地鐵公司
MTR Corporation

A railway journey into risk management

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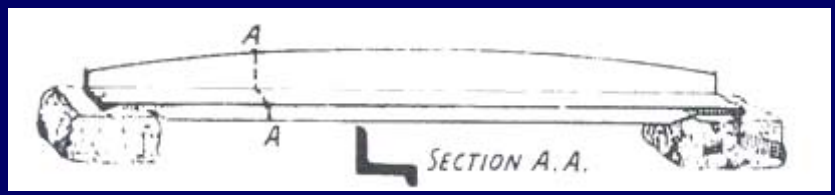
Acting Operations Director

1-2 December 2005

The Risks Then

1804 : Richard Trevithick built 1st railway steam loco.



Cast iron ‘L’ shape rails could not take the load

He died in 1833 in poverty

The Risks Then

1830 : First railway fatality - William Huskisson MP ran over by Stephenson's loco "Rocket" (London & Manchester Railway – 1st intercity line)

"He thus became the first fatality on a passenger railway and signalled to the Government potential for disaster that were possible with these new railroads."- Samuel Smiles

The Risks Now - Safety

No. of passengers carried by national railways in 2004

National Railways	Patronage (million)
Korea	921
France	931
China	1,073
UK	1,088
Russia	1,299
Germany	1,695
India	5,112
Japan	8,617
Worldwide	>26,000

The Risks Now - Safety

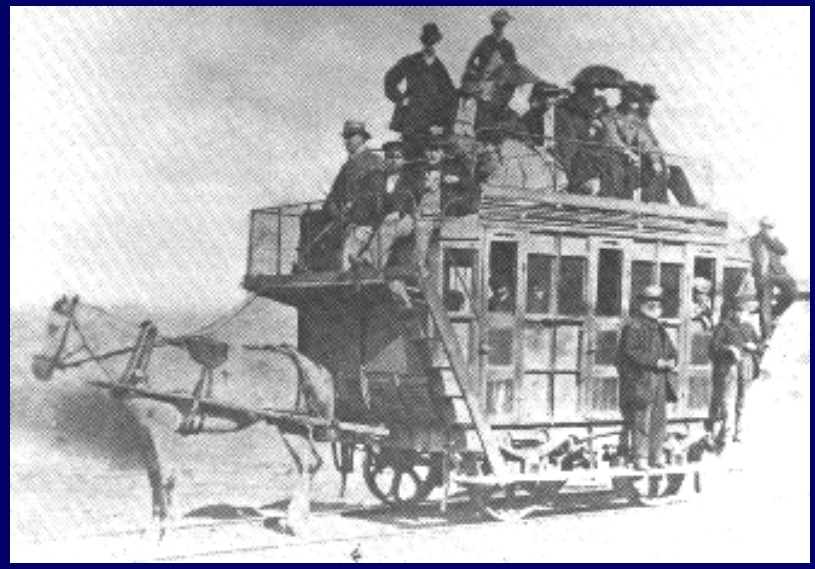
Railway systems

- more complex
- more capable
- more potential for disaster
- more intense public reaction to accidents

Are we coping with this complexity?

