



**Safety Control
in the Construction Industry
In India.**

By

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OVERVIEW

- **INDIAN SCENARIO**
- **CHALLENGES IN CONSTRUCTION INDUSTRY**
- **CONTROL MEASURES**

OCCUPATIONAL SAFETY & HEALTH IN CONSTRUCTION INDUSTRY

Introduction :

Construction Sector is very essential and an integral part of infrastructure development which gives tremendous boost to our country's economy.

The construction industry has registered enormous growth worldwide in recent years. Although the development of technology is rapid in most of the sectors, construction work is still labour intensive ,

In India the construction sector employs around 33 million people, which is next to agriculture.

Continued.....

The construction workers are one of the most Vulnerable Segment of the unorganized labour in our country.

Workers being exposed to wide variety of serious OHS hazards, the rate of fatal accidents in this industry is 4 to 5 times that of the manufacturing sector.

The workers are also exposed to a host of hazardous substances , which have a potential to cause serious Occupational diseases such as asbestosis, silicosis, lead poisoning , etc.

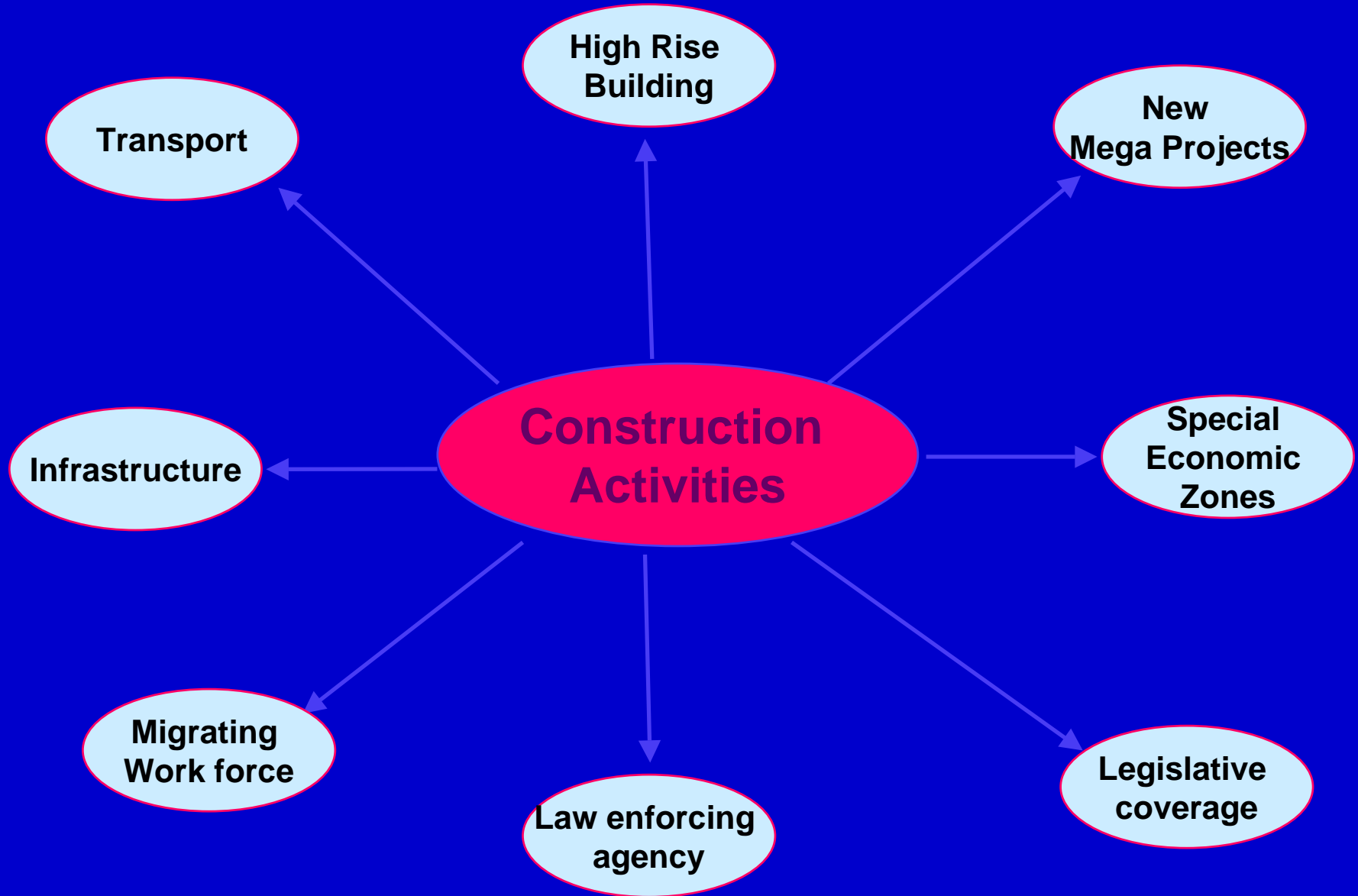
**There is also a serious potential of fires due to the storage and use of flammable substances and a potential for disasters due to collapse of the structures
And subsidence of the soil on which the construction activity is being carried out.**

Statistic of Construction.

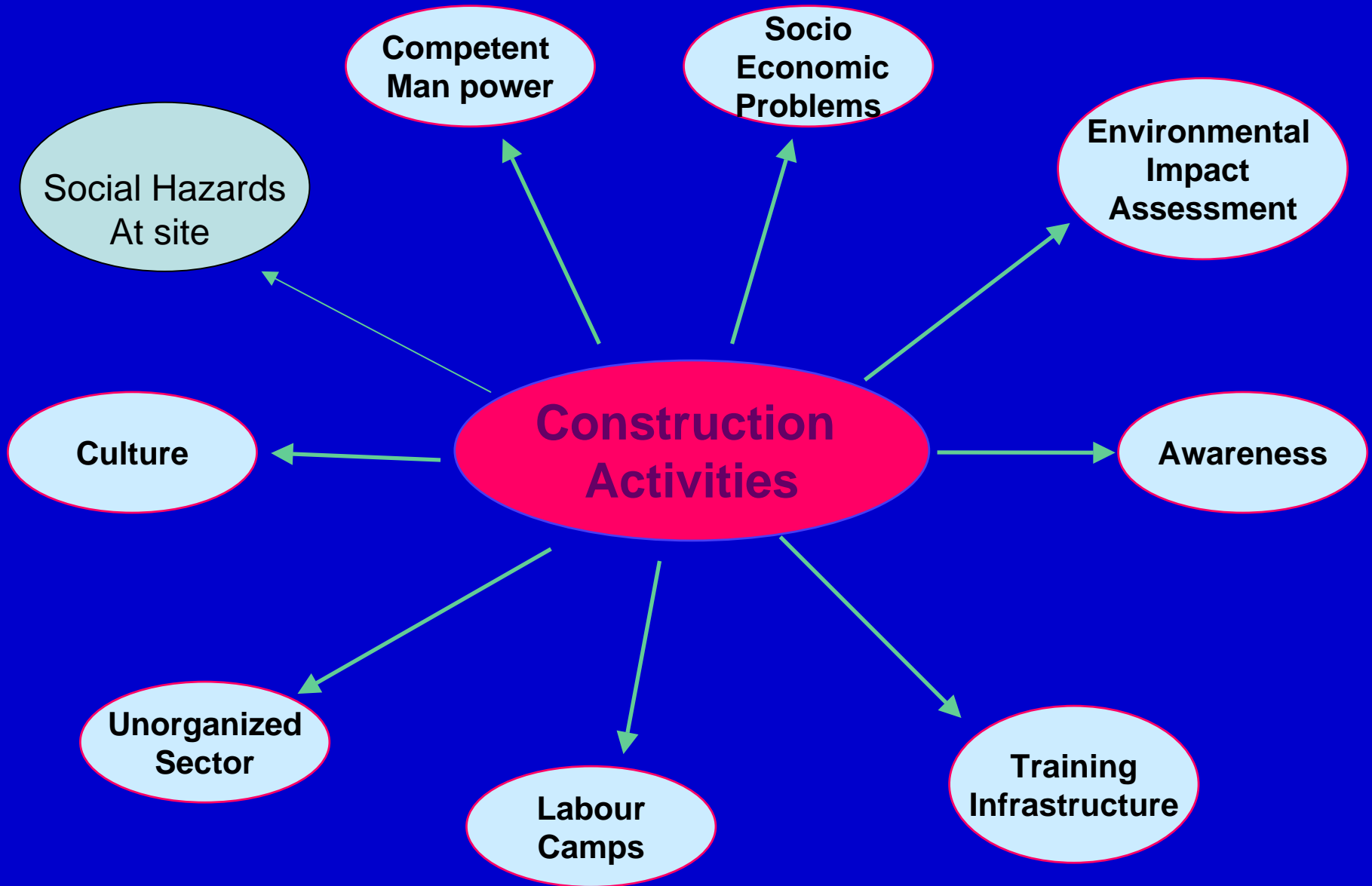
Annual turnover	Rs. 3921 billion
Contribution of GDP	6.2 %
Employment	33 million workers
Engineers	4.7 %
Technicians & Foreman	2.5 %
Skilled Workers	73.1 %
Annual growth	8 % (Targeted)

Source : CIDC Country Report 2005-2006

Challenges of Construction Industry in India



Challenges of Construction Industry in India



Proactive approach

- OHSE Policy and Organization structure

- Risk Assessment and Monitoring

 - Hazard Identification

 - Hazard Controlling

 - Hazard Monitoring

- Culture Development

 - Education and Training

 - Communication

 - Promotional Activities

 - Follow up

 - Employee participation

Proactive approach....(continued)



Occupational Health

Work area monitoring

**HIRA of activities and processes,
having occupational health risk
along with CAPA.**

**Statutory compliances – pre /
periodic medical check up.-MSDS
.....etc.**

Training .

