

# THE WHEEL RAIL INTERFACE AS A SYSTEM – ignore it at your peril

Paul Baker



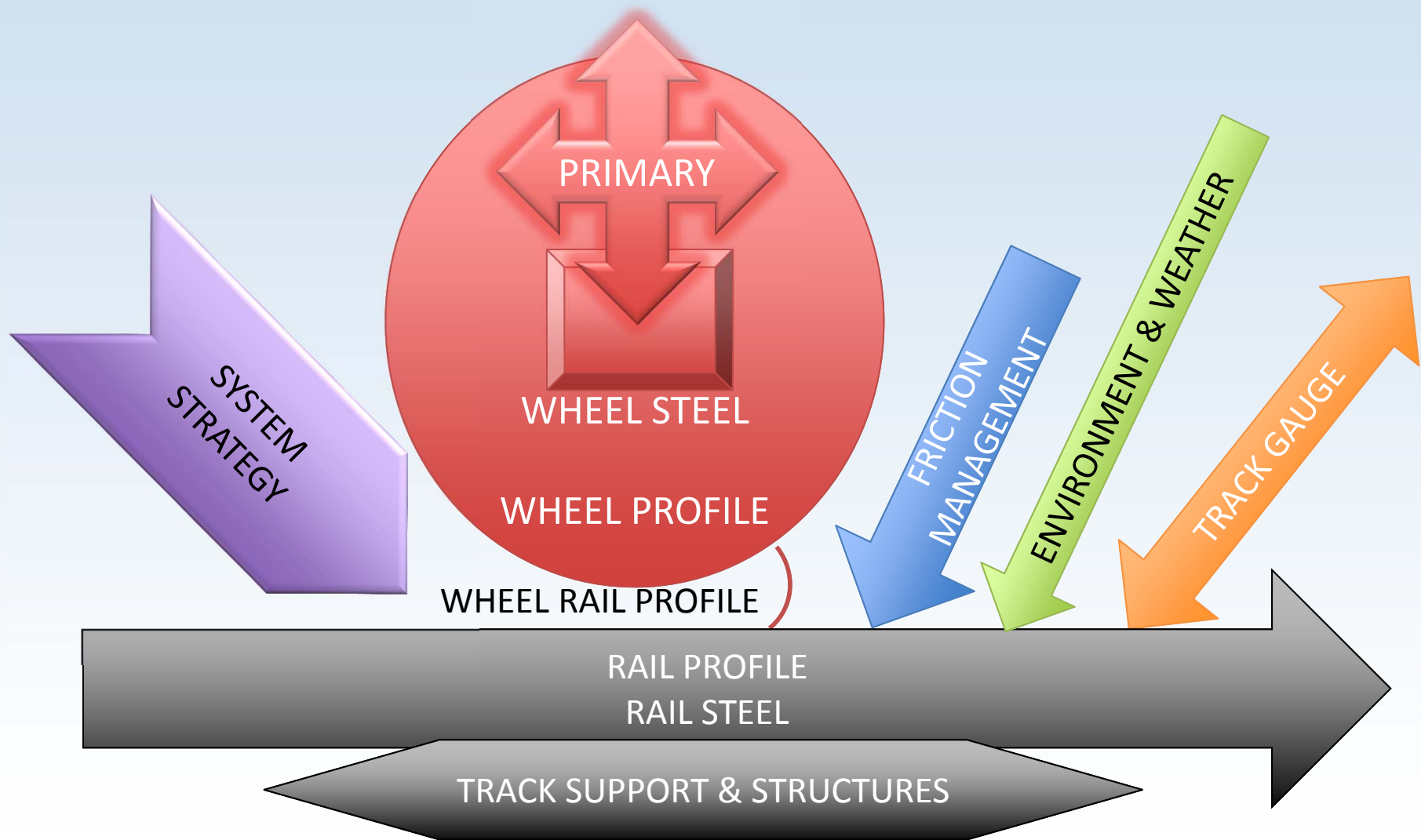
# **THE WHEEL RAIL INTERFACE AS A SYSTEM – ignore it at your peril**

This is based on 40+ years of railway engineering management and personal experience and reflections on the WRI 1990 to date so let me provoke your thoughts and views by sharing:

