Future Challenge and Responsibility for Technical Sector of Railways

Braam le Roux

Melbourne

20 June 2001

- In 1978 technical experts in Railways tended to have the attitude “We know, we have done it for a hundred years, don`t push me on the unproven.”

- Directeur-Ingenieur en Hoofcontroleur: circa 1850

Do we understand what we do?

- So often we become so accustomed to the outcomes of what we do that we accept without questioning it or understanding.
- In a way we cut ourselves off from fully understanding the challenge or looking for the the solution to the right problem
- Only by understanding can we hope to make great invention or improvement

Do we understand what we do ?

- “When you know the outcome of a scientific puzzle you lost the opportunity to understand it.” - Julius Miller 1968
- Fully Understanding Science started with Quarks . The Standard Model may soon have a means to endow the particle entities with the property of mass. Re-do Degrees?
- Most Railway engineers know the Newton model does not adequately enough explain friction to be used for final railway design.

Globalization

- We can not escape Globalization
- We may not like it
- We may not understand it
- But we cannot escape the Electronic Herd
- Or international commerce
- It is an opportunity for Railways that can take the gap.

The future

Australia is playing a central and pioneering role to ensure the future of Railways.

- John Kirk of ARA is doing a sterling job.
- I believe Railways will come to its own in this century of overcrowding , globalization, costly energy and carbon pollution

Interstate traffic

- Railways have in their very nature a platinum opportunity to make a killing in this day of predictability and arrival time management
- The Metro services offer excellent new technical refinement opportunities.
- To do the right thing calls for understanding the challenges and basics.

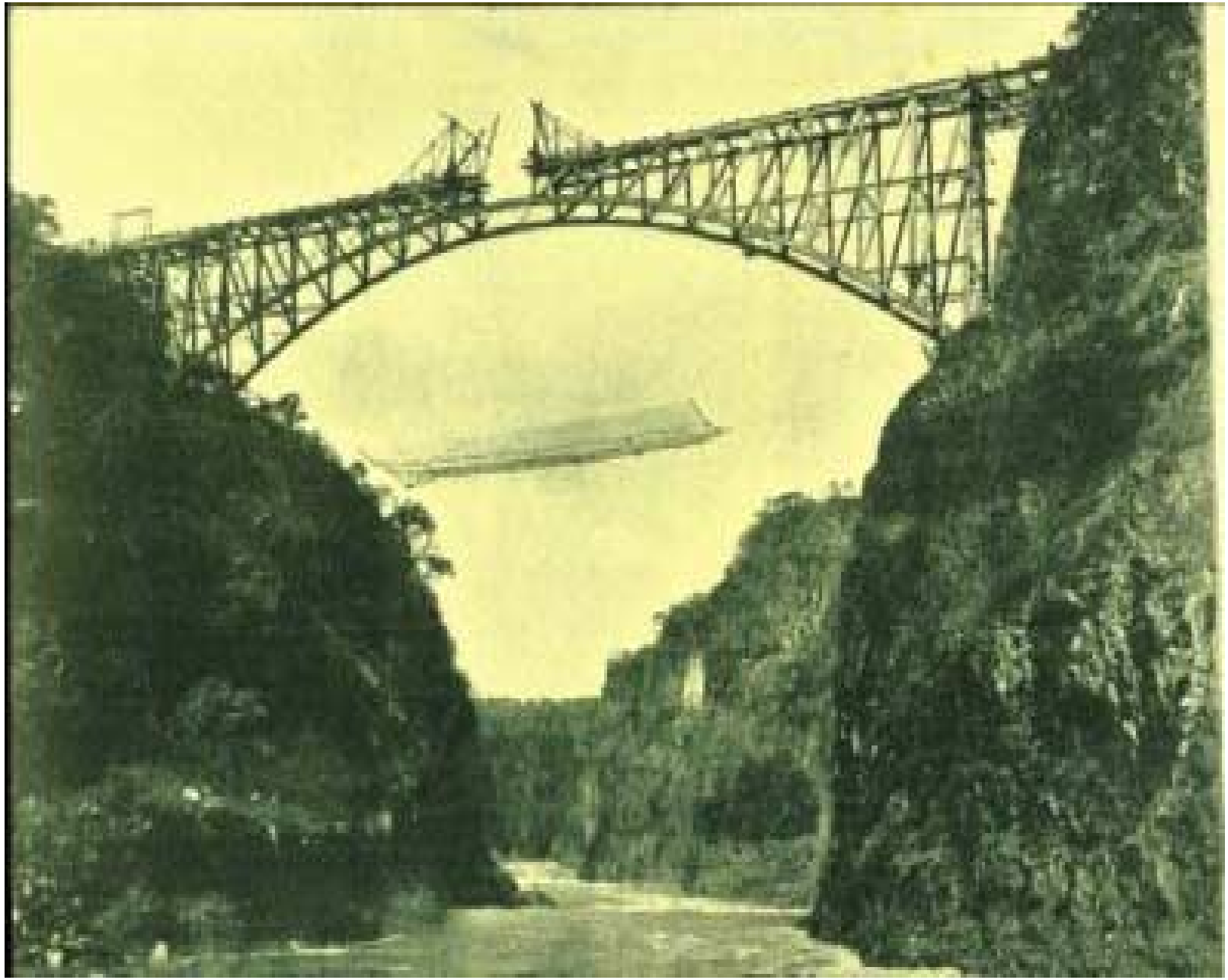
Create thrivability for Rail

- The “hundred years experience” mentality is very attractive for peaceful sleep.
- The Road people is not sleeping at all : Mr Devine
- According to Peter Ellyard “The future belong to those that get there first.”
- For years we had it all our way for that very reason.

Railways was also the start of industrial activity

Technology feats became the expected rather than exception

Bridge the gap for the future ?



