How Safe are our Railway Projects?

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Safety in Railway Projects

Planning | Design | Construction | Operation

Risk Management | Asset Management | Competence Management

Standards & Procedures | Audit & System Assurance | Stakeholder Management | Culture

Safety
How safe is SAFE?

... Can these happen to me?
How safe is SAFE?

... Can these happen to me?

And this happened...
Safety in Railway Projects

Hazard - A condition that could lead to personal injuries, property loss or system failures

Safe planning, design, construction and commissioning

Risks to customers, public, contractors & staff are reduced to As Low As Reasonably Practicable
Safety in Railway Projects

Operational Safety

Construction Safety
Operational Safety
Operational Risk Management Framework

Identification
Evaluation
Mitigation
Monitoring

Organization

Process
Tools

Design
Construction
Operation
Risk Identification & Control

Identify & Evaluate Risks

Propose, Agree, Prioritize and Implement control actions

Register Risks

Update & review risk records

Proactively & systematically identify & control risks

Design
Construction
Operation
Risk Identification & Control

- Technically feasible?
- Minimal impacts on operability and reliability?
- Minimal cost implication?

Determining the risk acceptance level and safeguards required

Design  Construction  Operation

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Operational Safety

Hazard with potential impact on the future operating railway

Construction activities with potential impact on the existing railway
Hazards affecting Future Operation & Maintenance

Fire (e.g. Train / Station / Trackside)

**Mitigation:**
- Materials Specifications
- Evacuation Provisions (for escape & rescue)
- Signage / Procedures / Training

Derailment

**Mitigation:**
- Derailment upstands / beams (viaducts / stations)
- Derailment detection
Hazards affecting Future Operation & Maintenance

Collision (e.g. Train to buffer)

Mitigation:
- Adequate overrun
- Buffer
- Signage

Platform – Train Interface

Mitigation:
- Minimum Clearance
- Detection
- Infill (e.g. Taper Plate)
### Construction Hazards affecting Operating Railway

**Fire / Flood spreading to Operating Railway during breakthrough**

<table>
<thead>
<tr>
<th>Mitigation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>← Temporary bulkhead during breakthrough</td>
</tr>
<tr>
<td>← Fire rated bulkhead</td>
</tr>
<tr>
<td>← TVS &amp; FSI readiness prior to breakthrough</td>
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</tbody>
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**Construction work in Station (Noise / Dust)**

<table>
<thead>
<tr>
<th>Mitigation:</th>
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<tbody>
<tr>
<td>← Segregation of works areas from station users</td>
</tr>
<tr>
<td>← Fire rated hoarding</td>
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</tbody>
</table>
Construction Hazards affecting Operating Railway

**Vibration / Mechanical handling near Mainline**

**Mitigation:**
- Piling with low vibration
- Scheduling / possessions
- Railway Protection procedures

**Tunneling / Excavation near Operating Railway Mainline/Station**

**Mitigation:**
- Railway Protection procedures
- Monitoring
- Contingency Plans
Construction Safety
Construction Safety

Operational Safety

Construction Safety

Design for Safety and Constructability

Construction Safety on Site
Design for Safety and Constructability

Impacts:
- Increased safety risk
- Cost escalation
- Programme delay

Mitigation:
Make construction easier and safer by:
- Avoiding constraints
- Simplifying design
- Increasing repeatable features
- Designing out the need for high risk construction methods
Five new projects constructed simultaneously, with over 21,000 contractors staff and workers employed at the peak:

- Differing levels of contractor experience, safety standards and culture
- Insufficient experienced management, supervision and workers to fill positions
- Junior staff taking up roles that they may not be ready for
- Labour recruited from other industries
Construction Safety – for Public

Construction activities involve work in densely populated areas –

Public exposed to risks arising from the Works

Protection measures in place
Fostering a Safety Culture

- Safety Audits
- Contractors Incentive Scheme
- Mandatory Safety Training
- Contractors Safety Awards
- Safety Responsibility Statement
- Near Miss Reporting Campaign

Safety Culture

SAFETY STARTS WITH ME

- 1 Serious or Fatality
- 10 Reportable Accidents
- 30 Lost Time and First Aid Cases
- 600 Near miss Incidents with no visible injury or damage
Success Factors

- Commitment of management and staff at all levels
- Total commitment of contractors
- Give risk early consideration
- Monitor safety activities continuously
- Continuously review system
- Good simple process
It is our responsibility to take care of ALL our passengers...
THANK YOU