

An aerial photograph showing a multi-lane highway on the left with a yellow construction vehicle, a railway track in the center, and a container yard on the right. The scene is overlaid with a semi-transparent white filter.

Safety & Quality in Projects

Dedicated Freight Corridor Corporation of India Ltd.

11th Sep 2023 | Safety and Quality Forum, New Delhi

A **Rupee** Spent
Is Spent



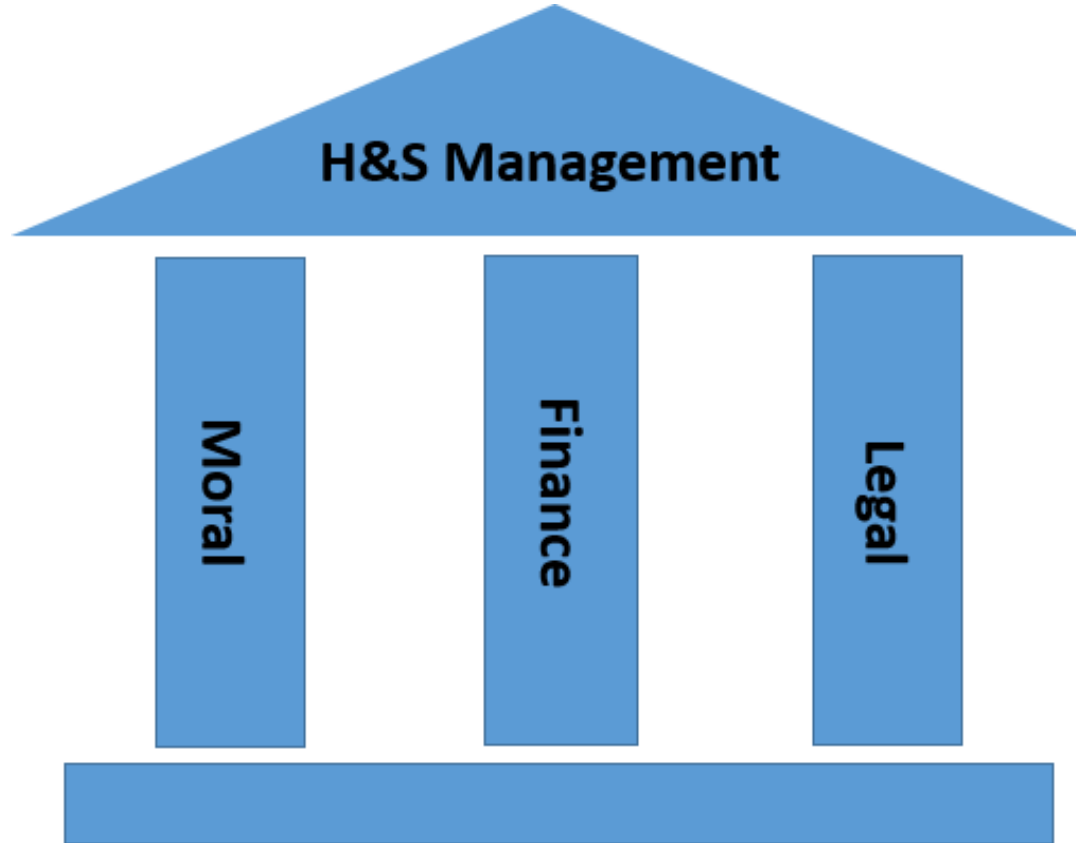
A **Second** gone
is gone

Do it right the first time

Avoid rework

- **Three Pillars of Health and Safety Management**
- **Safety Scenario at DFC Project**
- **Steps to enhance safety at DFC Worksites**

Three Pillars of Health and Safety Management



34 Million Accidents Occur Worldwide Every Year

(International Labor Organization)

Accidents can cause a great deal of pain and suffering .
It brings anguish not only to the injured, but also to their co-workers,
family members, relatives, and many others.

Everything that can be done to avoid this needs to be done.



Employers have an obligation to ensure that their employees do not suffer injury, ill health, or pain.



In developing countries, employers need to be more aware about safety and health of their employees.



If an accident occurs,
the organization will suffer a great deal of damage.