Track : The long thin thing

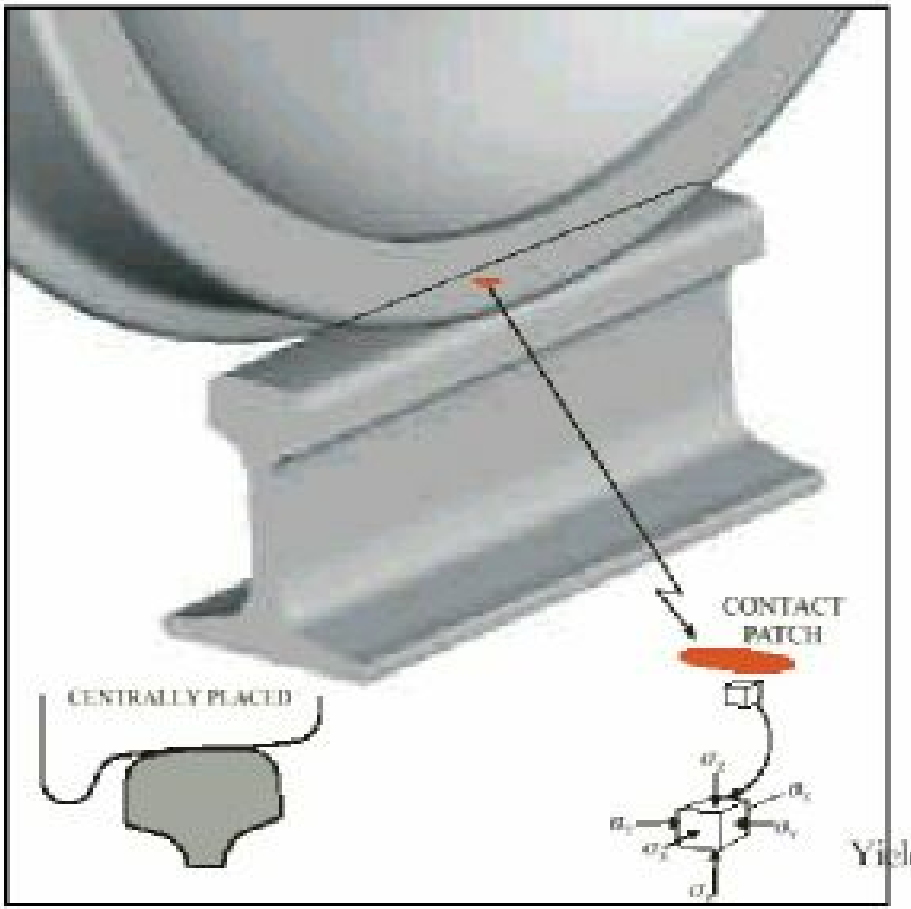
- Why Rail chairs
- Why Ballast
- Why trains
- The three D`s
- 35 tons per axle = Limit?
- Can we find a maintenance free design
- Can I find a Stable structure

Tubular Track (Pty) Ltd

Enduring vertical alignment …

IHHA Guidelines: contact patch

coin of 13-millimeter (½-inch) diameter (see Figure 1.1). This implies that a 20,000-tonne train is supported over an area equivalent to the surface of a kitchen table (1.3 m x 1.3 m or 4½ ft x 4½ ft)!



σ_z 1400 Mpa
σ_x σ_y 800 Mpa
Yield Stress is 600 – 800

Figure 1.1. Contact between Wheel and Rail: Wheel Centrally Placed on the Track

Ihha book Shelling/headchecks

Figure 1.3: Intense single point contact between flange throat and the gauge corner of the rail, which results in head-checking and shelling.