1. My own opinions!
2. My own views and observations!
3. My own experience!



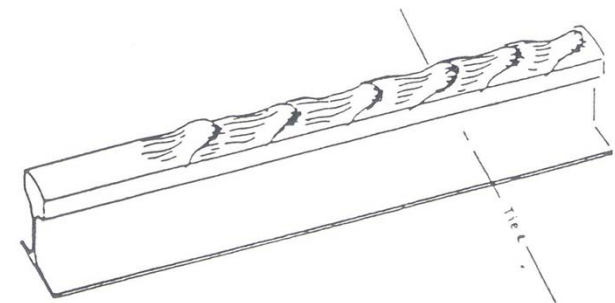
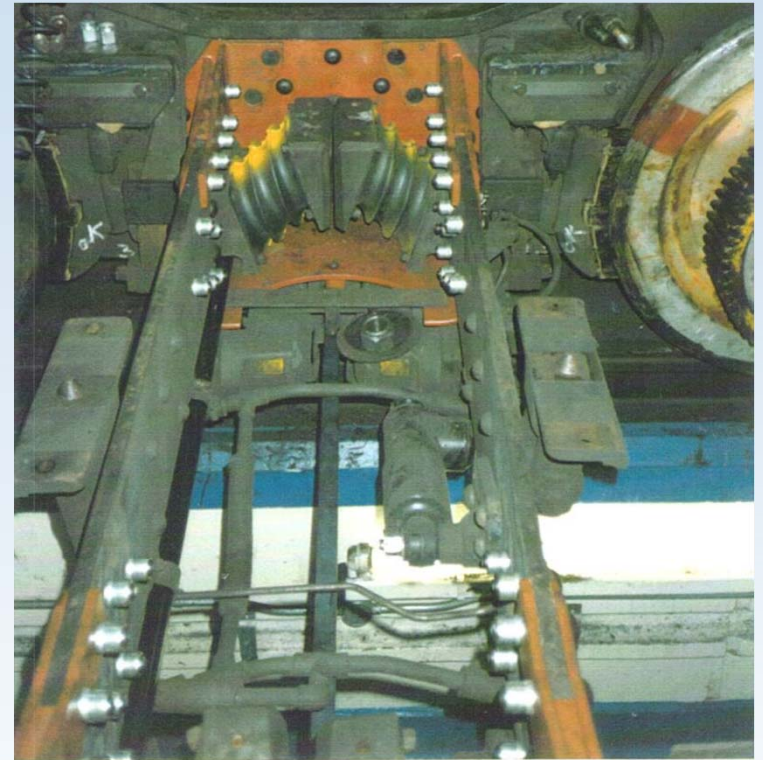
# THE SYSTEM MODEL – What do you affect?



# The WRI system – the start of it for me

Appointed to a rolling stock depot

1. Motor bogie frames were failing (motors falling off!).
2. 173 3 car units
  - 4 motor bogies per unit = 692 bogies
  - a lot of risk and money
  - and not just this fleet
3. Why?....60 foot rails?
4. No, corrugation on relatively new track but a new track form, not understood

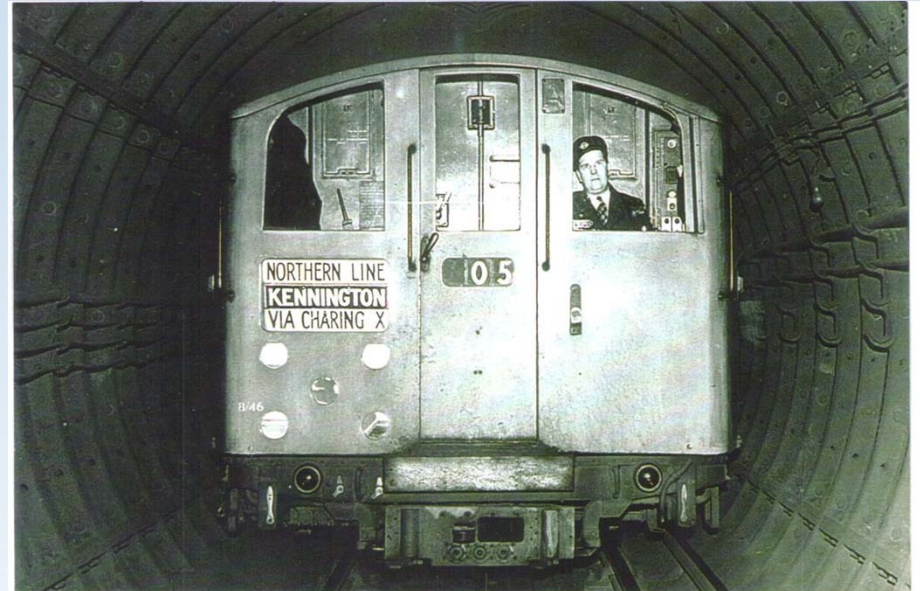




# Then

## Then Line Infrastructure Management – Deep Tunnel

1. Health & Safety legislation....noise exposure levels to train operators in tunnels.
2. Noise inside carriages passenger environment
3. Noise/vibration nuisance to neighbours (but some lovely dinners)
4. A tunnel with snow?



