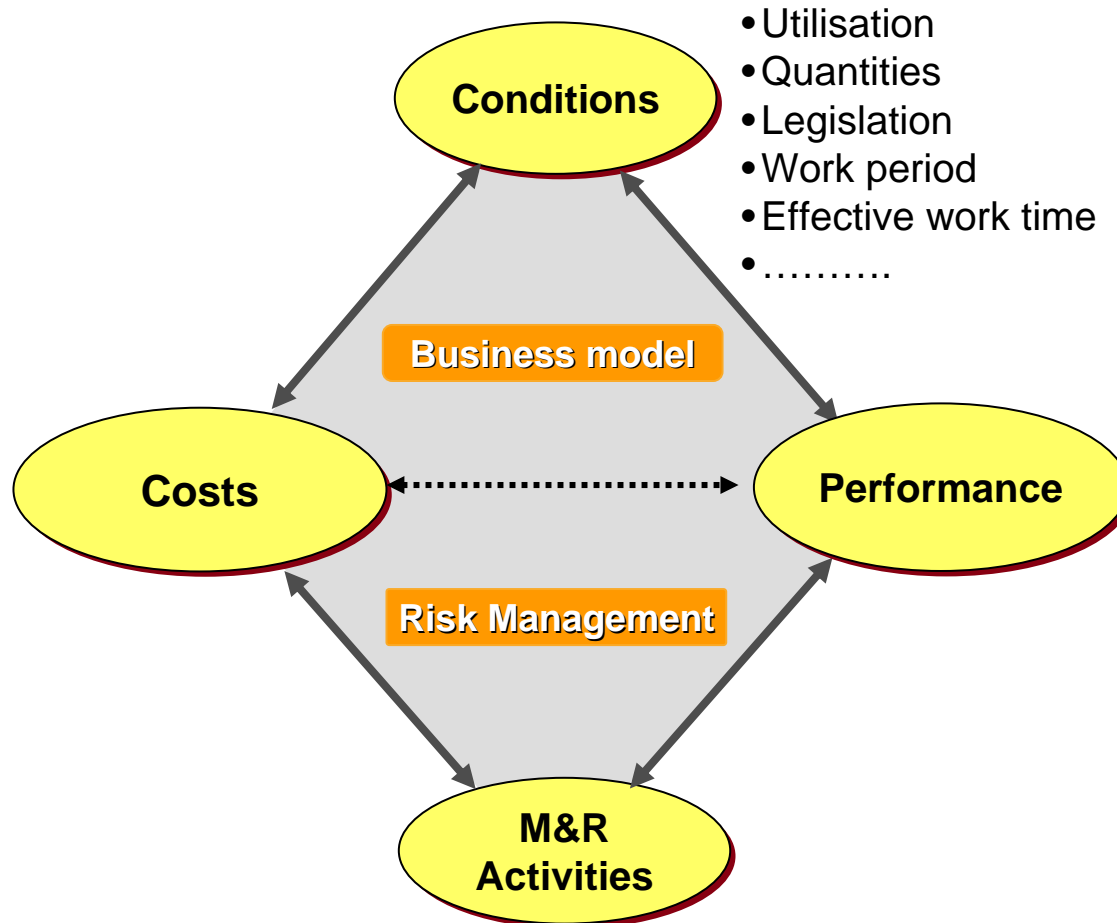
	Subject	Freight (US)	Mixed (Europe)	High-speed
Functionality	Gauge	Double stack	UIC GA/GC	UIC GA/GC
	Axle load	32	22.5	17 tons
	Speed	80-110	80-160	>200 km/hr
	Train weight	5000	100-400	300 tons/train
	Train length	2000	50-400	250 metres
	Capacity	2 – 40	20 – 250	20-120 trains/day
	Quality	Punctuality	hours	minutes
RAMS(HE)		aaaa(he)	bbbb(he)	cccc(he)
Techniques	Dynamic impact	>1.5	1.1 – 1.4	>1.5
	Rail profile	65	54 – 60	60 kg/m²
	Life time rail	1000	400 - 500	500 million tons
	Points density	0.2	1.0	0.1 per km track
	Signal distance	7.000	1.000	2.000 metres

INDICATIVE

The world of a manager in a nutshell



The relation between Costs & Performance can be managed with the help of risk management and modelling techniques