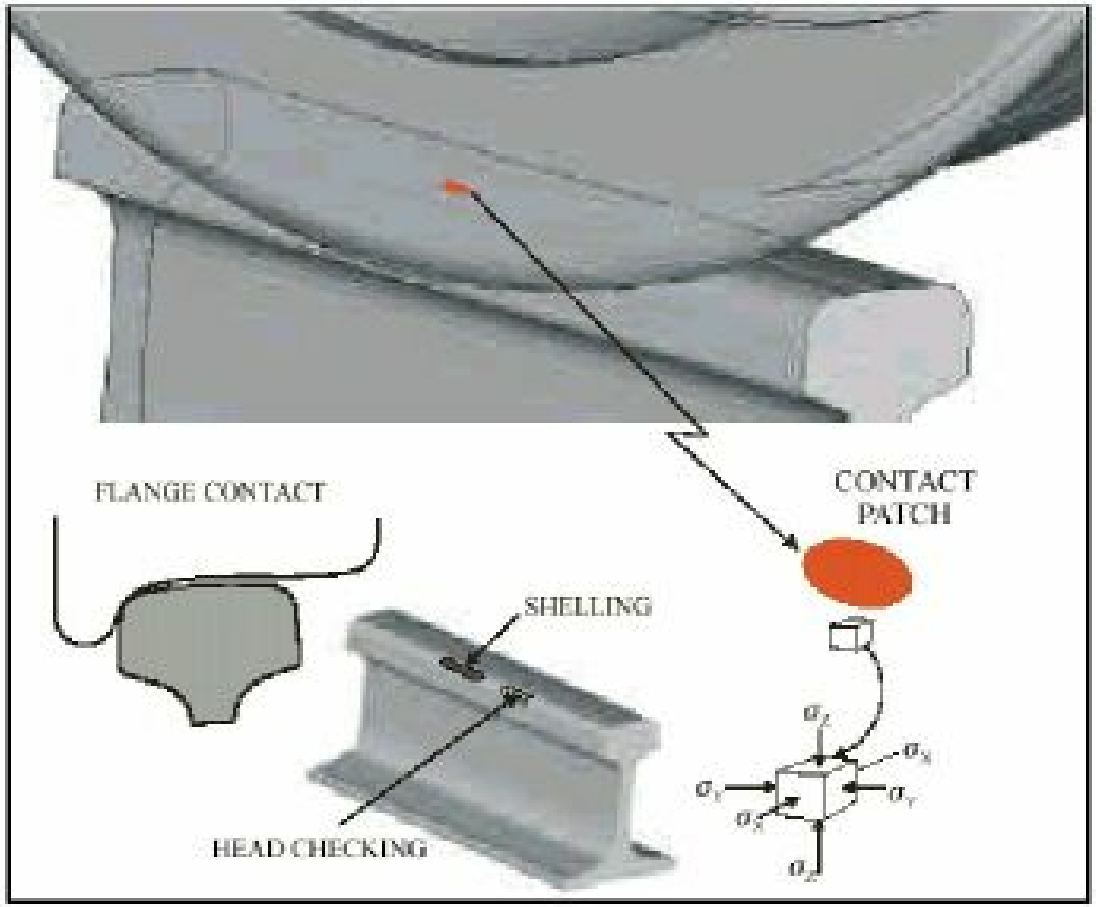


Figure 1.3

Field side of inside rail

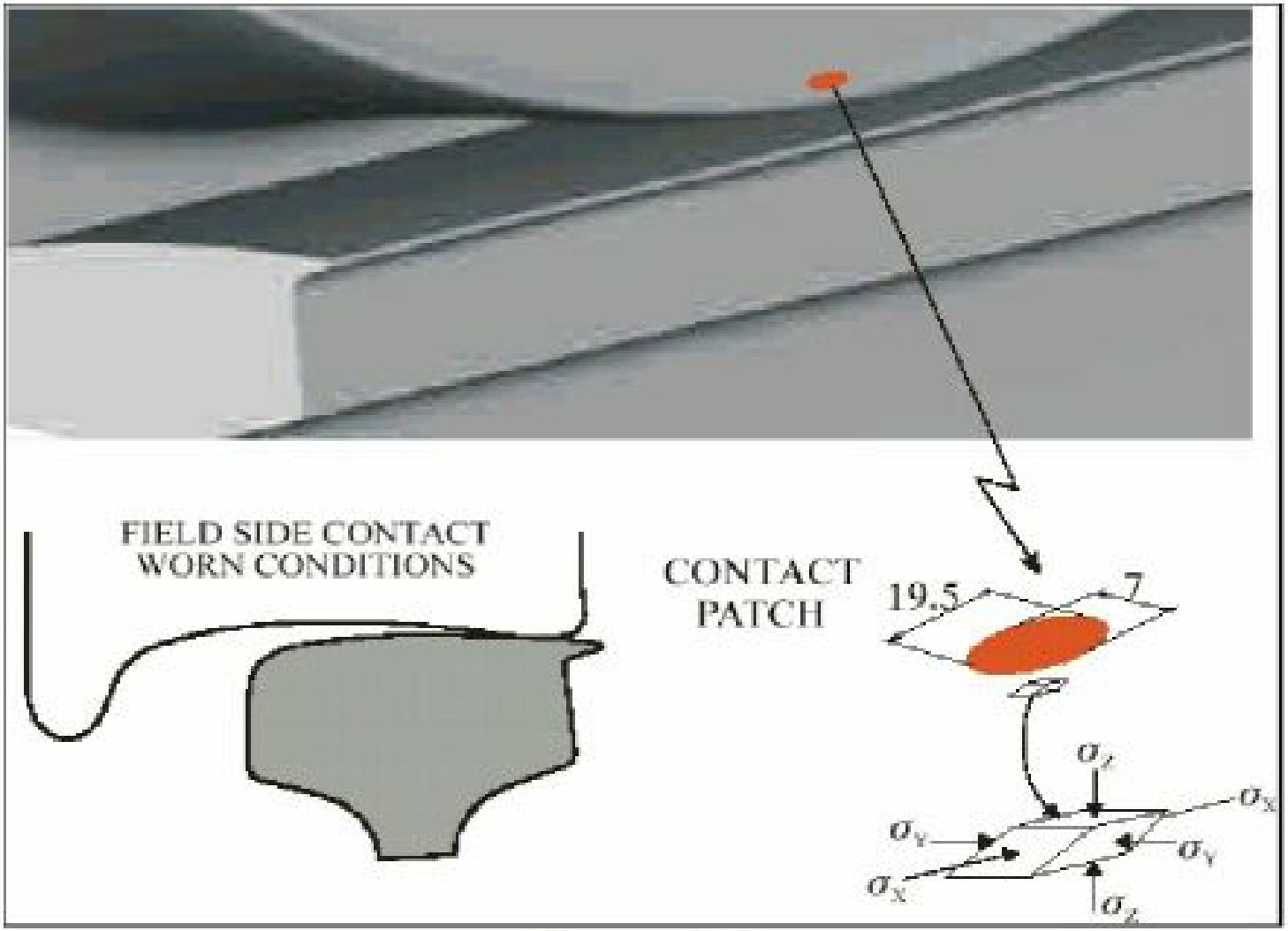


Figure 1.5

Longitudinal creep on tangent