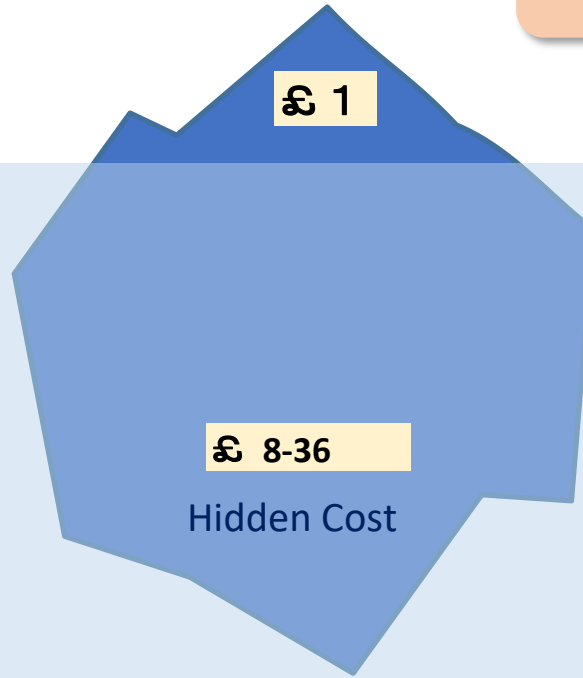
US \$ 3 trillion are lost each year due to injuries, illnesses and fatalities
(International Labor Organization)

**The costs can be enormous,
many times greater than most individuals think**

Covered by insurance (visible cost)

- Workplace accident insurance
- Third party insurance
- Construction insurance

Not covered by insurance (Hidden costs)



Data shows that the actual costs are 8 to 36 times higher than the direct costs.

(UK)



- Decline in productivity
- Overtime work for employees
- Leave compensation
- Temporary employment
- Accident investigation
- Fines
- Increase in insurance premium rates
- Loss of company's credibility
- Decline in stock price
- Loss of customers

Occupational Health & Safety Regulation

- Most countries have laws and regulations
- To ensure the health and safety of workers.
- Organizations/agencies oversee and enforce that these laws and regulations

Health and safety requirements are clearly stated in the contract documents for infrastructure projects.

Indian Scenario

Industrial Safety and Health
(Ministry of Labour & Employment)

National Occupational Safety and Health (OSH) framework

Legal Action

PDCA	ISO 45001	Implementation	Management Tools
	Leadership	Top management declares its commitment to health and safety management.	<ul style="list-style-type: none"> Health and Safety Policy
PLAN	Plan	Identify hazards and analyze risks. Prepare health and safety management plan and construction plan based on health and safety policy.	<ul style="list-style-type: none"> Health and Safety Management Plan Construction plan Hazard and risk analysis
DO	Support and operation	Provide the necessary resources and implement the plan Provide education and training for employees and workers Top management demonstrates its commitment to health and safety management.	<ul style="list-style-type: none"> Training for newcomers Periodic Health Examination Work Permit Health and safety committee meetings Health and Safety Management Report
CHECK	Performance Evaluation	Ensure that work is carried out in compliance with plans, contracts, and laws and regulations.	<ul style="list-style-type: none"> On-site health and safety inspections Internal and external health and safety audits ISO 45001 audits
ACTION	Kaizen (constant improvement)	Implement measures to prevent recurrence based on accident investigation reports. Review and continuously improve the safety and health management plan.	<ul style="list-style-type: none"> Accident Investigation Report Compliance report Update of construction plan and health and safety management plan

Safety Scenario at DFC Project

DFCCIL has defined “**Safety targets, goals and aims**” in their works by implementing effective safety and health techniques and measures to achieve -

- Zero total recordable injury or accident.
- Zero reportable environmental incident.
- All personnel inducted in accordance with the approved contractor’s Safety Plan.
- Total compliance of conducting inspections and audits as per approved Safety plan.
- 100% incident / accident recording and reporting.
- 100% adherence of usage of appropriate PPEs at work.
- Executing construction work with least disturbance to the environment, road/rail users, nearby residential areas and traffic.