# And more

1. Introduction to rail grinding
2. Found an expert, benefits of managing the interface
  - Preventative profiles
  - Increased rail and wheel life
  - Experience of others
3. And then one morning.....
4. 28 to 1 train in 2 hours.
5. Lubrication failure (or really too much!)

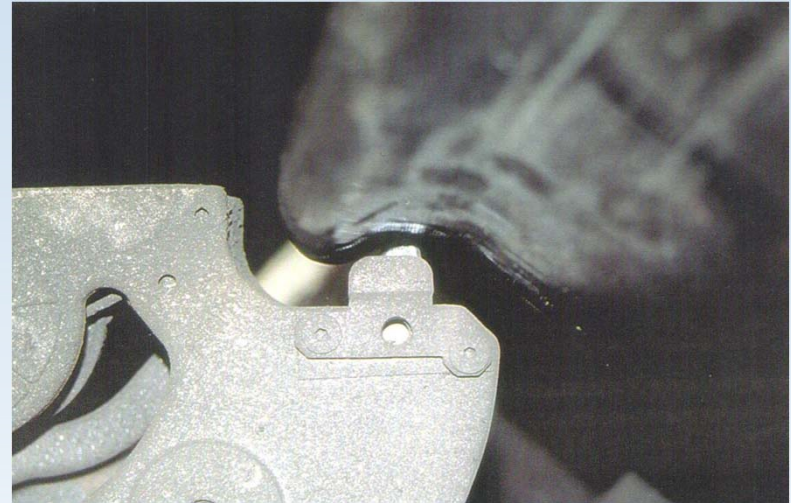




# A solution?

The world stopped (well, at least our Line)

1. So stick lubrication?
2. Seemed a good idea at the time but.....
3. Stick is dry, no lubricant migration or balance hence increased rail head friction and so rail wear
4. So friction is part of this!



# Now some education

So you can explain this then?

1. Introduced to expertise, one high-jacked (willingly), the other more home grown.
2. Principals of rail management to manage defects (they will happen, it's a given rule!!), reduce failures and hence improve performance and gain life from a very expensive asset....hence rail management
3. Comparisons around the world soon showed what others were doing.....heavy haul, rapid transit.....and successfully, most of the time
4. But the dreaded “Business Case” .....





# At worst

If all else fails – raise some concerns!



# I move on.....

## Heavier rail

1. The “split business”....but what about WRI....it met at the contractual divide
2. The changing technology and business model...increasing the “stress state”.....ignoring the interface
3. Events included:
  - Ride deterioration.....new traction systems, 1435mm gauge trains on a 1432mm system
  - Poor understanding of rail metal technology, applications and what you have to do to manage
  - Lack of understanding of failure type and root

cause.....and



# So it happens





# The result.....

## Operationally

1. Rail network brought to its knees
2. Massive diversion of money, men and materials
3. Recovery over many years

## As a business

1. The maintenance Contractors disappeared
2. Credibility issues that still haunt today
3. So we have the business case!





# Does the business learn and carry forward to:

Line upgrades

- New rolling stock with new traction systems(familiar?)
- Whizzo new signaling to increase capacity and utilise the new train performance
- Results in higher acceleration and braking rates
- **BUT**.....increases the “stress state” of the system



# Does the Project Team consider its roll?

- The new track will manage that....or will it? Rate of change of new trains versus rate of change of track!
  - Possible new track forms (but at what rate....and is it modeled?)
- A strategy so that when the Project team moves on it has prepared and equipped the maintainer for the future through education and investment?