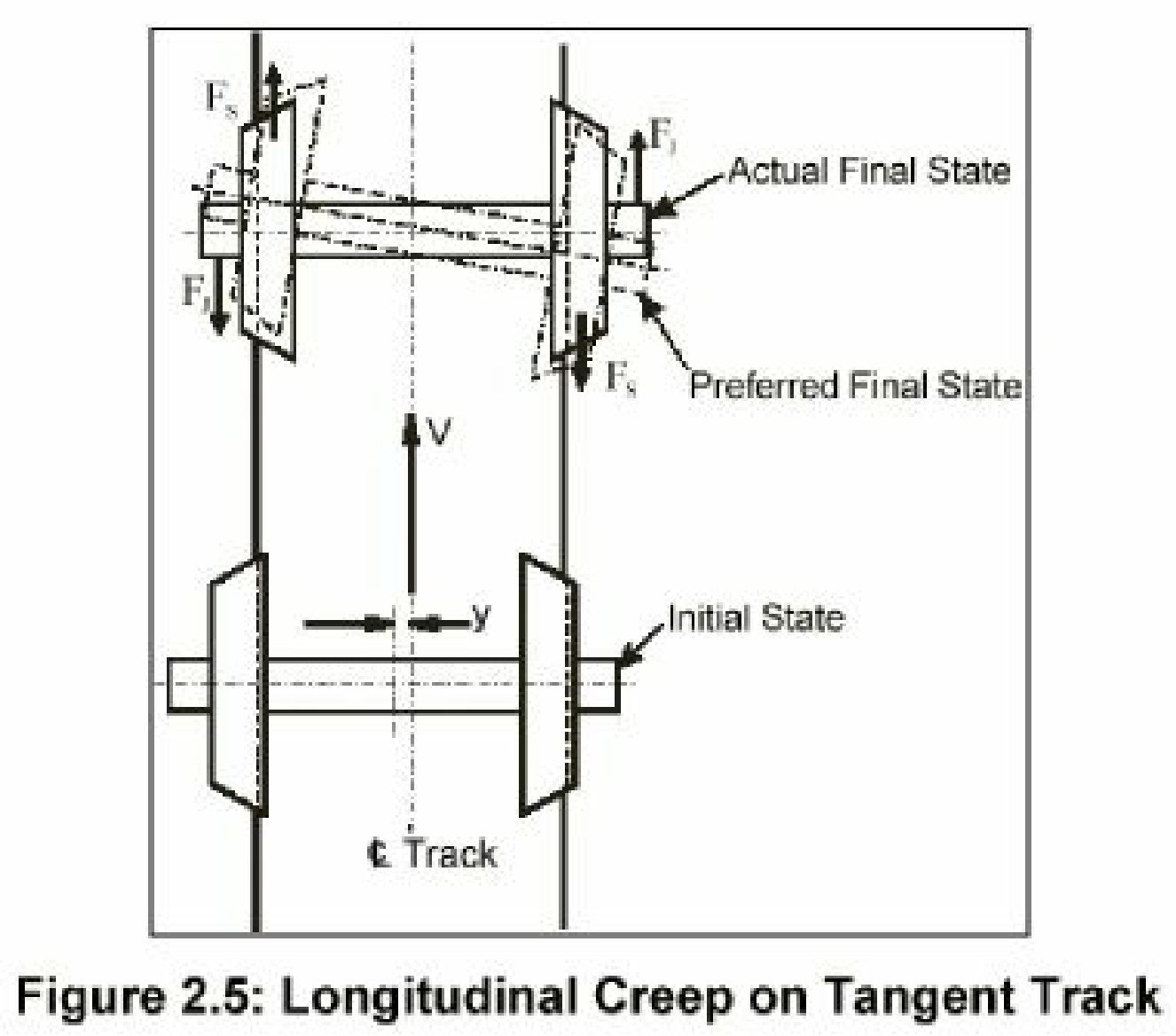


Figure 2.5: Longitudinal Creep on Tangent Track

Solid bogie in curve: Flanging

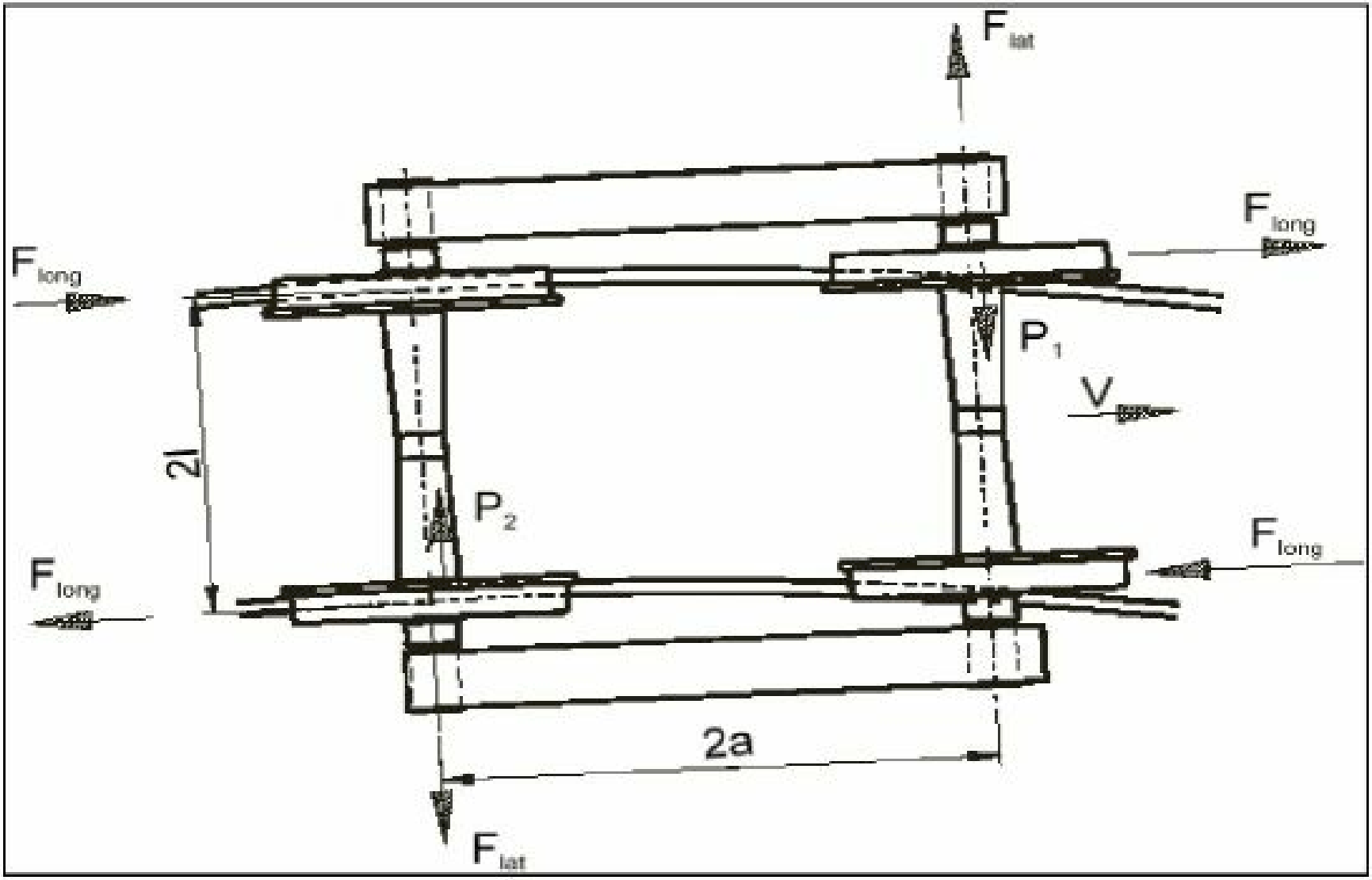


Figure 2.21: Flange Contact in Curves