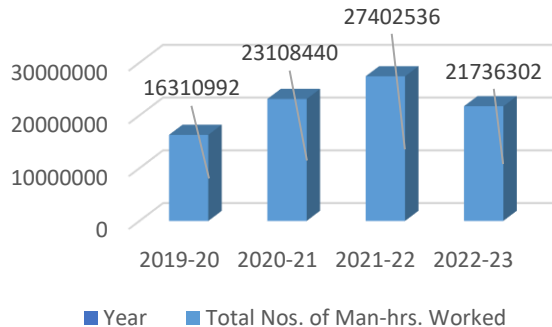
- Working adjacent to Live IR Tracks
- Working adjacent to high tension lines
- Working near and over Water
- Working in Tunnel/Deep cut
- Heavy Lifting & Launching Operation
- Working at Height
- Moving Equipment/Machinery- Rail bound & Road bound
- OHE Mast Erection, Boom Erection, Stringing of wire
- Loading/Unloading of Construction Materials at Worksite

Incident Management Through Safety Statistics

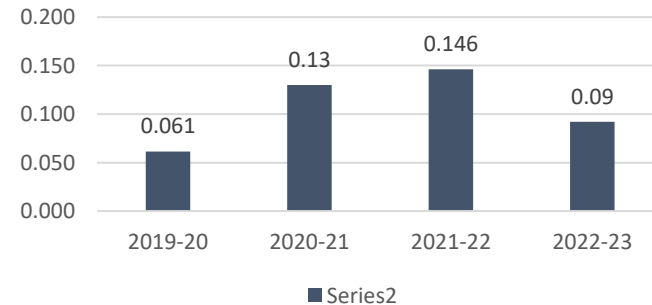
[Case study of WDFC Phase-2: Vadodara-JNPT (550 km)]

Safety Statistics (2019-2023)						
Year	Total Nos. of Man-hrs. Worked (Mn-hrs) A	No. of Fatal Incident B	No. of Lost Time Injury (Days) C	No. of Man-days lost (Injury & Absenteeism) D	Occupational Disease E	Frequency Rate F (C/A X Mn)
2019-20	16.3	0	1	10	0	0.061
2020-21	23.1	0	3	83	0	0.13
2021-22	27.4	0	4	162	0	0.146
2022-23	21.7	0	2	49	0	0.09

No. of Man-Hrs. Worked



Frequency Rate



Steps to enhance safety at DFC Worksites

- **Competitive bidding- Contractors want to reduce the cost**
- **EPC contracts- Design is a major issue**
- **All attention for project progress- Least attention to EHS issues**
- **Safety as an organizational culture lacking**
- **Method statements are not adhered to**
- **Lack of supervision and devotion of PMC agencies**
- **Lack of Training- For supervisory and working staff**
- **Inadequate availability of safety equipments and PPE kits**

- ✓ **Hazard Identification & Risk Assessment For Each Activity**
- ✓ **Regular Safety Inspections**
 - Inspections as per Mandatory Checklists of Safety Equipment bring used
- ✓ **Mass Tool Box Talk**
 - Discussion on Safety Measures and Procedure before start of work,
- ✓ **SHE Committee Meeting**
 - Regular meetings to discuss and analyse Safety Issues at Site for Implementing Safety Measures
 - Stakeholder meeting to discuss Key Safety Concerns and implementation of Safety Policy guidelines in the Project

✓ **SHE Training**

- Onsite Safety Awareness training to the Workers

✓ **MARS (Monthly Audit Rating Score)**

- Internal Monthly Audit between Engineer and Contractor

✓ **Mock Drills**

- Hands on training of the Workers to demonstrate the response to Safety Incidents

✓ **External Health Checkup Camps**

- To ensure the Physical and Mental fitness of the Workers at the Workplace and Labour Camps

Safety Measures at DFCCIL

Construction Railway Operations (CRO) Training & Awareness

- Documentation work for “Construction Railway Operations (CRO) Manual” is fixed.
- Training and Awareness on “Safety Precautions” as per CRO Manual organized regularly in all Contract Packages.
- Constant meetings conducted by PMC/DFCC with the Contractors to sensitize and make them understand on the importance of CRO.



Ongoing Practice on Information Dissemination on Incident (Fatal & non-Fatal) Case Studies

- “SAFETY ALERTS” are regularly issued to the Contractors as proactive measures to avoid recurrence of any incident at sites.
- Information pertaining to “Derailment of Works Train” on DFC Track happened in the past is being reviewed & analysed and accordingly shared with the Contractors to take necessary preventive measures.