Proactive approach....(continued)

- Fire prevention

- Emergency preparedness

 - Quantification of Risk from process

 - Natural calamities

 - Other Factors..

 - On and Off Site Emergency Plan

- Statutory Requirements (ROR)

OVERVIEW OF STATUTES APPLICABLE TO CONSTRUCTION INDUSTRY

- **Building & other construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (BOCWA)**
- **Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998 (BOCWR)**
- **Petroleum Act, 1934 (PA)**
- **Petroleum Rules, 2002 (PR)**
- **Explosives Act, 1884 (EA)**
- **Explosives Rules, 1983 (ER)**
- **Gas Cylinder Rules, 1981 (GCR)**
- **Static & Mobile Pressure Vessels (Unfired) Rules, 1981 (SMPVR)**
- **Electricity Act, 2003 (EA)**
- **Indian Electricity Rules, 1956 (ER)**
- **Motor Vehicles Act, 1988 (MVA)**
- **Central Motor Vehicles Rules, 1989 (CMVR)**

In 1996 the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act,1996 was promulgated.

The Central Rules under this Act were notified in November 1998.

The Central Government has notified its Chief Labour Commissioner as the Central enforcement agency under the above act.

Till this date 14 states has notified their enforcement agencies.

DGFASLI

The DGFASLI organization has been providing technical support over the years in drafting of Central Rules/ Model Rules, carrying out studies, surveys, safety audits and conducting training programmes, workshops and seminars in this sectors for the past over three decades.

National Safety Council

The National Safety Council (national and unit levels), has been conducting training programmes, safety audits, information dissemination ,producing awareness material and organizing campaigns for the construction industries for over a decade.

Proactive approach....(continued)

- Work permit

- Contractors selection and safety

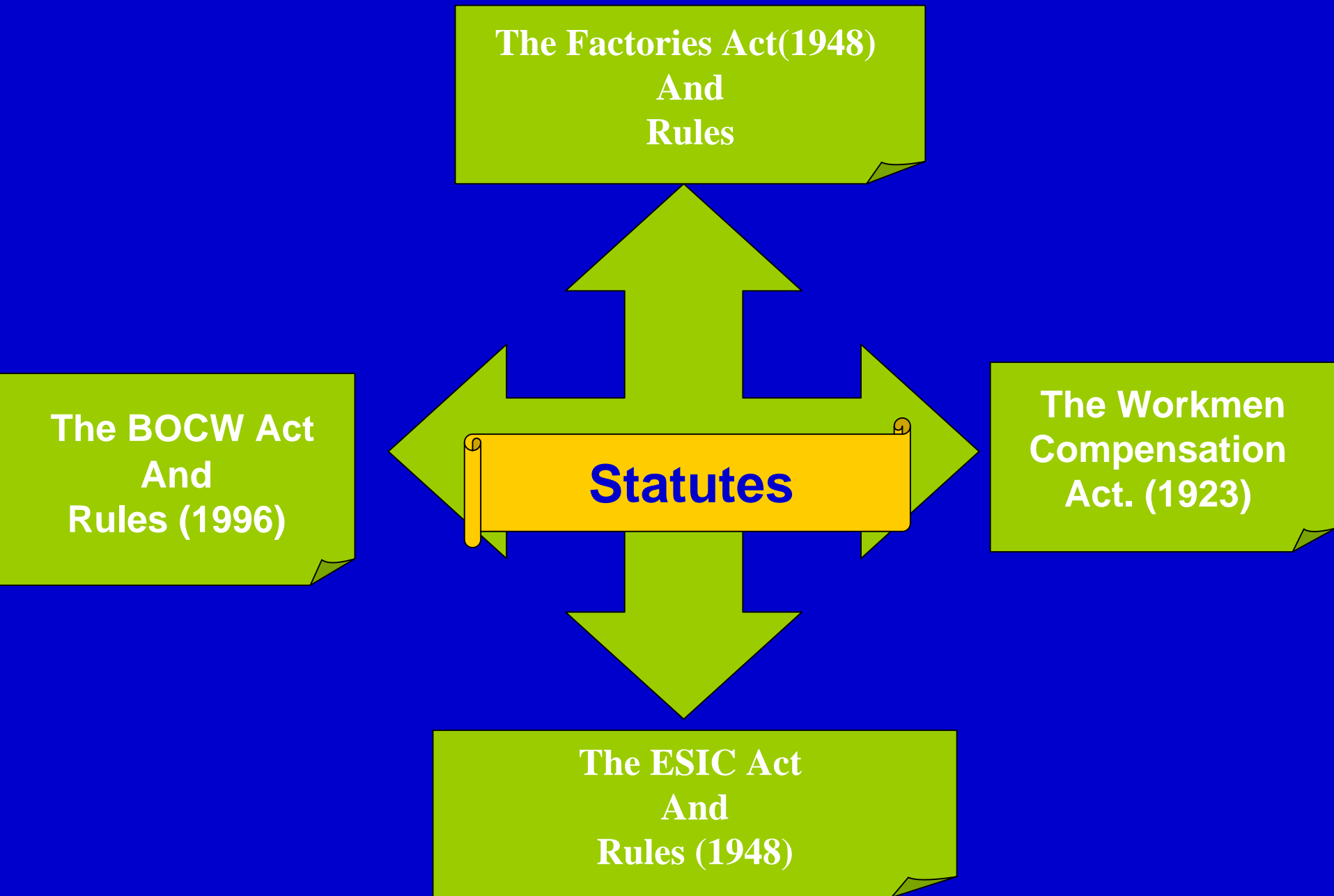
- Personnel Protective Equipment

- Management system - ISO 9001-2000(QMS)
 - ISO 14001-2004 (EMS)
 - OHSAS18001-2007(OHS)
 - SR- (Pro.ISO-26000 Sustainability growth)
 - IMS ,TPM, 5-S,TO.etc.

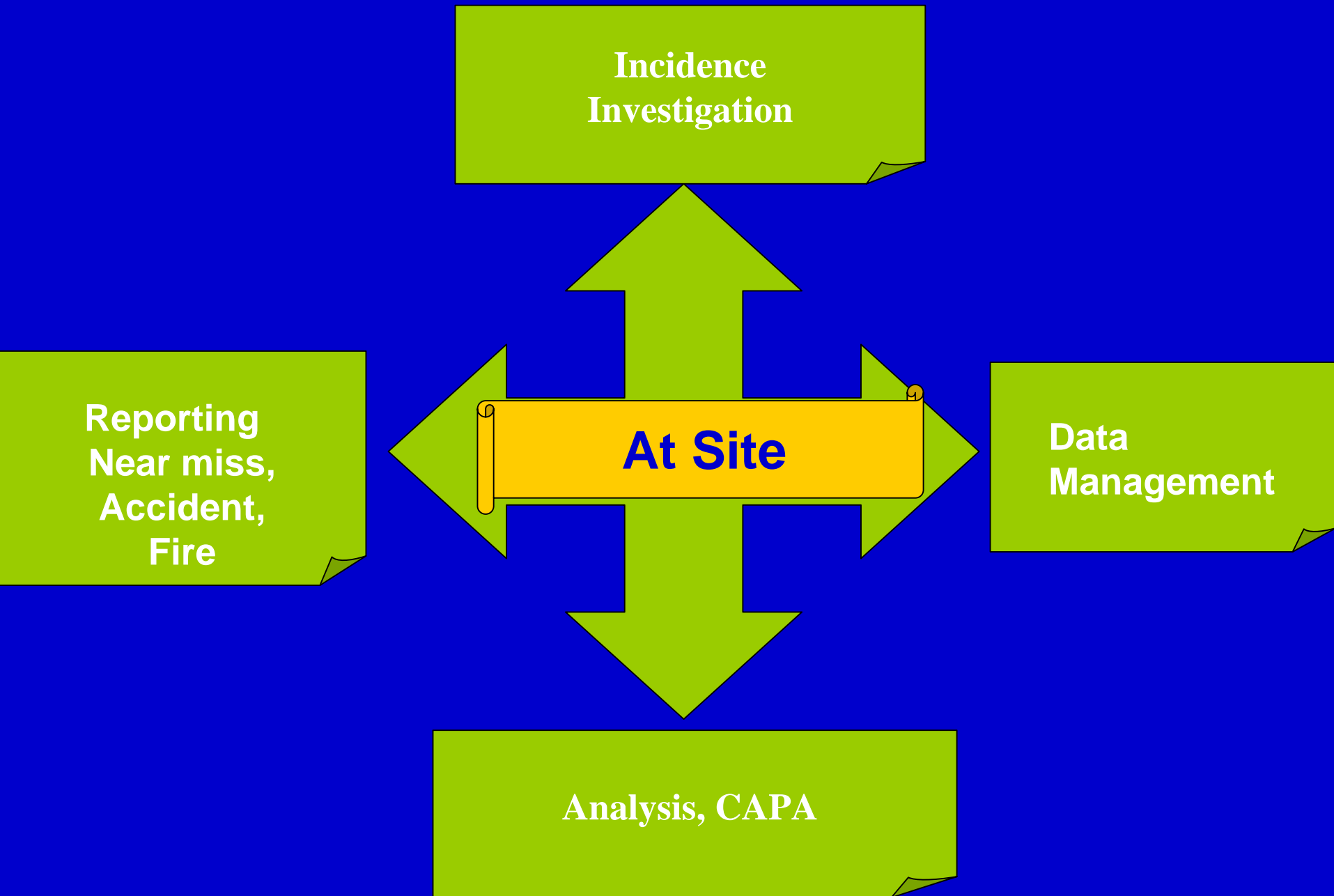
Proactive approach....(continued)