Bending and Shear constraints

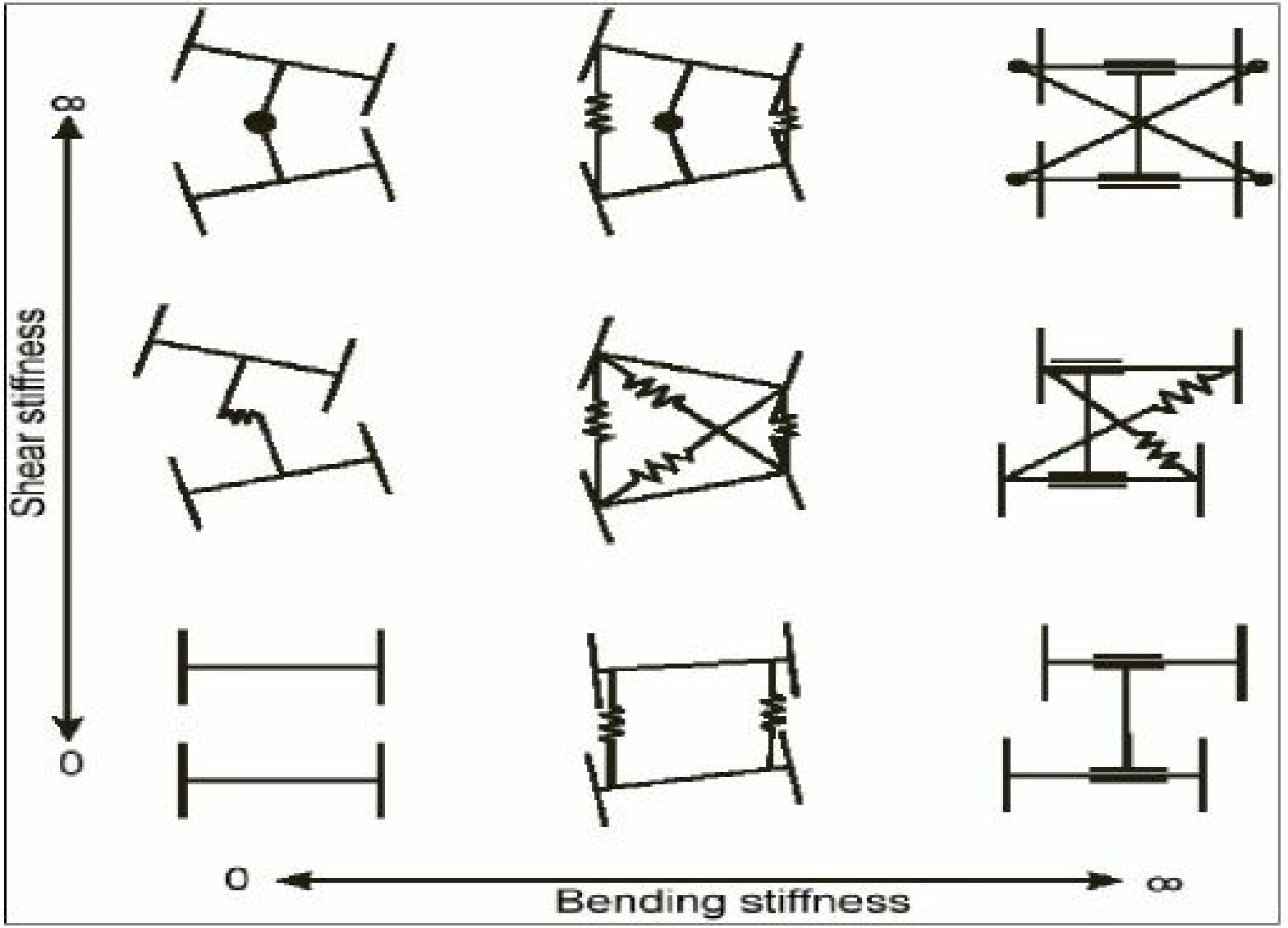


Figure 2.17: Various Degrees of Bending and Shear Constraints

Air brake steam with bissel