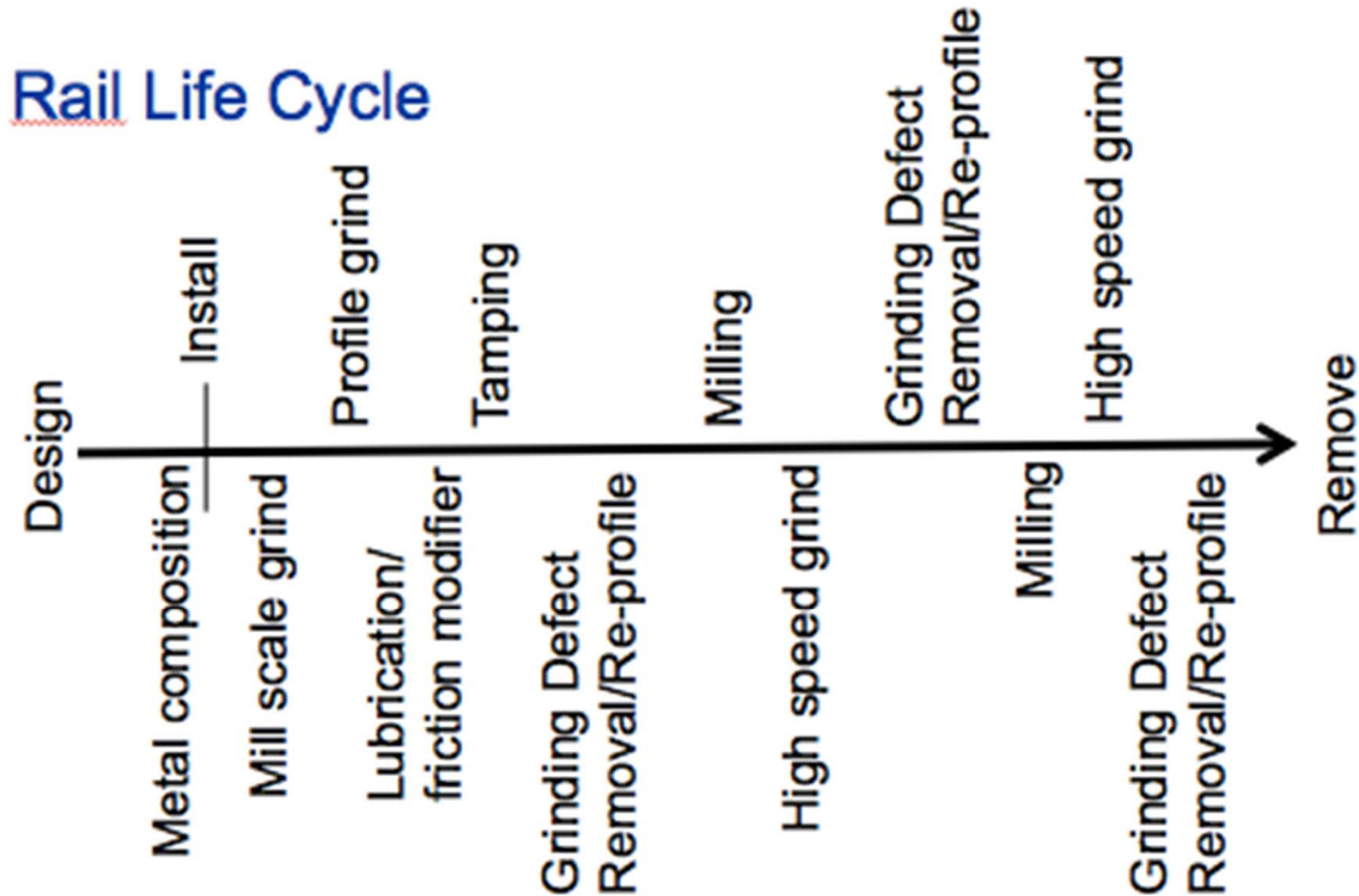


## And if not the result is.....

- New type of defect...STuD's
- Rapid increase in RCF
- Sudden need for re-railing and unique resource
- Lack of developed strategy in profiles and life cycle management in advance
- And all predicted in principal!!!!
  - The cost is now diverting money and resources



We need to understand and manage the life cycle





## In conclusion

Regrettably history seems to repeat itself

The eye goes off the ball WRI interface  
management is a “one off treatment”!

The customer does not see it

But they know about it when it fails

And the engineer has to explain

.....Again!

And the business wastes resource



# So finally

The knowledge is out there.....

.....that is why we here!

And (as we say) a stitch in time.....

.....saves nine





Thank you!

YOUR QUESTIONS/THOUGHTS?