- **Propagation, Implementation and Monitoring of OHS policy.**
- **Liaison – Internal and External customers.**
- **Strategic planning - 5 Years planning, SBP. ABP, Disaster management etc.**

Reactive Approach

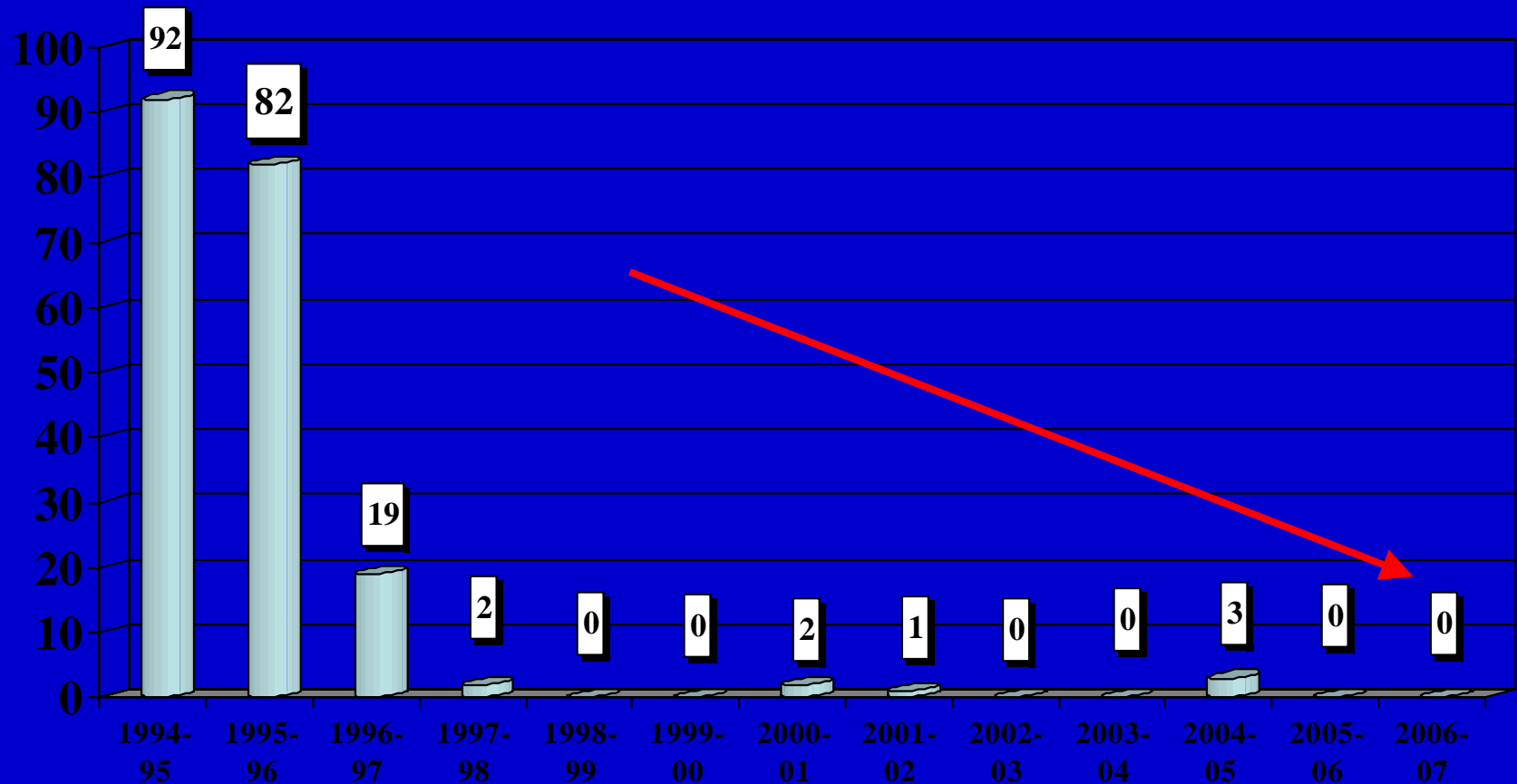


Reactive Approach



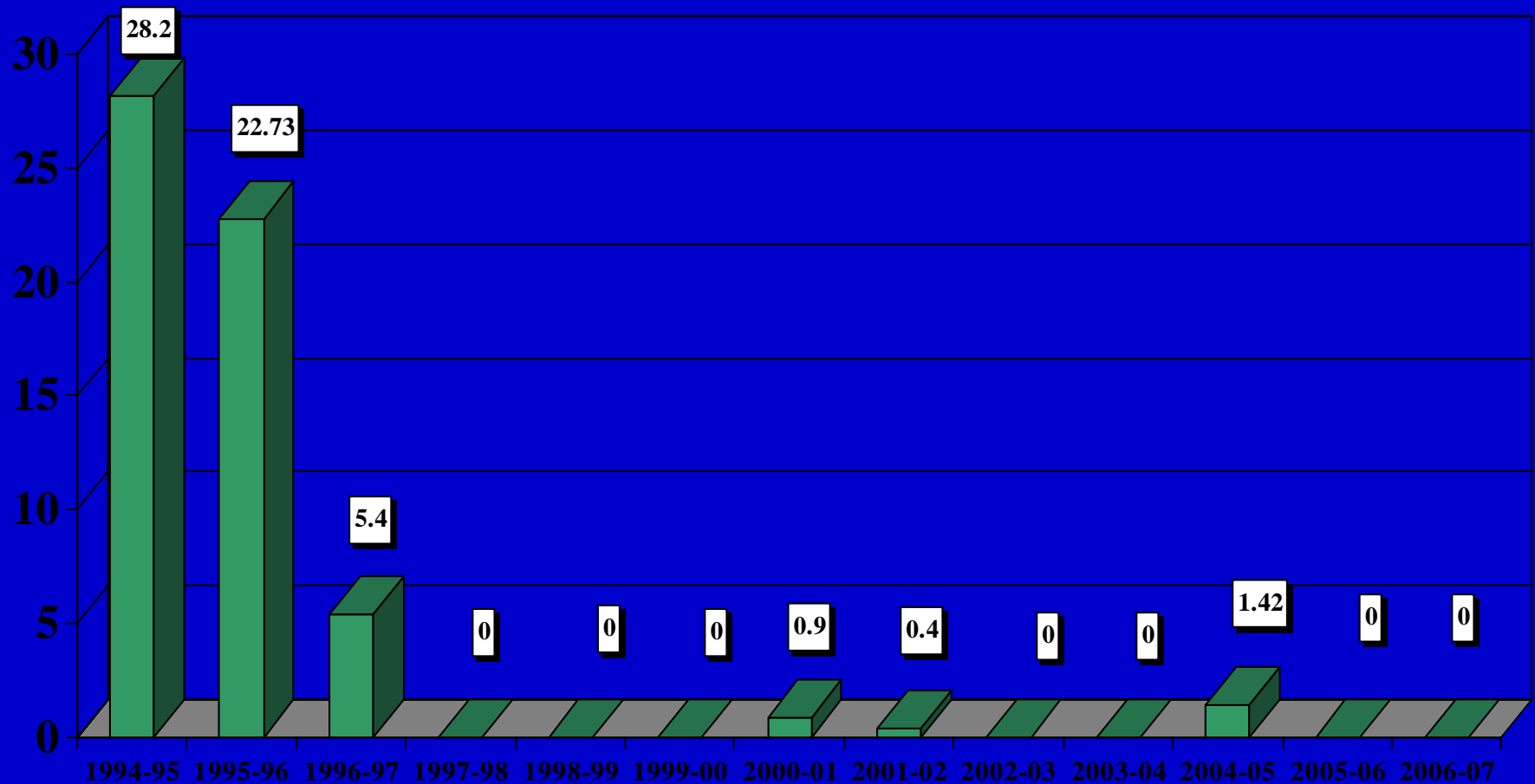
REPORTABLE ACCIDENTS

Godrej & Boyce - Construction Div.