IHHA book :Self steering bogies

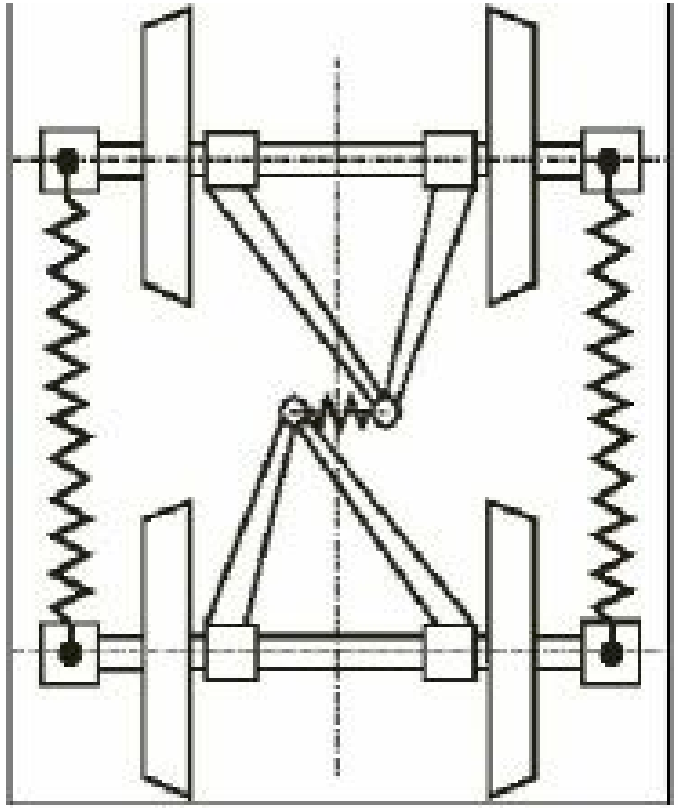


Figure 2.37: Bissel Frame Bogie

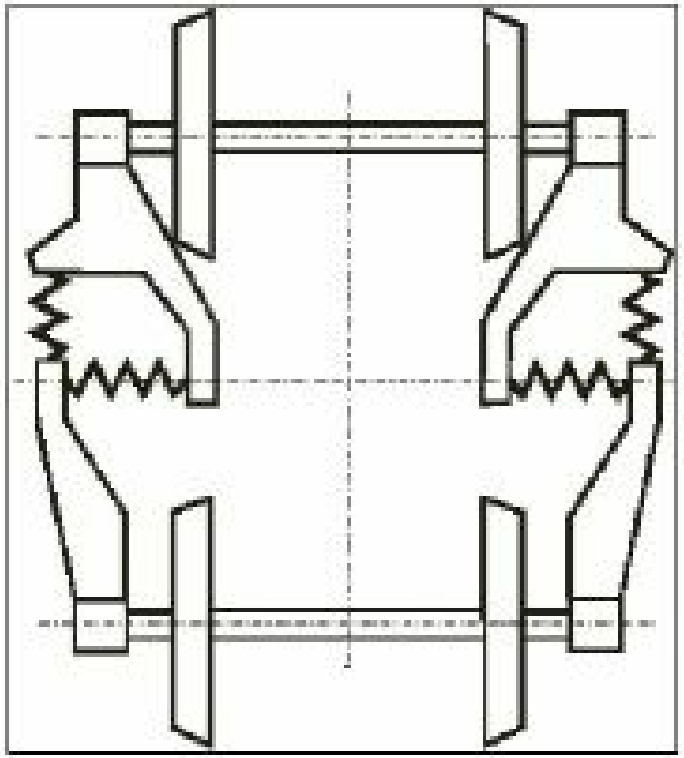
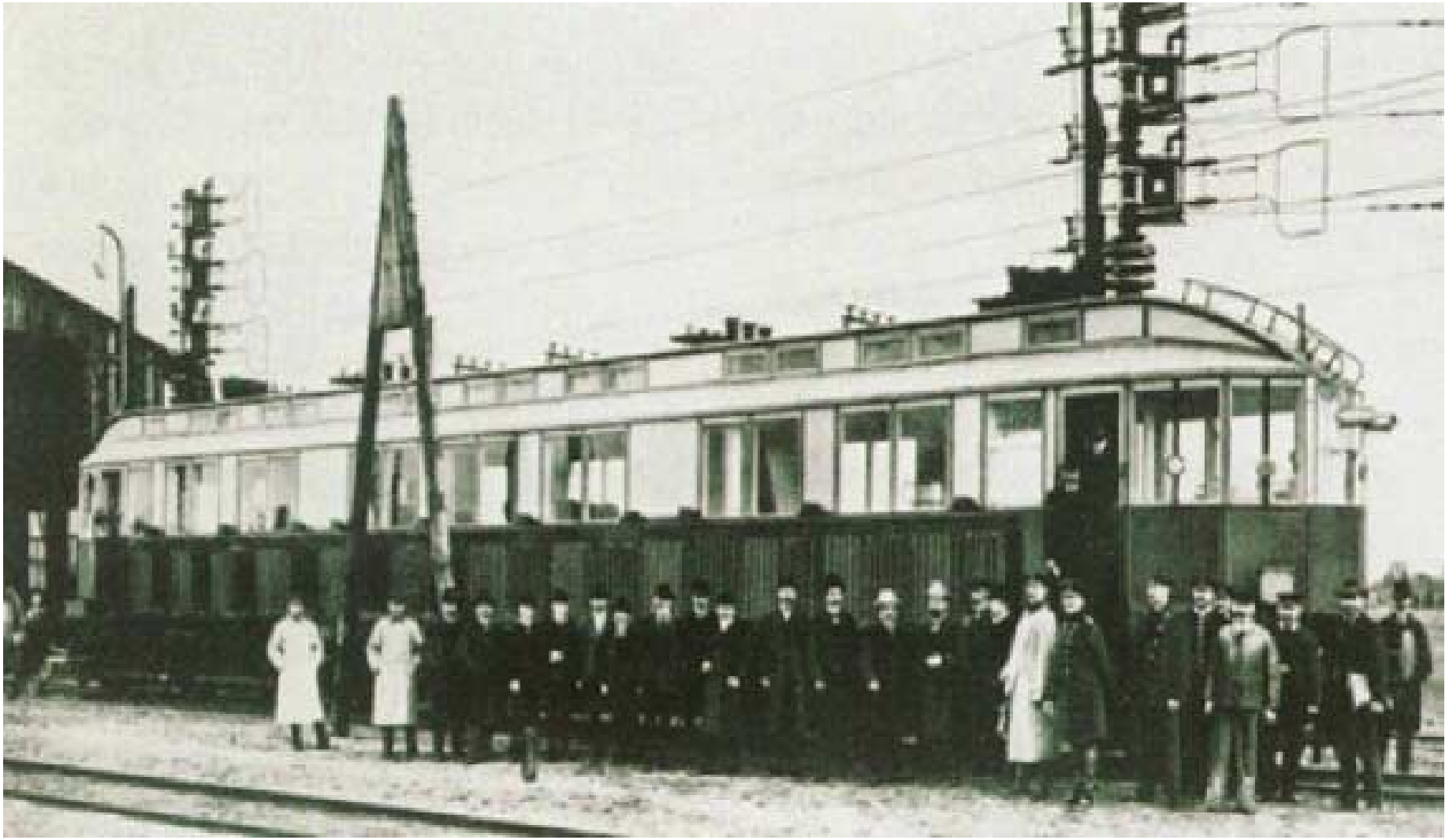