Continuous Efforts on Safety Precautions for Contractor’s Activities Adjacent to IR Live Tracks

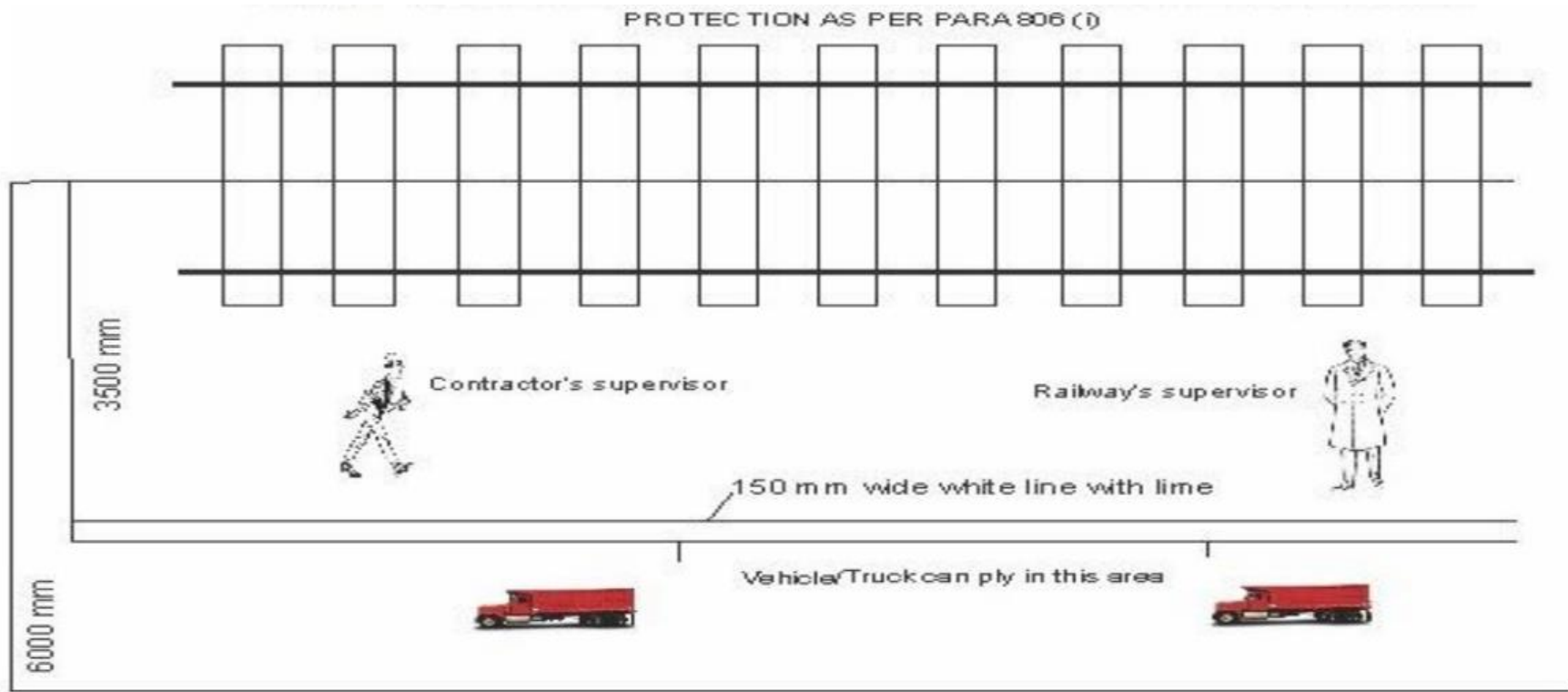
Implementation of various safety precautions before commencement and during construction work is constantly enforced to the Contractors. Some of these measures are:

- Erection and Maintaining barricades/fencing as per requirements
- Work Permit from IR
- Training of Workers / Employees
- Look out man / Hooter
- Movement of Construction Vehicles restricted within 3.5 m from IR Track.



*[Barbed wire fencing
b/w IR and DFC]*

Working within 3.5 - 6 meter from nearest IR Track



Pep. Talk



Operator Training



Induction ID card

Safety vehicle



Poster Sign board

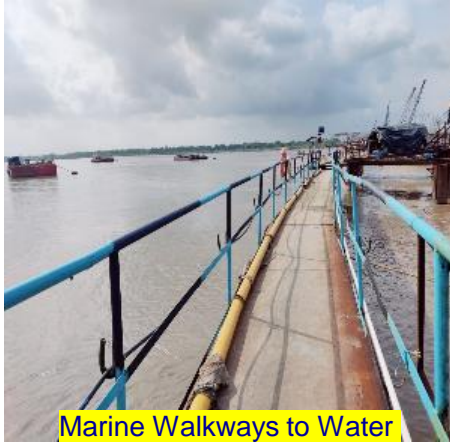
- Dumping work is going in presence of PMC Engineer/ Site Supervisor/Safety Officer.
- Flagman deputed with Red flag and whistle to alert driver when train approaching.
- Demarcated with Caution tape to keep dumper away from IR Track at safe distance.
- Driver having valid Driving License & Competency Certificate.