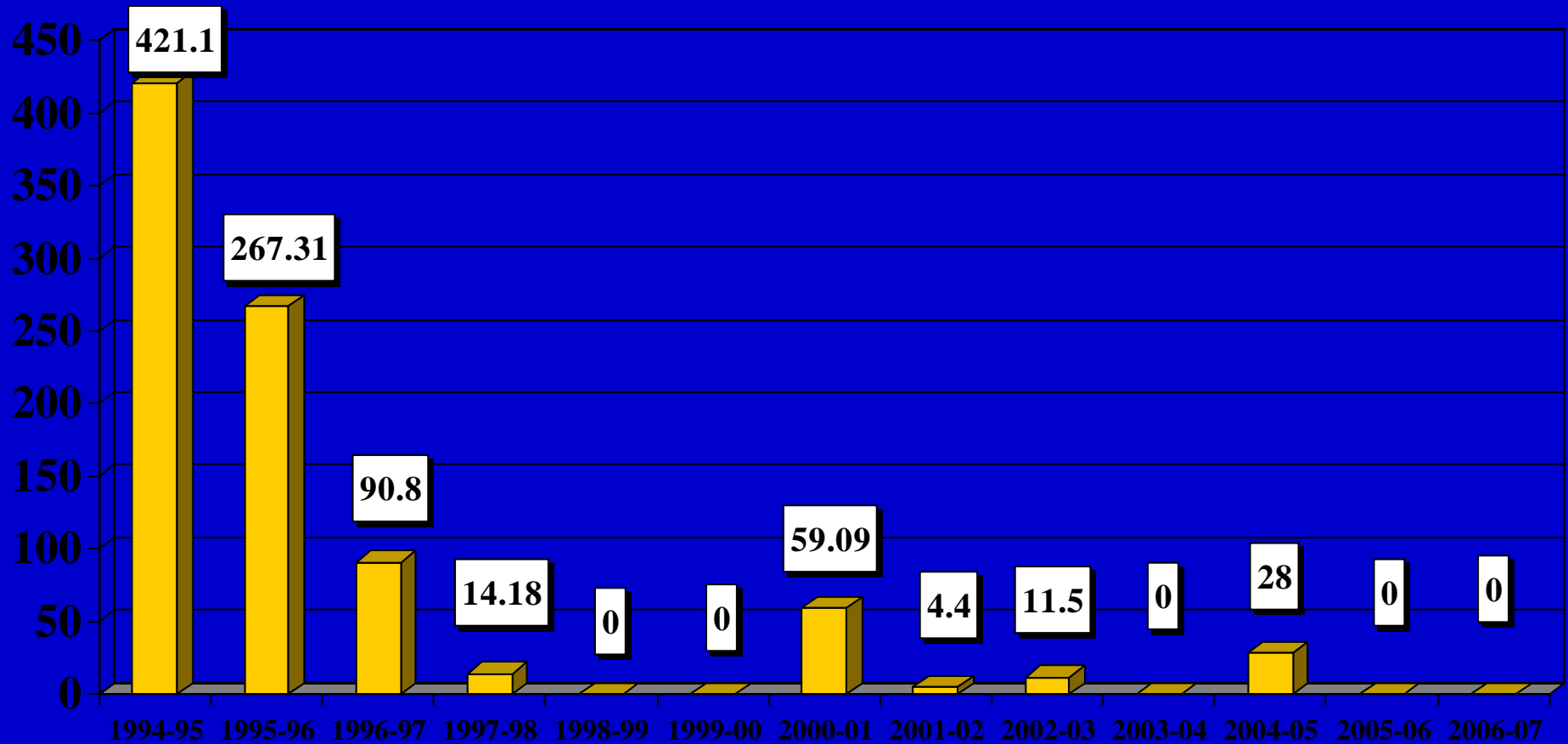
FREQUENCY RATE (FR)

Godrej & Boyce - Construction Div.



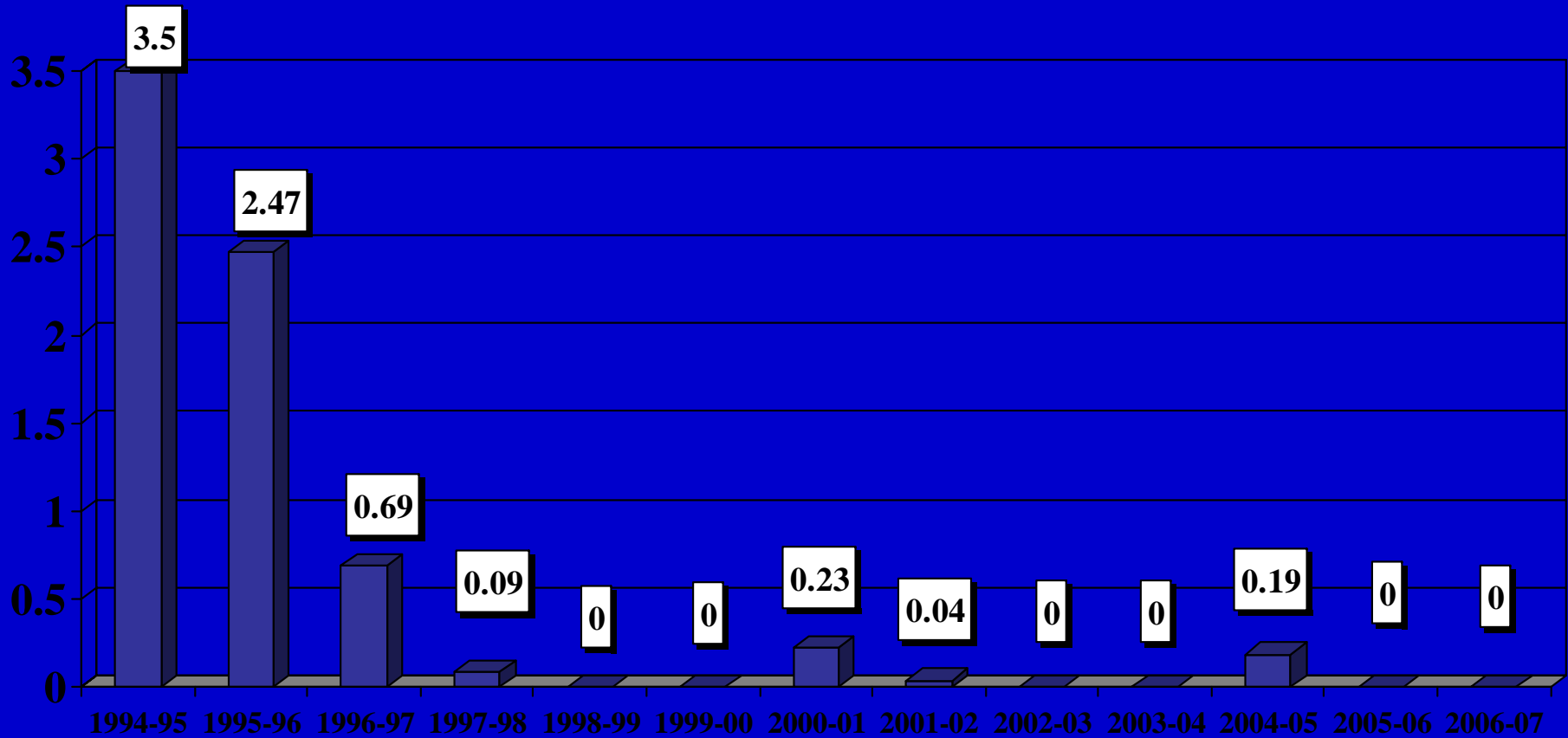
SEVERITY RATE (SR)

Godrej & Boyce - Construction Div.