The Risks Now - Service

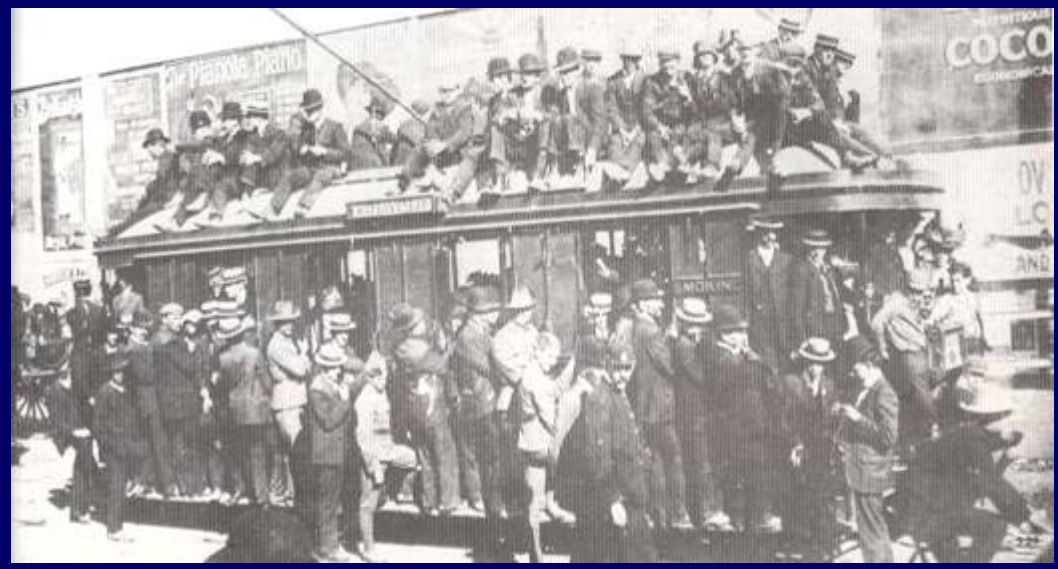
1807 : 1st passenger railway service (horse drawn) from Swansea to Mumbles



1870 : 63 years on, horsepower increased - so did payload

The Risks Now - Service

1908 :Sydney



Today …

The Risks Now - Service

In Aviation:

1921 : In-flight entertainment in 11-seater hydroplane

Today

The Risks Now - Service

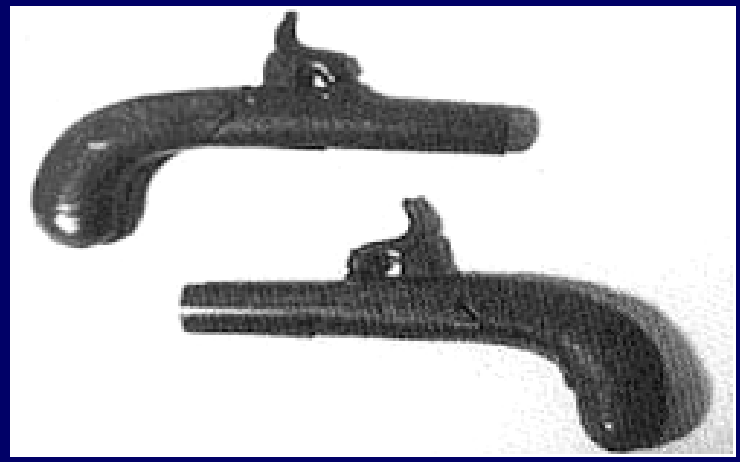
- Higher service quality expectation
- More enquiring
- Media sensitive
- Need to proactively manage customer demand and associated risks

Requires a revolution in railway culture – is this happening?

The Risks Now - Security

Security measures in

19th century



21st century

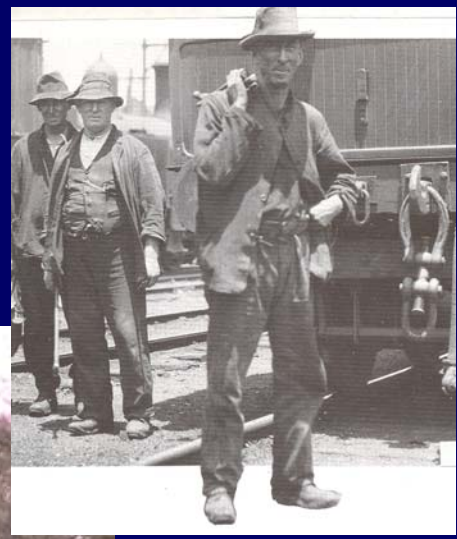
The Risks Now - Security

- Security threats:
  - Terrorism
  - Acts of violence
  - Assault
  - Vandalism
  - Mugging
  - Sexual harassment
- Railway must remain open and accessible

As society becomes more complex does our design consider societal needs?

The Risks Now - Technology

- Conservative?
- Lags behind
- Requires long lead time to bring new technology into service
- Under-investment hampers
  - Renewal
  - R&D



Why is under-investment endemic to railway industry?