- Construction Railway Operation & Track Access Procedure
- Continuous meetings with the Contractors and interface contractors to sensitize them on track safety.
- Contractors encouraged to Conduct Public outreach and public awareness Programme, which are regularly monitored by PMC



Safety Precautions while working near and Over Water



Marine Walkways to Water well



Stopper Gates on Marine Walkways



Safety Net inside Water well



Access to Water well



Marine Access Control



Deployment of Flagmen with Equipment's



Barge Crane swing Area Barricaded



Barges & Boats side fencing



Display of Safety Posters



Safety Induction by SHE Director to JICA team



Pre deployment safety induction



Fire fighting training



On site training by external agency



Work at height safety training



Daily pre start TBT



- Inspections (conducted jointly with site execution, P&M, Admin and SHE Team)
- Pre-designed checklists are used



- Toolbox Talks at all working locations by the site engineer, supervisor & SHE personnel
- Daily before starting of physical work activities at the worksites.
- Include safety precautions followed by a Safety pledge.



SHE Induction training:

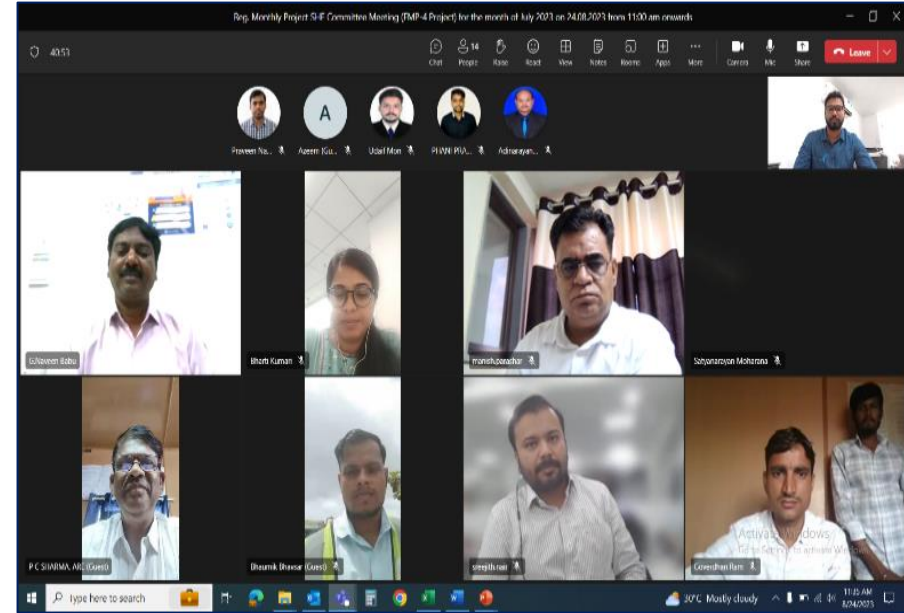
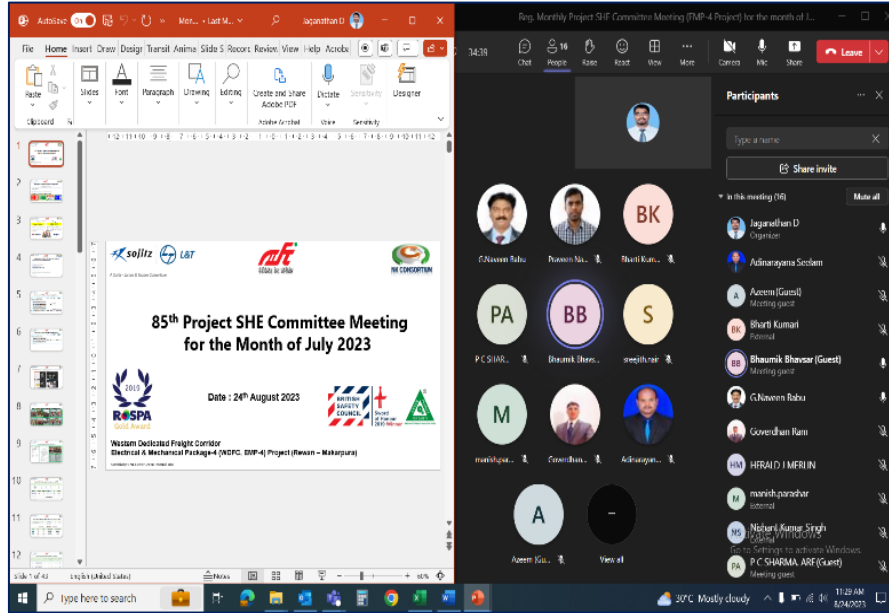
- Mandatory for all the employees, operators, visitors & workmen before deploying
- Includes hazards & control measures, occupational health awareness and environmental & emergency response arrangements at the worksites.