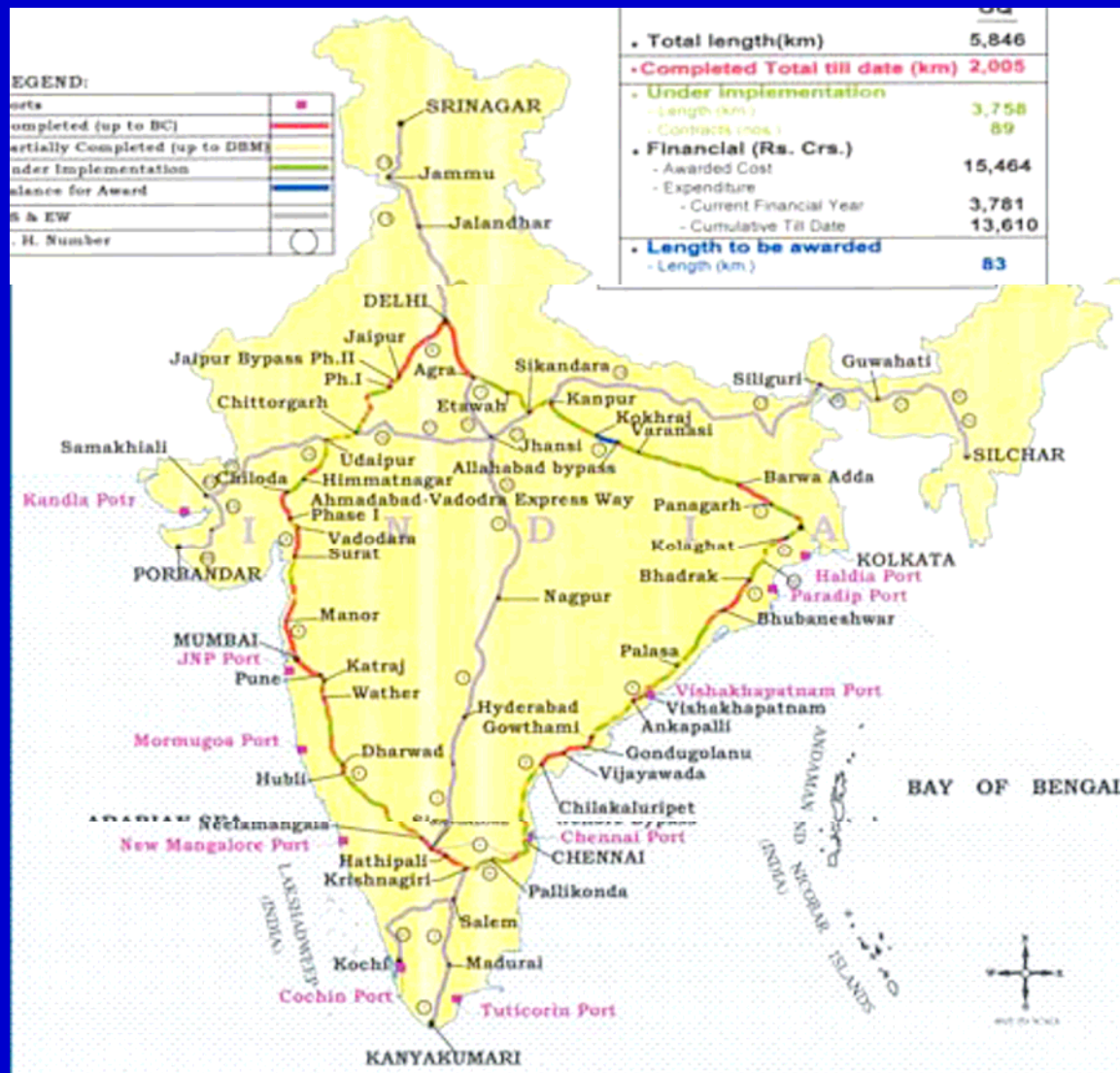
FREQUENCY SEVERITY INDEX (FSI)

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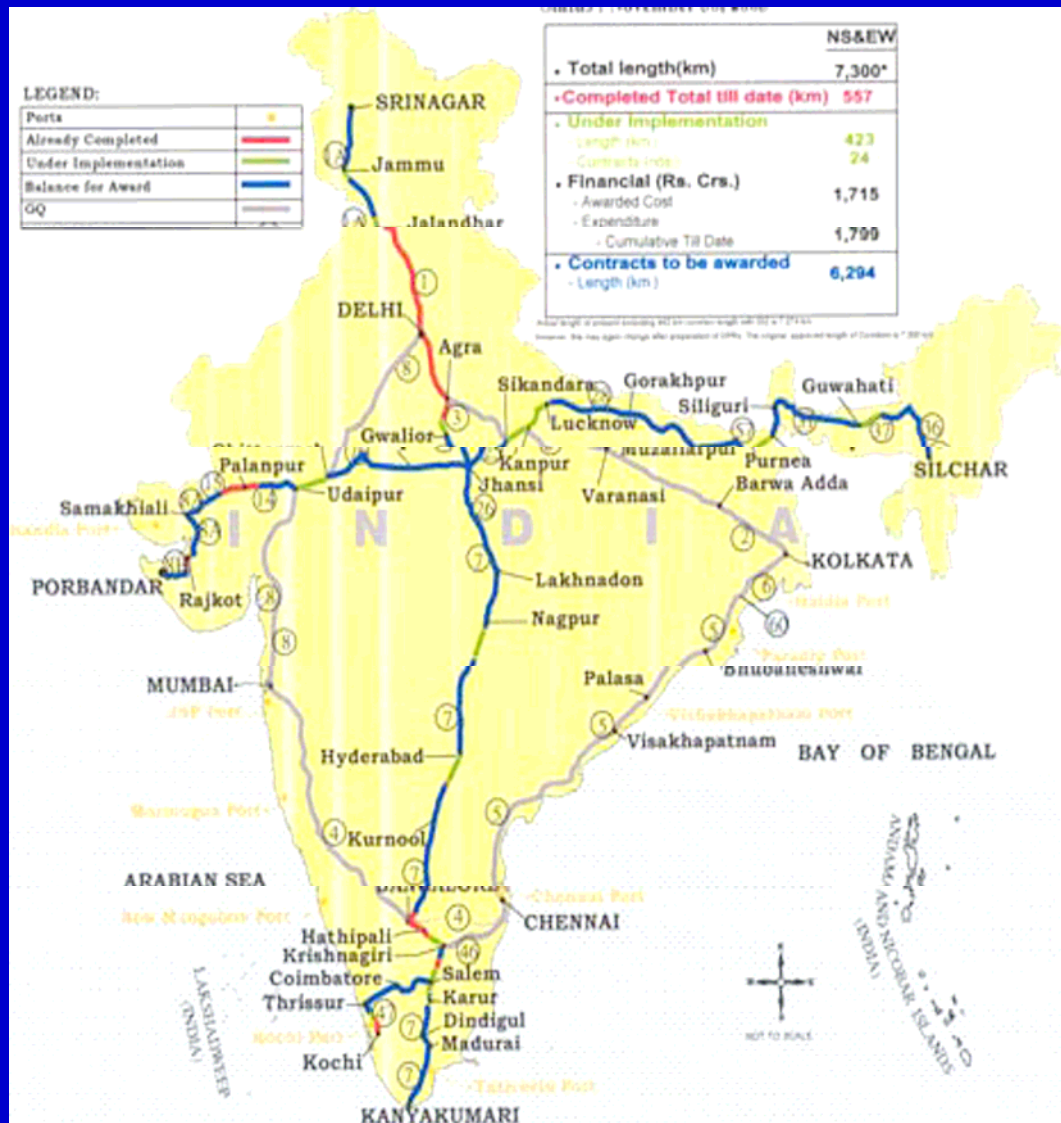


Mega Infrastructural Projects in India

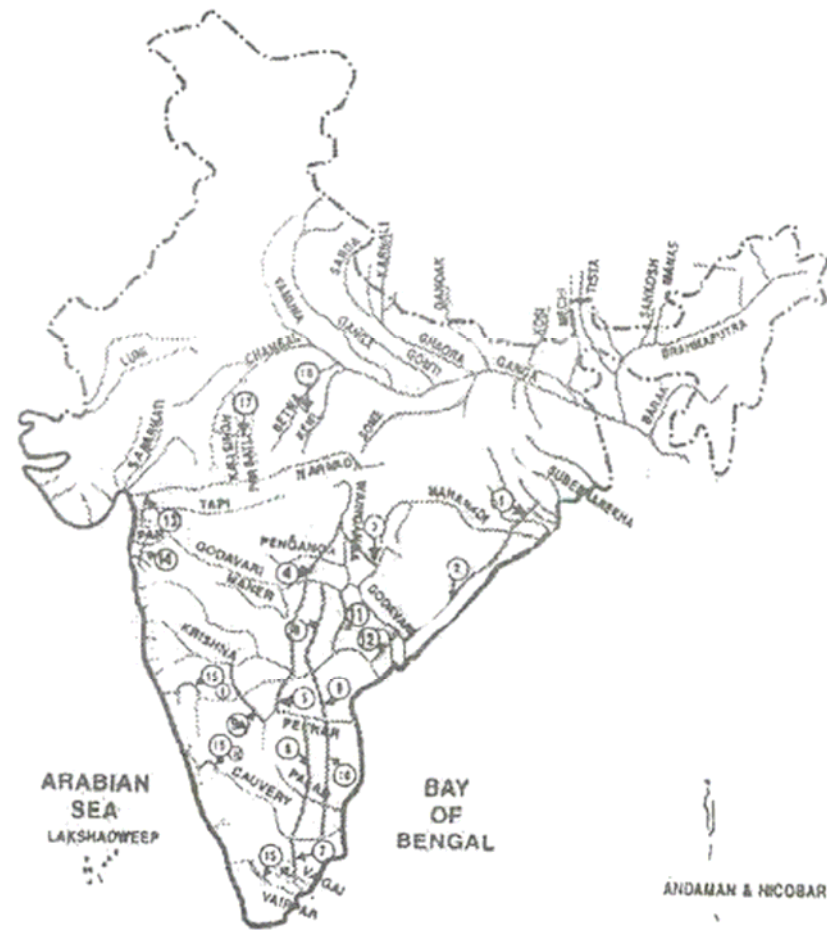




Golden Quadrangle (Source: www.nhai.org)