Figure 2.38: Radial-Arm Bogie

More Maintenance / E= 216 k/h 1904



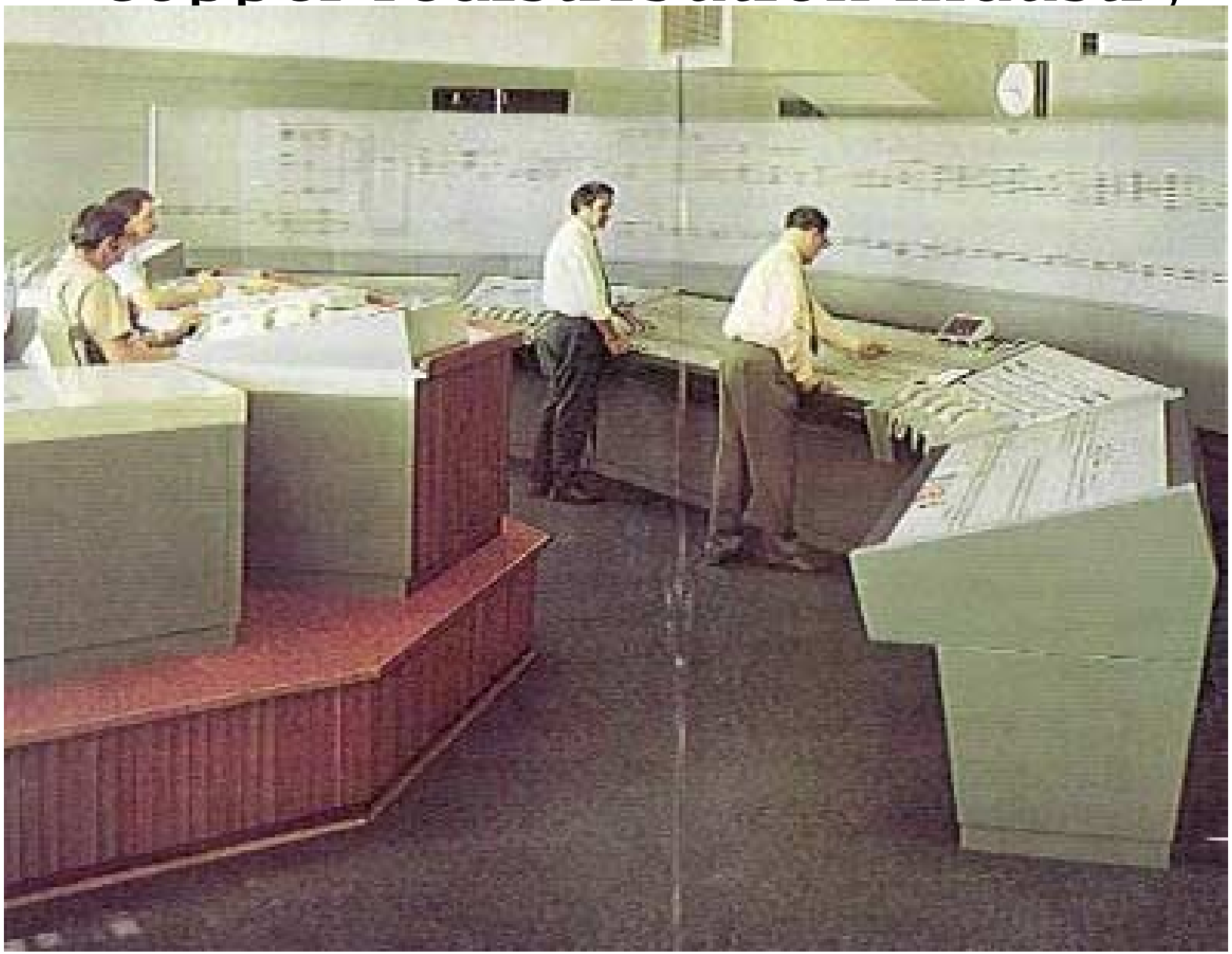
First Electric Locomotive

The start of the TGV: 350/600km/h

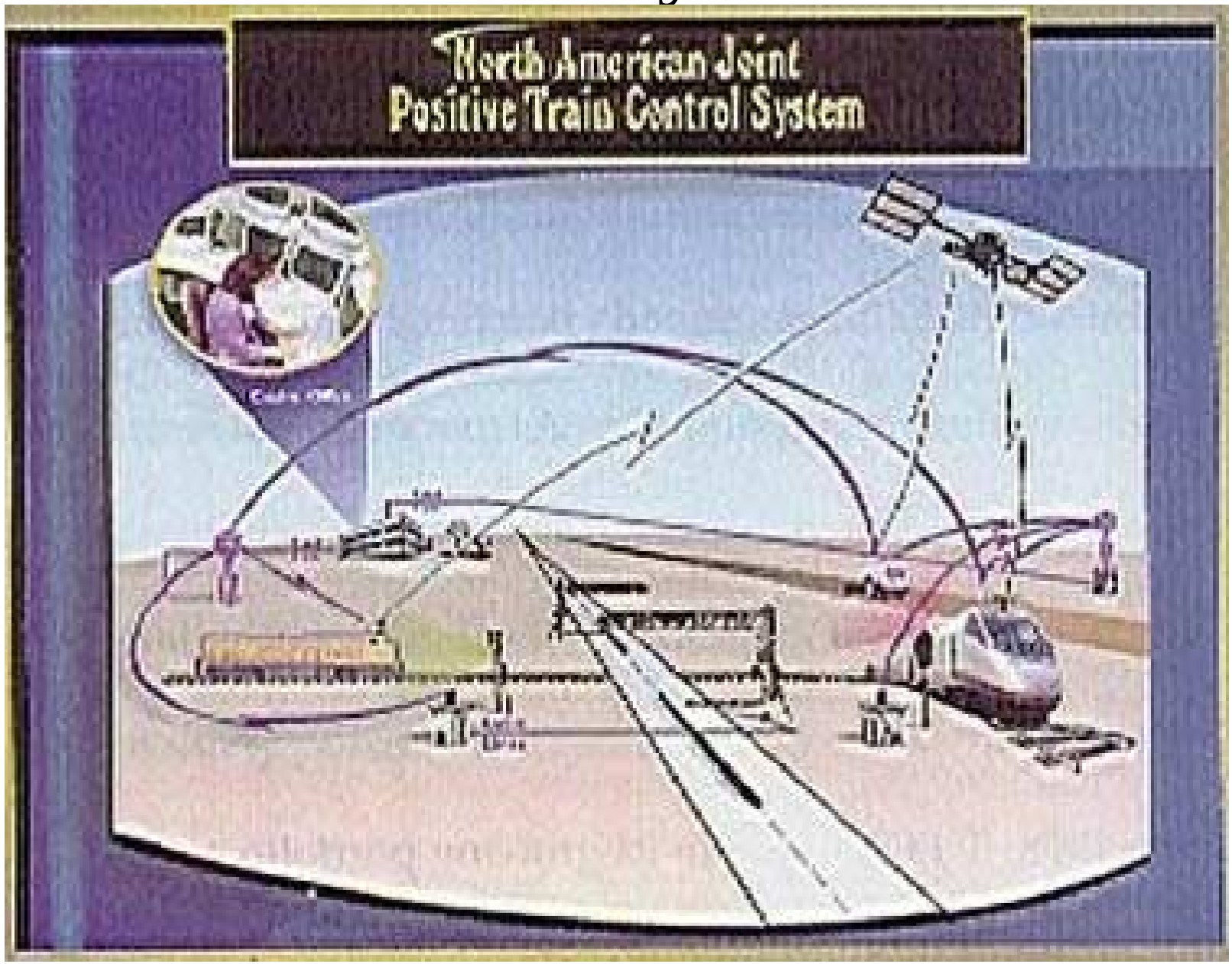
Managing guided transport thro infrastructure

- Track worthy trains and train worthy tracks
- Define the limits of authority
- Detect clear
- Authorize and block out
- Handshaking

CTC ready for bulldozers and copper redistribution industry



The Ideal when you don`t own



Cell phones

Ready for the Push principle


AUTOMATED CONVOY. DON'T EVEN THINK ABOUT IT!
4
3
" we already have trains on tracks "