The Risks Now – Politics & Finance

- Strong political and public interests
- Many stakeholders
  - Government
  - Politicians
  - Share holders
  - Operator/Concessionaire
  - Contractors/Equipment suppliers
  - Transport competitors
  - Unions
  - Public/media

Are politicians, financiers, opinion formers and other stake holders proactively engaged?

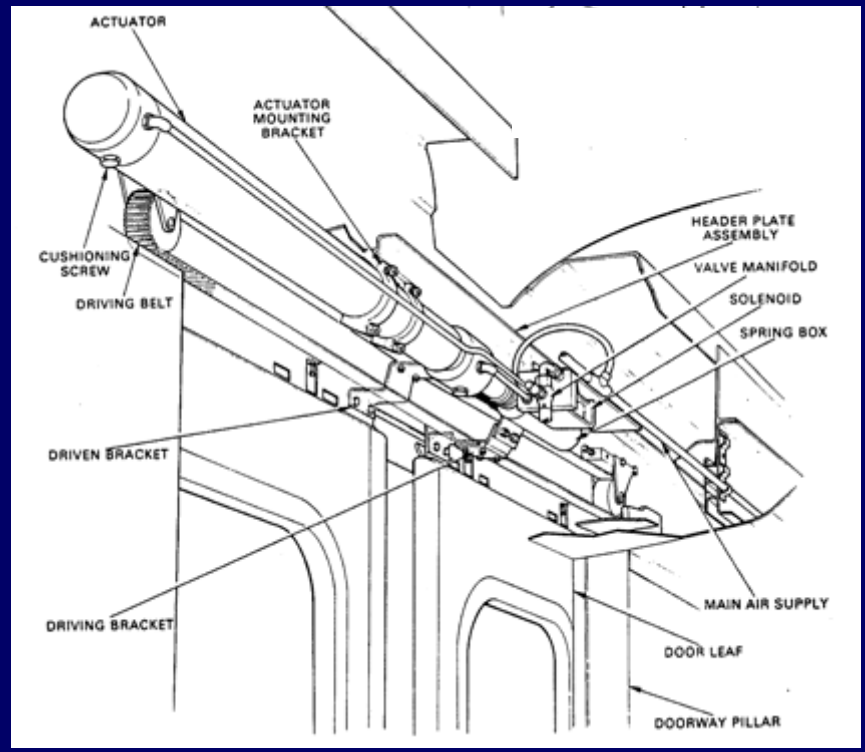
Railtrack PLC
(in Railway Administration)


French Railway strike

How Can we Cope

How MTR began:

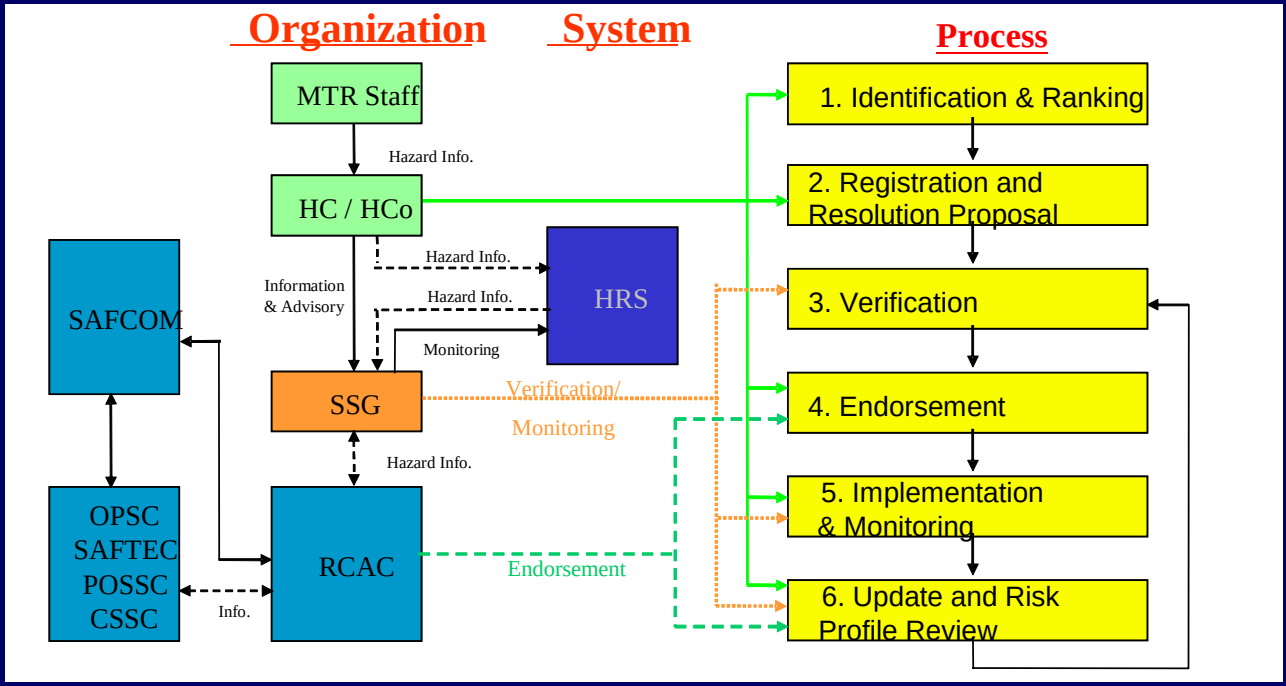
- **One step at a time**
- **1st HAZOP on train door system in 1992**
- **General response: ??!!**