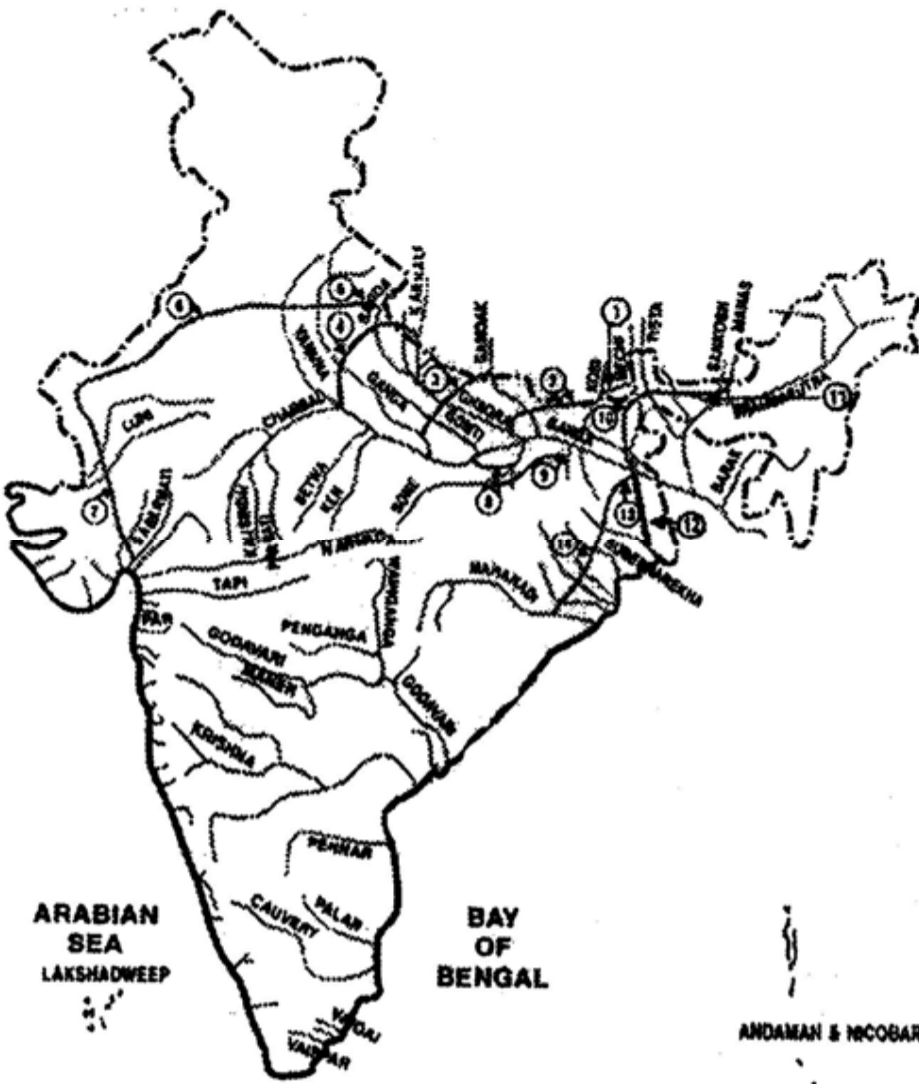
North-South East-West Corridors (Source: www.nhai.org)



Proposed Links of the Peninsular Component Reddy, (2002)

Proposed River Links

1. Mahanadi-Burhabalang
2. Mahanadi-Godavari
3. Indravati-Wainganga
4. Wringing-Krishna
5. Krishna (Srisailem)-Pennar (Prodattur)
6. Pennar (Gandikotta)-Palar-Cauvery
7. Cauvery-Vaigai
8. Godavari (Inchampalli)-Krishna (Nagarjuna Sagar)
9. Krishna (Nagarjuna Sagar)-Pennar (Somasila)
- 9.A Krishna (Almatti)-Pennar
10. Pennar (Somasila)-Palar-Cauvery (Coleroon)
11. Godavari (Inchampalli)-Krishna (Pulichintala)
12. Godavari (Polavaram)-Krishna (Vijaywada)
13. Par-Tapi-Narmada
14. Damanganga-Tansa/Pinjal
15. West Flowing Rivers of Kerala and Karnataka (Bedti-Varda; Netravati-Hemavati; Pamba-Anchankovil-Vaippar)
16. Ken-Betwa
17. Parbati-Kalisindh-Chambal



Proposed River Links

1. Kosi-Mechi
2. Kosi-Ghagra
3. Gandak-Ganga
4. Ghagra-Yamuna
5. Sarda-Yamuna
6. Yamuna-Rajasthan
7. Rajasthan-Sabarmati
8. Chunar-Sone Barrage
9. Sone Dam-Southern Tributaries of Ganga
10. Brahmaputra-Ganga (Mstg)
11. Brahmaputra-Ganga (Jtf) (Alt)
12. Farakka-Sunderbans
13. Ganga-Damodar-Subarnarekha
14. Subarnarekha-Mahanadi

**Proposed Links of the Himalayan Component
(Reddy, 2002)**

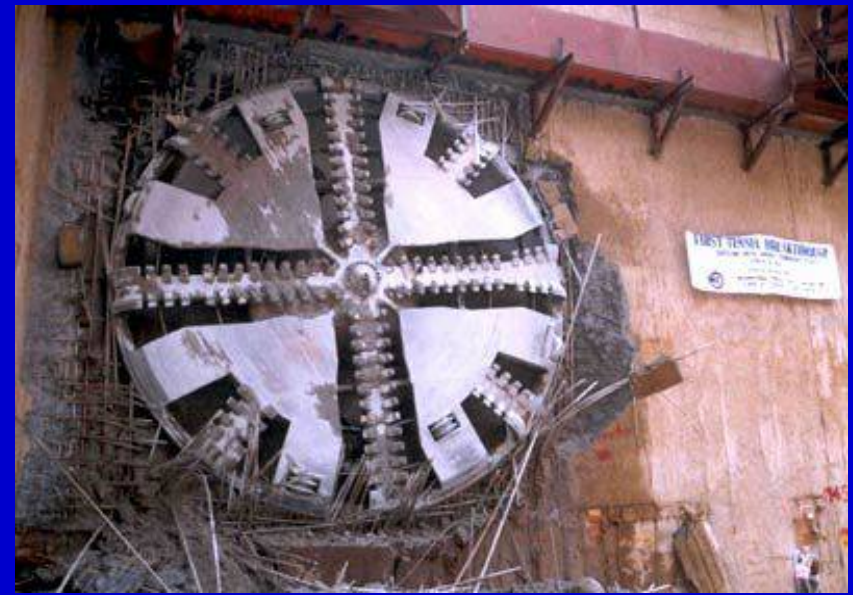
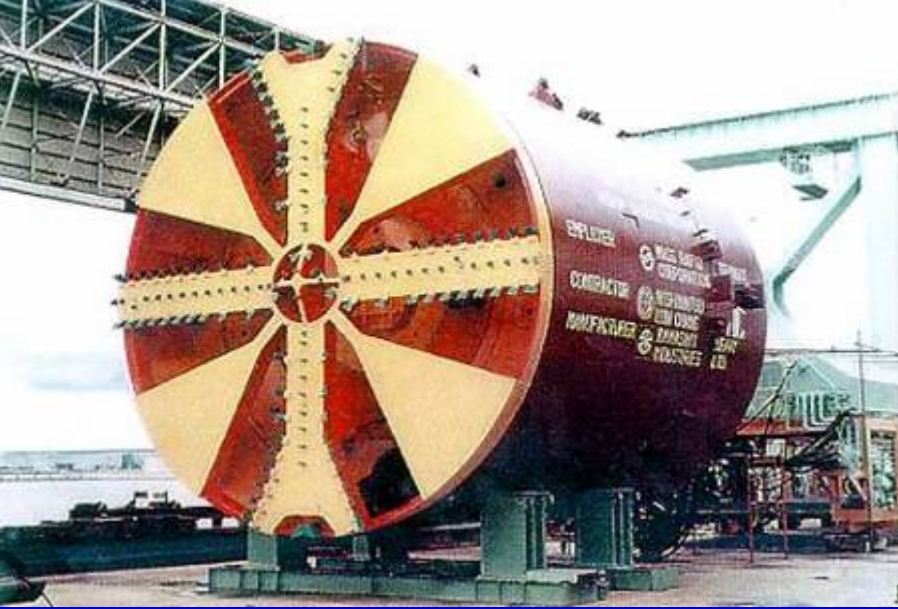
Sea-Ports Project:

This project of upgrading existing ports along the gigantic Coastline of the country will be an invitation to traders from all over the world in all Directions, hence the project is called as Neck less Project. The total outlay of project of about 60000 crores rupees. This project is also expected to relieve the pressure on the rail, road and air traffic systems, by allowing the Ship and ferry services throughout the coastline. It includes improvement of harbor structures, developing advanced navigational inventory systems for small and large structures and adding a few smaller ports for linkage.