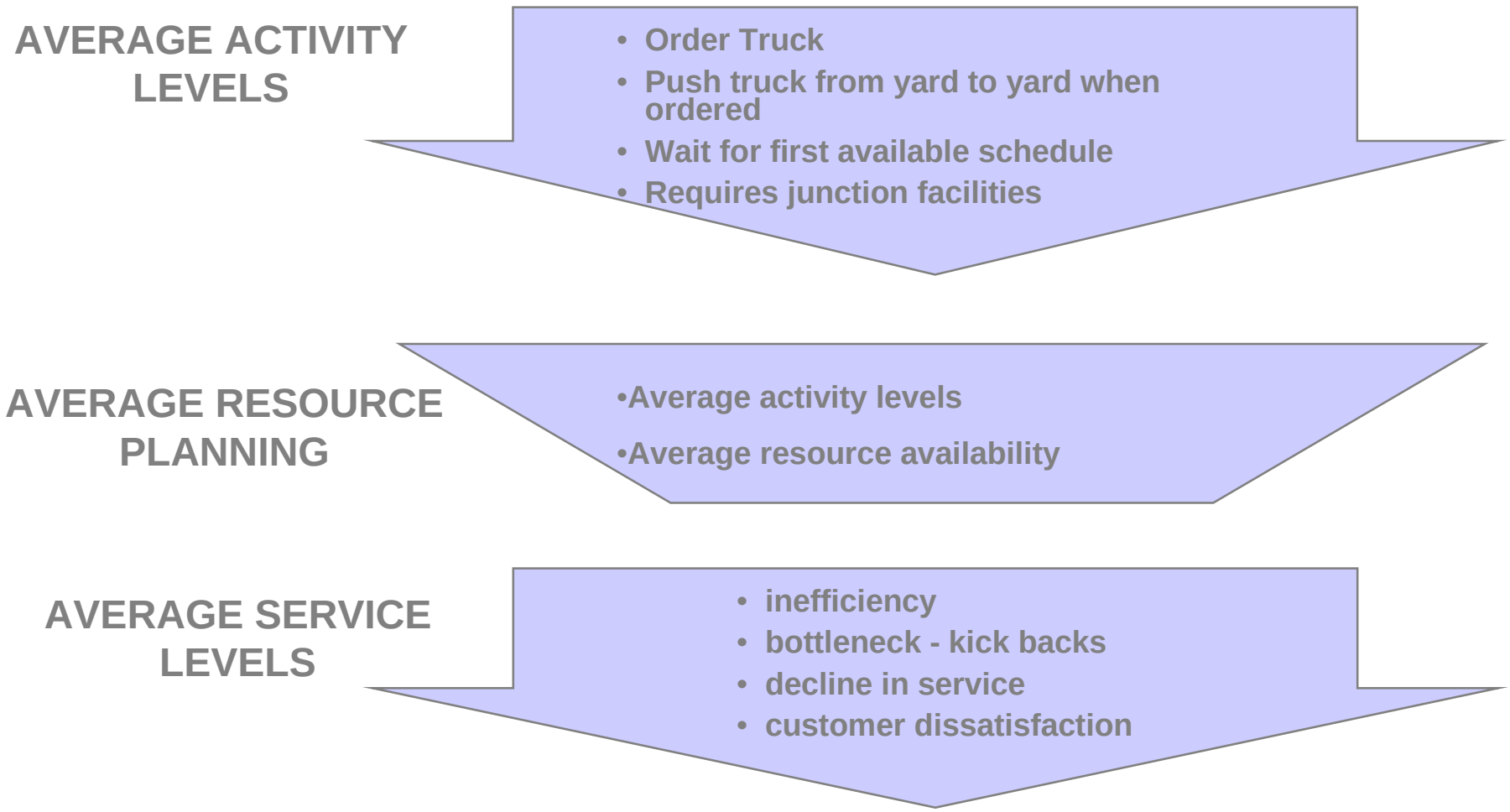
RTS the brains trust of Railways

- Professions lured away most of the brilliant brains that used to come our way.Engineers computer boffins and CA`s are the only pool we have .
- We need to understand more and more
- Become comfortable with undefined frames of reference.
- Understand the limits of GAAP and Finance

Thanks

- Enjoy
- Good luck

Push Model – The past



Pull Model

CUSTOMER SPESIFIC ACTIVITY LEVELS

- Weekly consultation with customer
- Sales reserve capacity in NWB by OD pairs

CUSTOMER SPESIFIC RESOURCE PLANNING

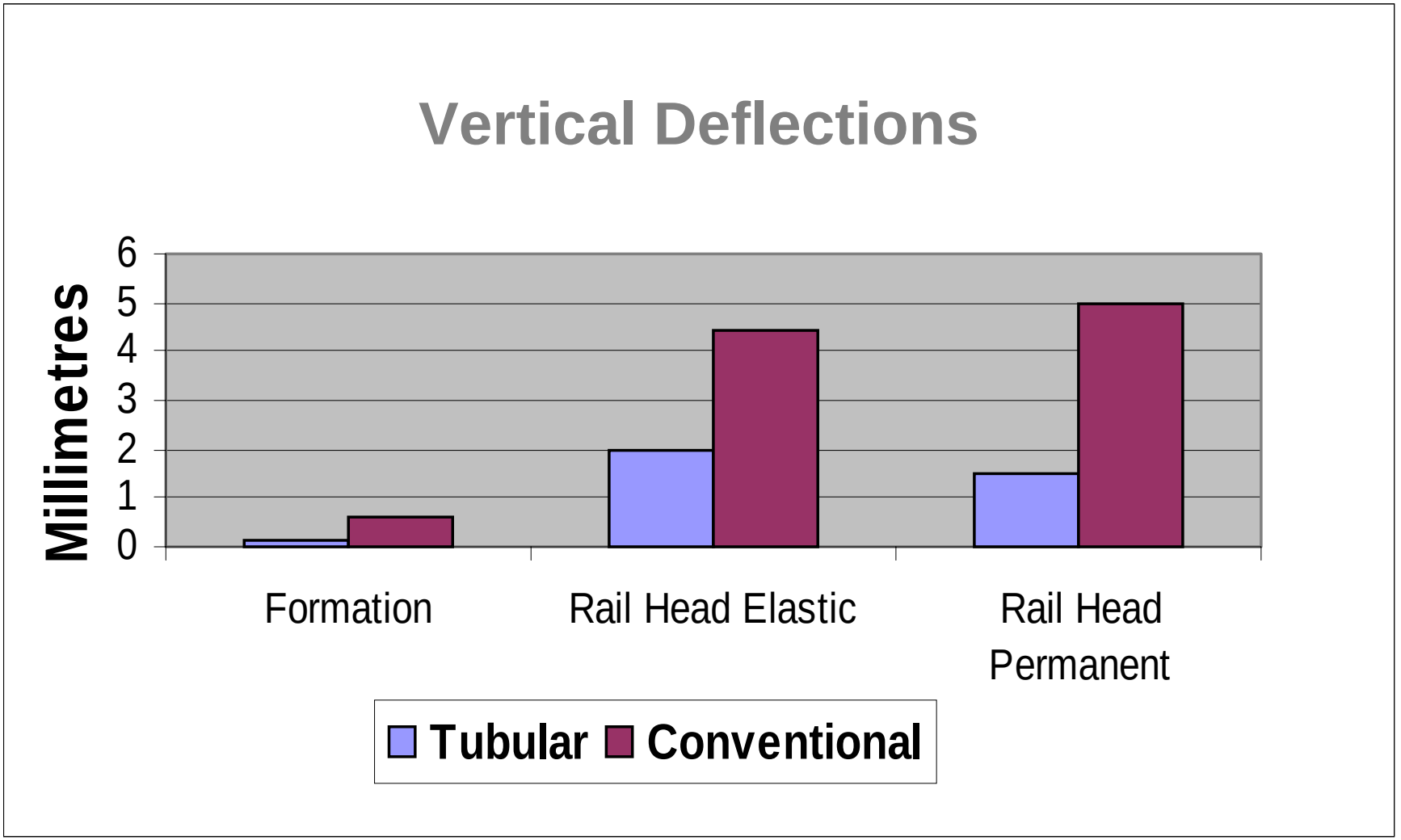
- Daily train plan ex NWB
- Reservation and agreement with customer on T1, T2, T3, T4
- Executed through works orders, against reservations
- Realise reservations / promises

ARRIVAL TIME MANAGEMENT BEYOND TERMINALS

- Capacity planning based on actual NW-business assessment
- Specific and planned resource availability
- Efficiency
- Service codes to co-inside with non - rail activities

DELIVERING CERTAINTY

Testing simulated 16 Million Gross Tons at a speed of 40km/h on Class B formation.



Testing simulated 16 Million Gross Tons at a speed of 40km/h on Class B formation.