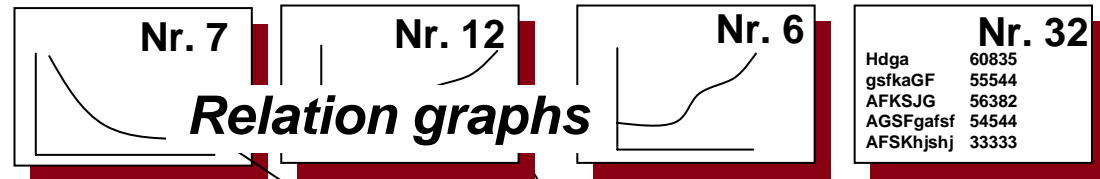


ProRail

The starting point of the Business model are the realization costs

Realisation matrix COSTS										
Rai Infrastructure	Systems / Objects	Kwan- tities	Norm		Costs		Costdrivers			
					Odh	VV, VVW	Tkm	Tonkm
Stations		Kwantiteit	€norm	€kosten	Costdrivers					
	Total Third parties				0,50,331	Mia				
ProRail organisation		Man yrs.	Costs		Costdrivers					
	Traffic Control									
	Capacity Mngt.									
	Infra Mngt.									
	Infra Projects									
	Network Devel.									
	ICT + Staff									
	Total	2800			0,70,431	Mia				

The influences of changing cost drivers are calculated with relation graphs



Realisation matrix COSTS

Systems / Objects	Kwantities	Norm	Costs		Costdrivers
			€	Norm	
Rai Infrastructure					
Stations					
Total Third parties			0,50,331	Mia	
ProRail organisation					
Traffic Control					
Capacity Mngt					
Infra Mngt.					
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Total	2800		0,70,431	Mia	

MODULE A: cost drivers MAINTENANCE

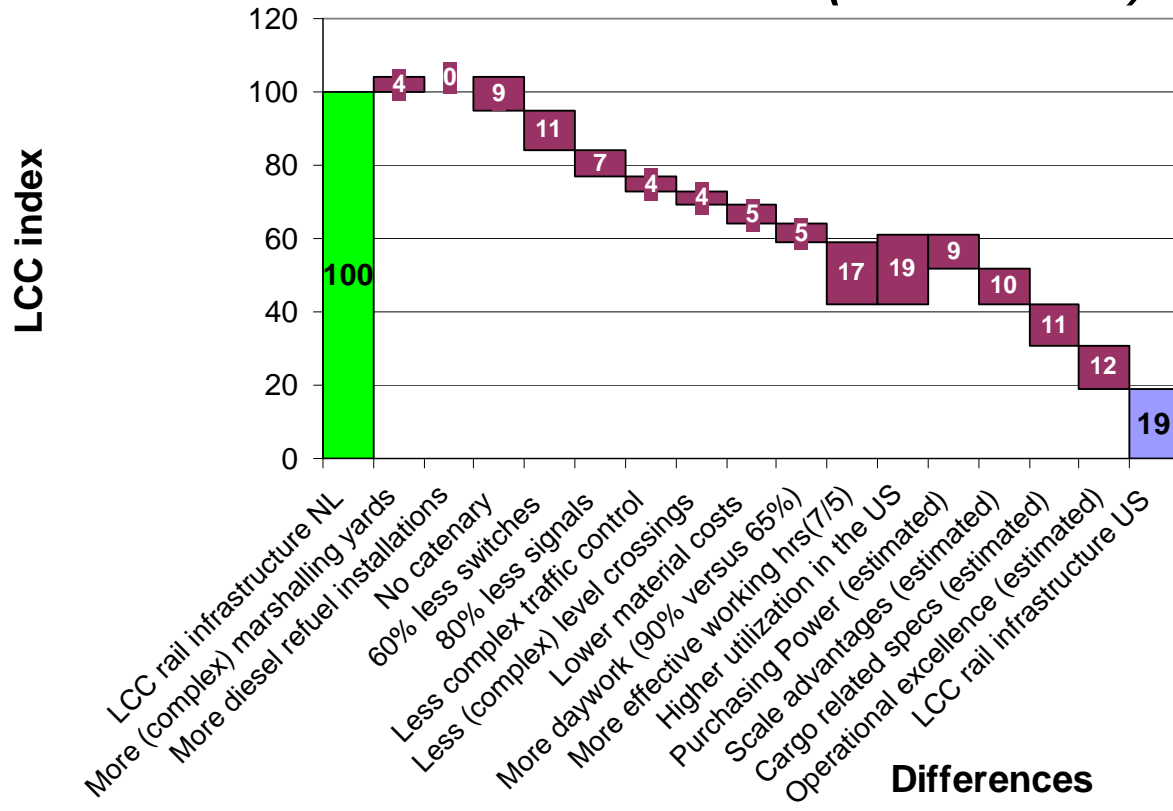
	Costs based on realization	Costs based on practice cost norms	Costdrivers					€Cost prognosis
			Kwan-tities	Use	D/N/W	Train Free Period	Price level	
Substructure								
Substr. elements								
Track								
Switch								
Marshalling yard								
Level crossing								
Level crossing, sign.								
Bridge & Tunnel								
Energy, 1500V								
Energy, diesel								
Signaling								
Communication								
Traffic Control								