Air-Taxi project :

This is another Mega-Project which will enhance air connectivity between various places in the country. The project entails enhancement of existing airports to higher standards and capacity, and addition of new airports at critical locations will lead to more hubs for traffic exchange in contrast to only Metro cities. It will lead to dropping

Down of air tariff cost to 70-80% of current charges. The financial outlay For this project is expected to exceed some of the ongoing Mega Projects in country.



Giant Tunnel Boring Machines used in underground tunneling work in the Delhi

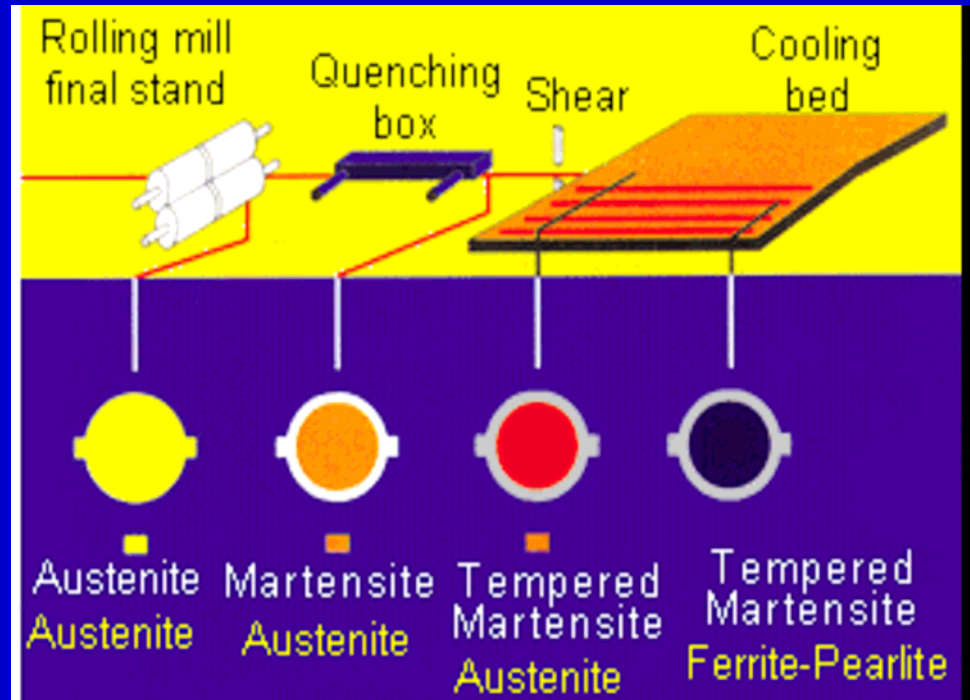
Metro Rail Project:

(a) Full view on arrival at the seaport in India, and

(b) a *break-through* in hard rock strata of Delhi.
(Source: www.delhimetrorail.com)

NEW MATERIALS, EQUIPMENT AND TECHNOLOGIES

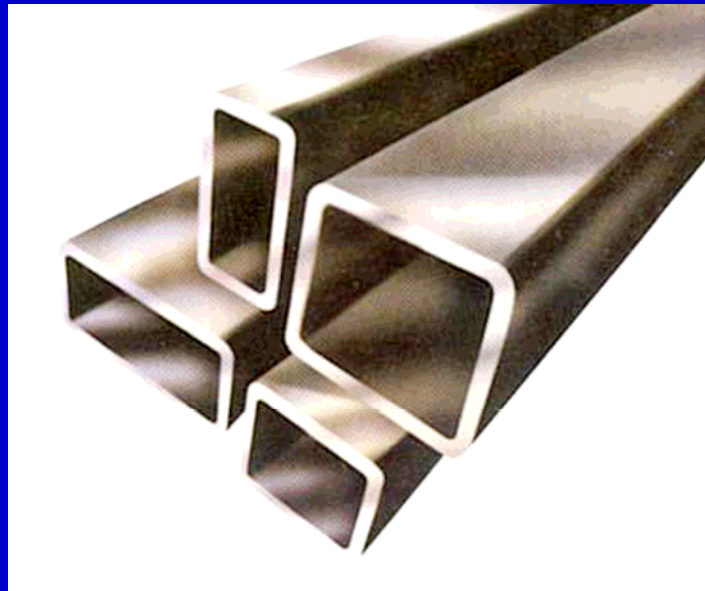
Corrosion Resistant Steel (CRS)



Strong Outer Layer – Ductile Core of Corrosion Resistant Steel

(Source: <http://www.tatasteel.com/longs/tiscon/images>, February 2003)

Closed Structural



Rectangular and Square Sections (Sinha, 2003a)

Economy of Steel Consumption through use of closed-structural

(Source: www.tatatubes.com/frames_pages/frames_closedstructurals.htm, 2003)

Table

Property Of Closed Structural	Application In Structural Systems	Steel Saved compared to conventional centre
Symmetry about all axes	Tension Ties	15
Higher Radius Of Gyration	Compression Status	45
Higher Lateral Rigidity	Flexural Members	25
Higher Shear Area	Members Under Shear	40
Greater Enclosed Torsional Area	Members Under Torsion	80

Engineered Steel Guardrail Systems



Steel Guardrail Systems
(Source: www.kirby-india.com, 2004)

Urban Construction Strategies



(a)



(b)

Massive Pre-cast Piers used for flyovers without disruption of under lying services and utilities:

(a) JJ Hospital Flyover on Pre cast Piers in Delhi, and

(b) Transportation of Pre cast Piers from site of construction to erection site (Bhattacharya, 2002)

Machine Automated Slip-form Pavers



Automatically guided slip-form paving machine and on-ground monitoring systems for transferring information from ground to machine. (Source: www.leica-geosystems.com, 2004).

PROJECT MANAGEMENT

- **Basic Infrastructure**

- **Contract Management**

- **Consultancy Services**

- **Project Control Site Selection and Landscaping**

1. *Resource Scheduling*

2. *Financial Control*

3. *Budget Formulations and Periodic Review*

4. *Expenditure Reporting and Monitoring*

● TECHNICAL HUMAN RESOURCE and EMPLOYMENT POTENTIAL

● THE CHALLENGES

1 Housing

Valmiki Ambedkar Awas Yojna

Indira Awas Yojna



**Single-storey housing in Vondh village (Gujarat)
built by the Government of Maharashtra.**

THE CHALLENGES

continued...

2 Environment

- (a) *Government action*
- (b) *Market forces*
- (c) *Institutional initiatives*
- (d) *Operational environment*