How Can we Cope

1994 –

- **ALARP based Safety Risk Control System**
- **Organisation; IT system; process**
- **Practical and effective**



How Can we Cope

Subsequent years –

Service Risks

- Extended customer service targets
- Equipment assigned criticality ratings C1-C4 based on failure impact on service
- Maintenance/improvement effort commensurate with criticality

Criticality Rating	System (examples)		
	Rolling Stock	Platform Screen Door	Track Circuit
C1	1	1	0
C2	5	0	1
C3	11	34	2
C4	2	7	5

How Can we Cope

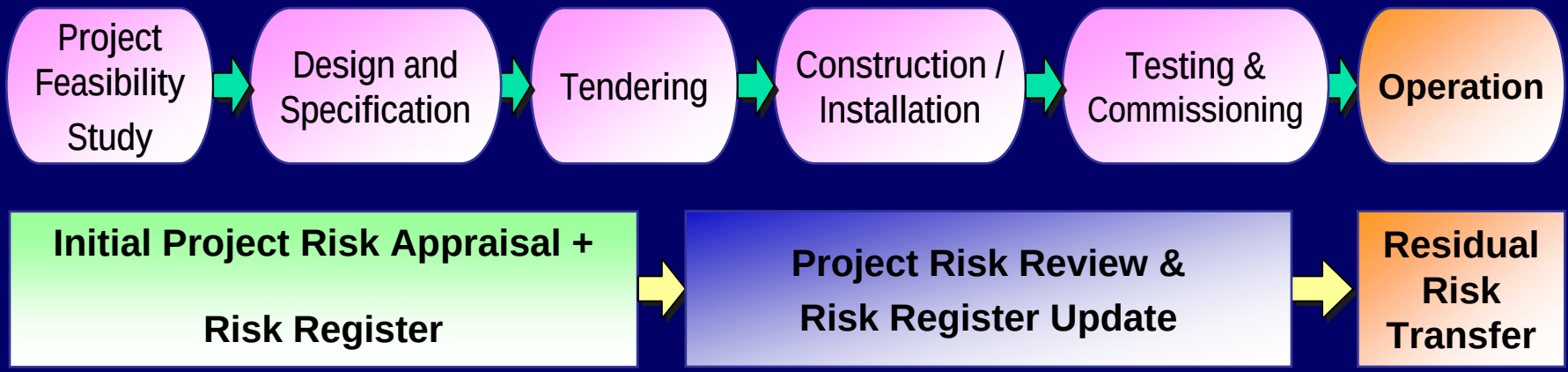
Security Risks

- Modeled on safety
- People; Revenue; Premises; Property; Information

How Can we Cope

Project Risks

- Major renewal/improvement projects
- Consequence based risk identification & assessment
  (Cost overrun, Programme delay, Political pressure etc)
- Life cycle approach
- Covers service outsourcing



How Can we Cope

Environmental risks

- noise pollution, water pollution, air pollution, land contamination and depletion of resources
- Environmental aspects ranked and registered