OPTION

Calculation of the influence of cost drivers

Cost driver analysis of rail infrastructure in the USA

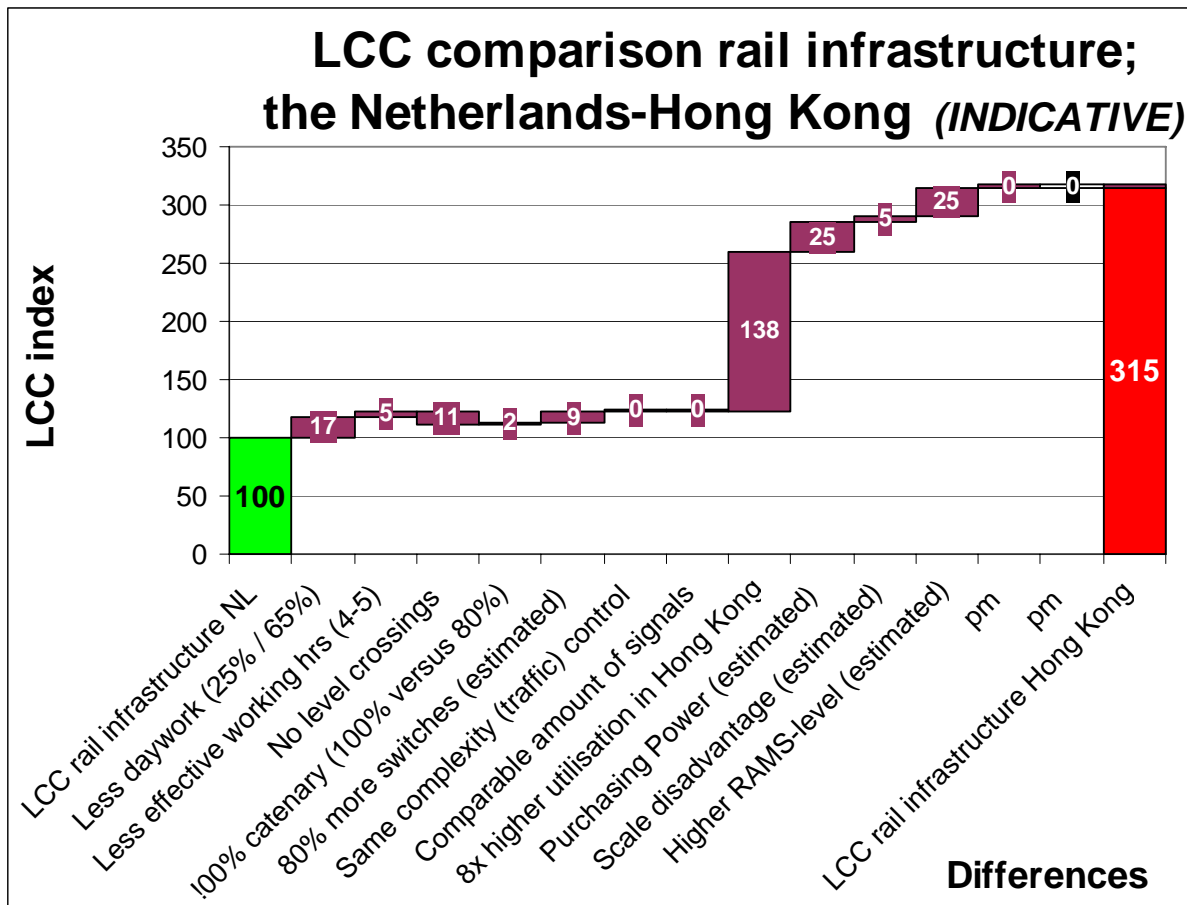
LCC comparison rail infrastructure; the Netherlands - US (INDICATIVE)