3 Transportation

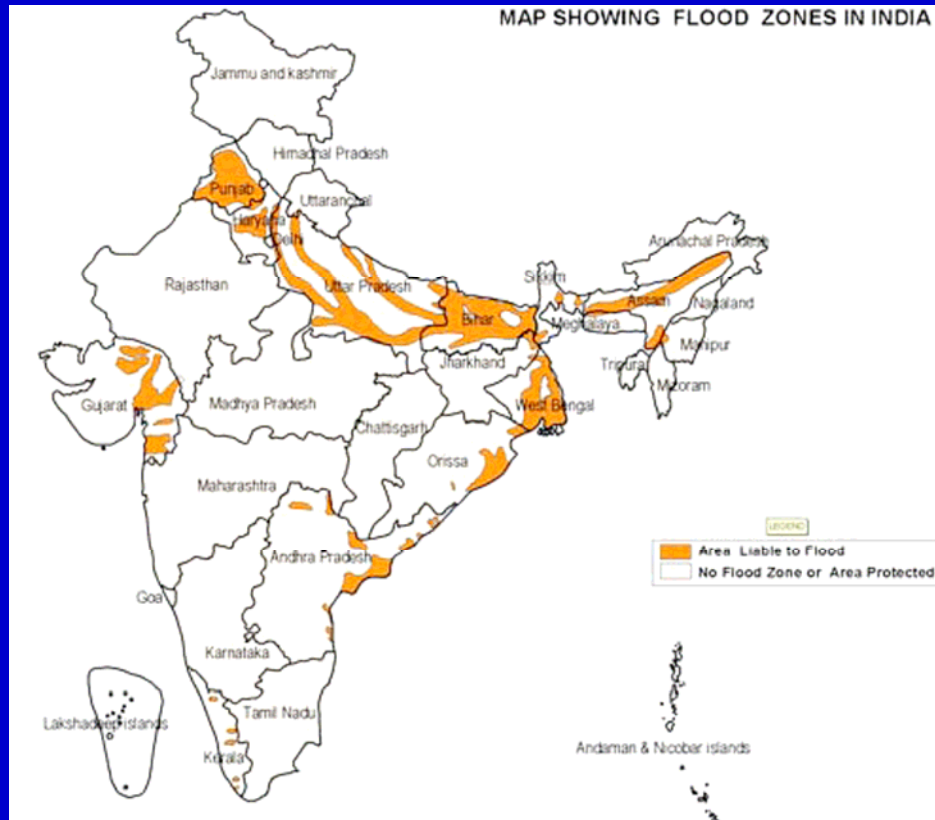
4 Power



Large apartments and commercial complexes with captive power generating systems (Source: www.unitech-limited.com)

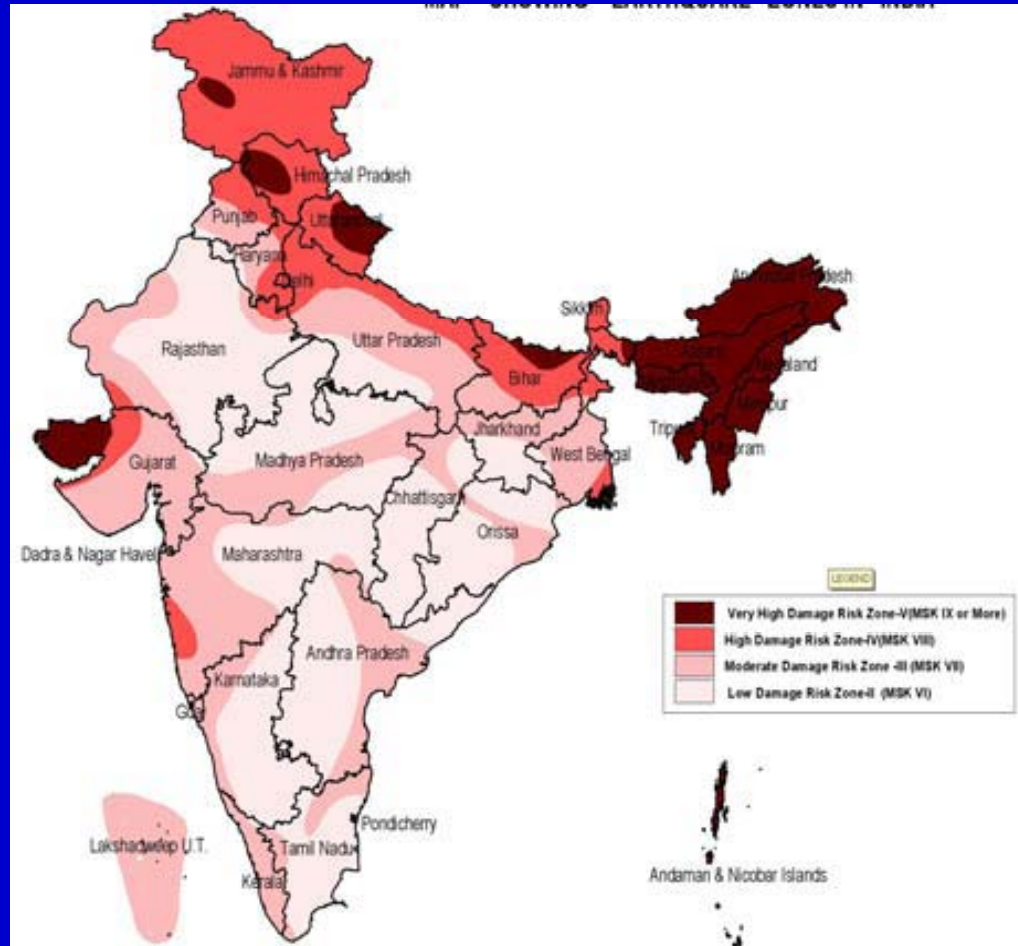
THE CHALLENGES continued...

5 Natural Hazards



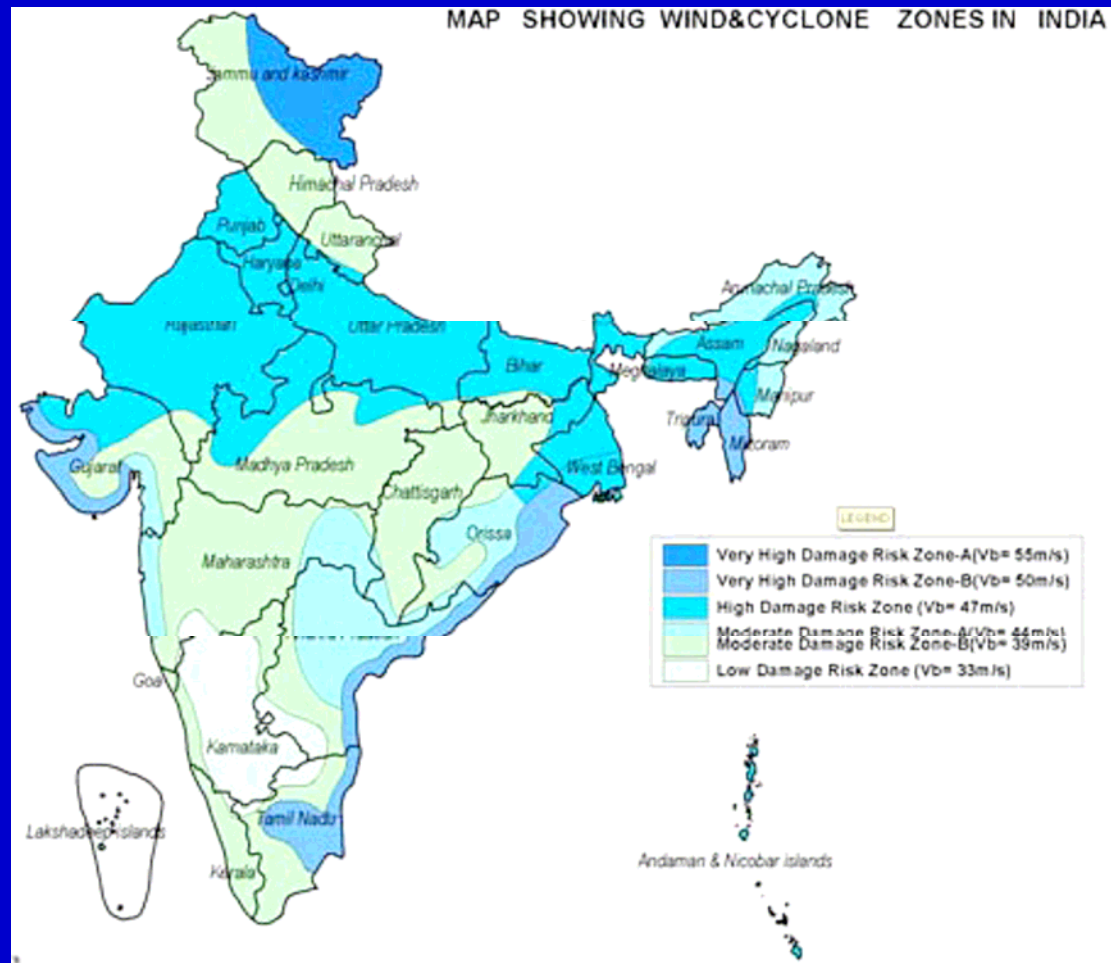
Flood Affected Areas of India
(Source: www.bmtpc.org/disaster.htm, 2004)

Natural Hazards continued.....



Earthquake Zones of India
(Source: www.bmtpc.org/disaster.htm, 2004)

Natural Hazards continued.....



Wind and Cyclone Zones of India
(Source: www.bmtpc.org/disaster.htm,)

Top Violations on-site



Bad storage – sagging rack



Cement storage – Loading against wall, loading up to the ceiling



Access to child



Injuries due to RMC





Bad fire protection



Gas cylinder kept horizontally anywhere



Bad hand tools



Bad illumination



Unsafe ladder



Unsafe sitting places



Unsafe sleeping place



Structural safety- crack on wall



Unsafe access



Unsafe act- standing on moving vehicle



Unsafe manual material handling



Unsafe mechanical material handling equipment



Misuse



Ventilation

Thanks