4000m of noise barriers being built along Airport Express Line by Sept 2007

How Can we Cope

Supplier Risks

- Spares Shortage
- Asset Conditions
- Asset Life profile
- Support Asset Replacement Planning

Asset Age Level	Life Factor (Current Age /Asset Life)
L4	< 0.5
L3	0.5 to 0.7
L2	0.7 to 0.9
L1	> 0.9

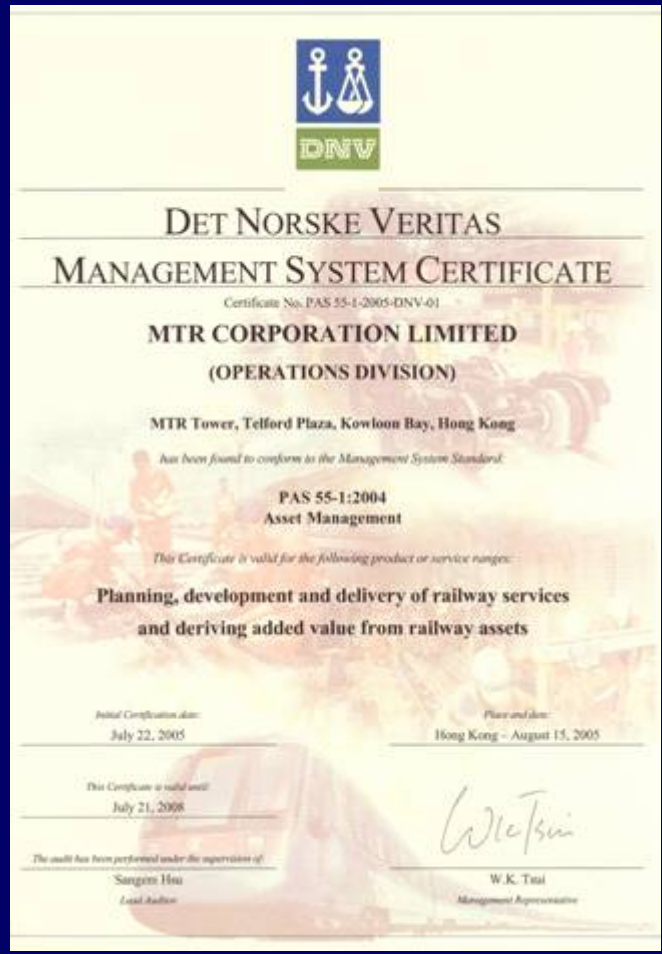
How Can we Cope

2003/2004 –

Asset Management System

- Minimise life cycle costs and maximize values
- Integrates risk management activities
- Manage technology risks through
  - Understanding business requirements
  - Assessing asset capabilities
  - Timely asset improvement/replacement programmes

Certified to PAS 55-1



DET NORSKE VERITAS

MANAGEMENT SYSTEM CERTIFICATE

Certificate No. PAS 55-1-2005-DNV-01

MTR CORPORATION LIMITED

(OPERATIONS DIVISION)

MTR Tower, Telford Plaza, Kowloon Bay, Hong Kong

has been found to conform to the Management System Standard:

PAS 55-1:2004
Asset Management

This Certificate is valid for the following product or service ranges:

Planning, development and delivery of railway services and deriving added value from railway assets

Initial Certification date: July 22, 2005

Place and date: Hong Kong - August 15, 2005

This Certificate is valid until: July 21, 2008

The audit has been performed under the supervision of: Sangen Hsu, *Lead Auditor*