Explanation of cost difference:

- No catenary
- Less switches (-60%)
- More day work (90%)
- More effective working time
- Economy of Scale
- No “passenger comfort” specs
- Operational excellence

Cost driver analysis of rail infrastructure in Hong Kong



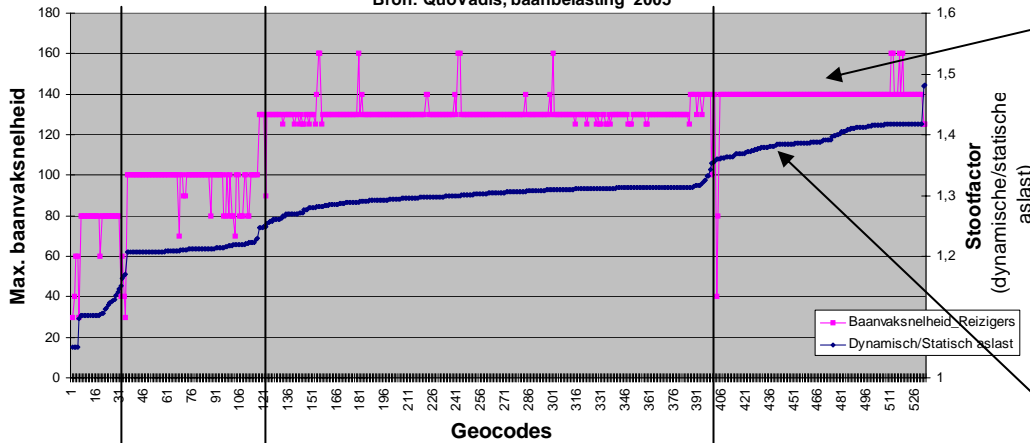
Explanation of cost difference:

- Very high utilization
- Less day work
- Very high RAMS level
- More switches (50%)
- Scale disadvantages

Two petty facts

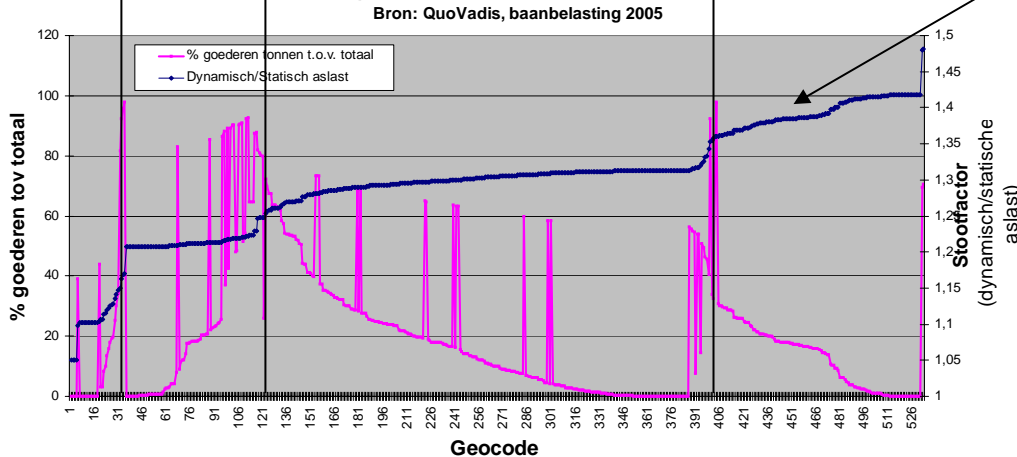
1. **Dynamic axle load; measured and modelled impact.**
2. **Costs & earnings of Rail Transport in a nut shell.**

Relatie gemeten stoot factor en maximum baanvaknelheid voor reizigerstreinen
Bron: QuoVadis, baanbelasting 2005