SHE Awareness training:

- On Job training for specific / Hazardous work activities
- Site personnel & workmen regularly updated.

Project SHE Committee Meeting



- Project level SHE Committee at the EMP-4 Project
- Monitoring & improvement of SHE performance monthly
- Building-up a high-level of safety culture at the various worksites
- Top management of SLT, PMC, DFCC & Sub-contractors are the members



Monthly Audit Rating Score (MARS):

- MARS Audit conducted jointly by L&T and PMC / DFCC SHE team
- Pre-designed & approved checklist
- Frequency - monthly
- Implementation of various parameters of the OH & S management systems like SHE Management, Site Safety, Occupational Health & Welfare and Environmental Management checked



Monthly Electrical Safety Audit:

- Monthly Electrical Safety Audit is also conducted jointly by L&T and PMC / DFCC
- Pre-designed & approved checklist
- Frequency - monthly



- Audit conducted by ISO certified external professional agency (M/s Salus EHS Solutions Pvt. Ltd.)
- Frequency of audit – quarterly
- Guidelines of ISO, ILO and national standards are followed.



- Mock drills on various potential emergencies conducted monthly
- Schedule prepared on various emergencies to be tested



- Basic health check-ups (BP, SPO2 monitoring) for site staff and workmen
- Government hospital doctors checking the health condition of workmen monthly at worksites.

SAFETY MEASURES: DON'Ts



Without shoes in switching yard



Do not wear loose cloths e.g. kurta pazama, lungi, etc.

SAFETY MEASURES: DOs and DON'Ts



SAFETY MEASURES: DOs and DON'Ts





Keep well equipped first aid box



Do not leave unwanted materials in switching yard

- Providing of Protection Screens to Prevent Human touching the high-voltage live OHE
- Daily Toolbox Training for Workers; Proper counselling on Fixing/Removal of Discharge Rods
- Impromptu inspection at the Site on Implementation and following of Safety Guidelines
- Health check up for Physical and Mental Readiness

Thank You



1. Enhanced Work Progress	Dynamic Working Conditions due to Multiple Activities, Multiple Work Fronts, Simultaneous Presence of Interface Contractors, Short Planning of work, Both Day & Night Working, etc. all posing new challenges everyday.
2. Sheer Volume	Inherent Safety Risks during Movement & Working of Construction Machinery and Vehicles along Running IR Track
3. Large Activity vs. Small / Isolated Activity	More Safety Focus on Large Activities [such as Hill cutting, Girder Launching, etc.] as compared to Less Safety Focus on Small / Isolated Activities [such as dumping by dumper, working of TM, working of Excavators, etc.]
4. Less Sharing of Near Miss or Dangerous Occurrence Cases as well as Case Studies from Work Sites	Missed opportunities to learn – where we went wrong or what better can we do next time to keep ourselves safe from more serious consequences.

5. Comprehensive Safety Check Points for Construction Machinery & Vehicle	Difficult to follow and cannot be made so many 'Yardsticks' for Safety Control.
6. Frequent Changes of Workers / Drivers / Operators	Difficult to Control. No option but to accept this fact as a Challenge.

[RISK MANAGEMENT]

- A. Risk Assessment & Analysis to be constantly applied and updated on a regular basis to address issues arising on DFC Construction sites in order to eliminate or reduce the level of its risk (*acceptable level*) by adding safety precautions or control measures.
- B. Re-emphasize and re-strengthen the importance of Safety as a part of culture & awareness at the Field-level.