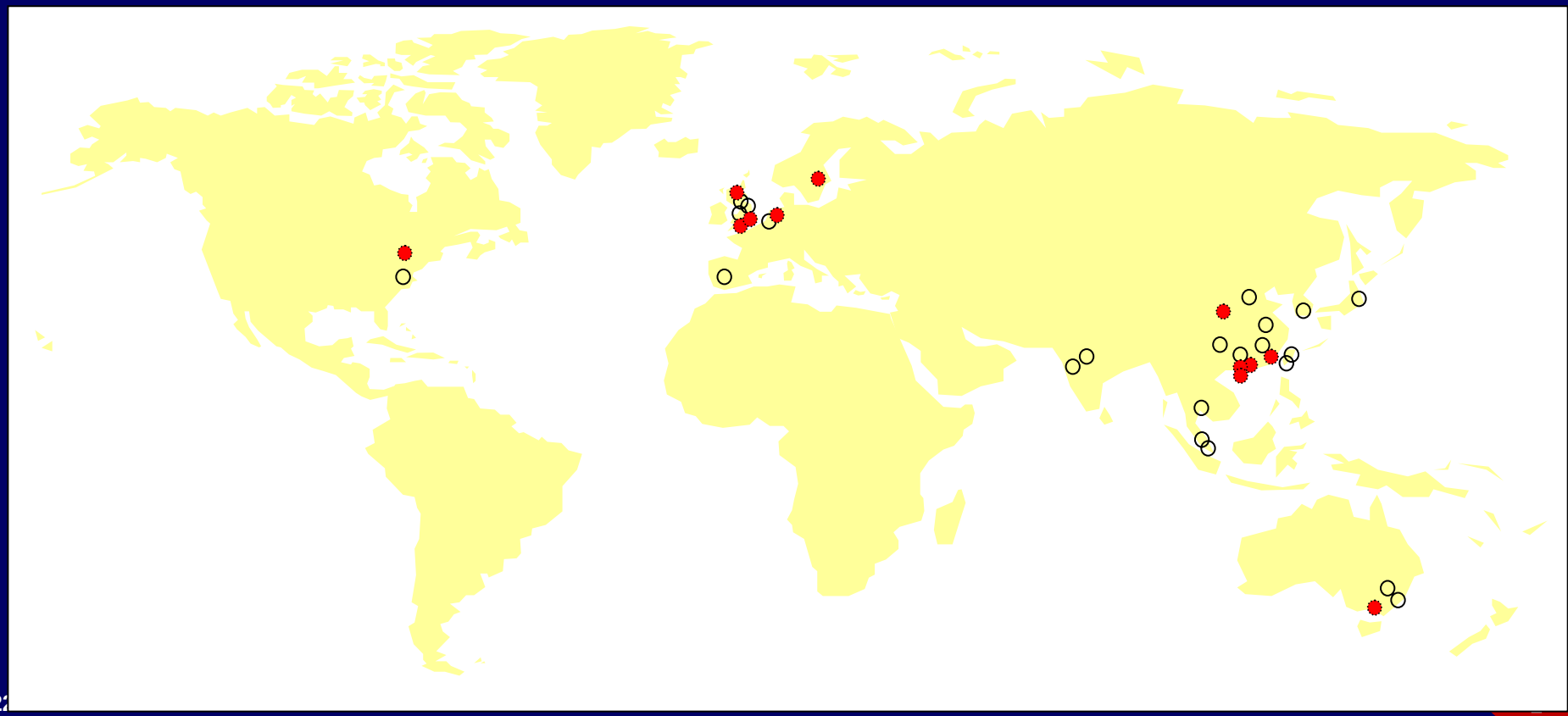
W.K. Tsui, *Management Representative*

How Can we Cope

2005 –

Enterprise Risk Management

- **Growth & Corporate Social Responsibility**
- **Finance; Safety; Business Operation; Reputation; Legal**



How Can we Cope

More risk management challenges –

Human Factors

- Loss of expertise and experience
- Cultural differences as we move to new territories
- Decision making in stressful conditions
- Communication of vital information

Conclusions

Risk Management:

- Tool – meet & evaluate social responsibility
- Common Language – communicate with & evaluated by society

Railway Industry:

- Caught in a time warp – not kept in pace with changing times
- Ability to manage risks more critical than ever before

Questions:

- Are we coping with complexity?
- Is our culture keeping pace with business and societal needs?
- Does railway design incorporate social and technical needs?
- What are we doing about endemic under-investment?
- Do we proactively engage stakeholders?

Conclusions

MTR has evolved a pragmatic risk management approach to address these issues to fulfill its mission, which is to "Provide excellent value to our customers, enhancing their quality of life, and contributing to development of the communities in which we operate"

Challenge:

How can you start your own journey to assure the future for your railway/company?

Thank you