Maximum line speed Passenger (and Freight)

Relatie tussen de gemeten stootfactor per geocode en het % goederen tonnen tov het totaal
Bron: QuoVadis, baanbelasting 2005

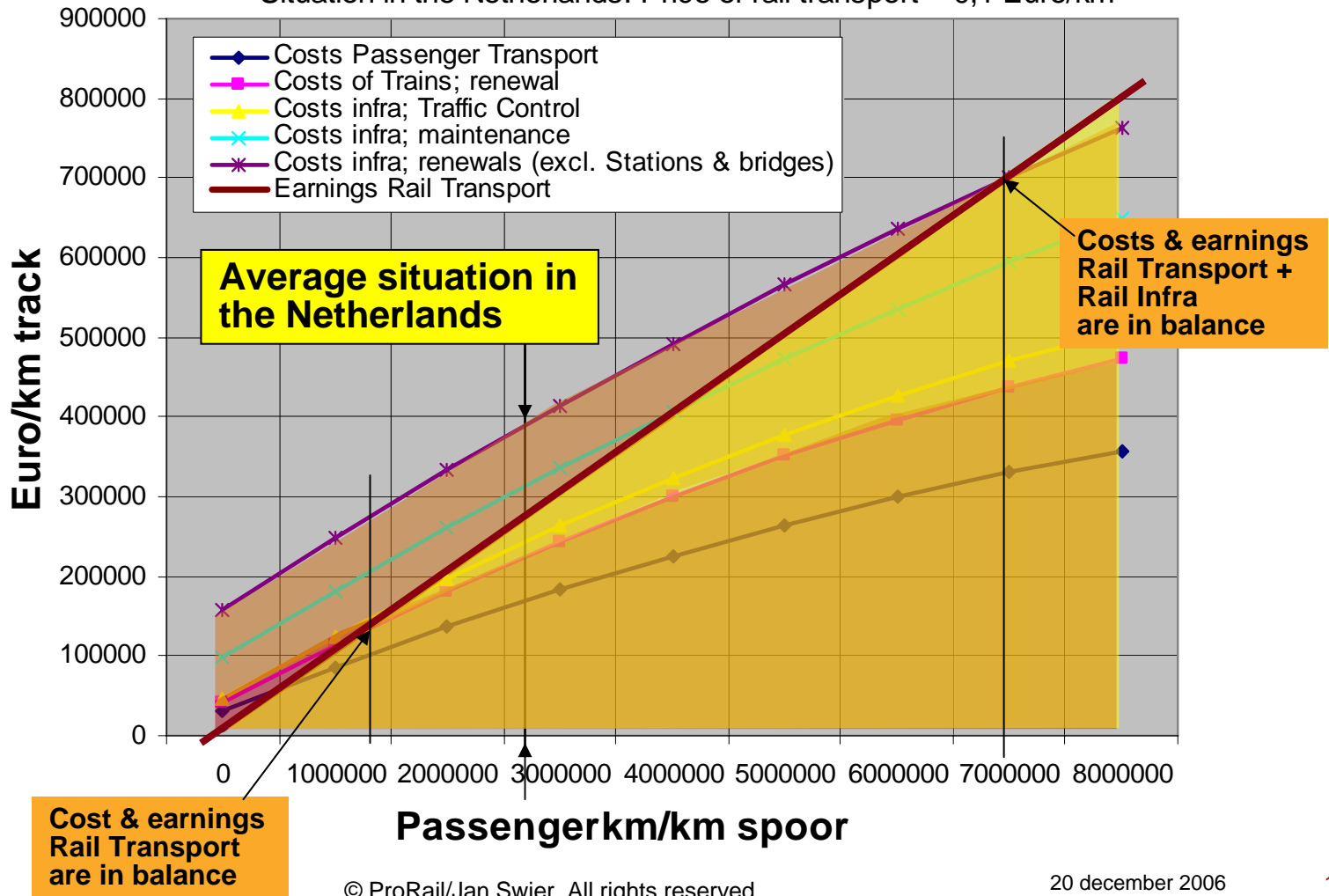


Measured impact dynamic axle load

Distributions of the amount of passenger and freight trains

Costs & Earnings Rail Transport

Situation in the Netherlands. Price of rail transport = 0,1 Euro/km



Thank you for your attention