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)

Challenges of Construction Industry in India

- High Rise Building
- New Mega Projects
- Special Economic Zones
- Legislative coverage
- Law enforcing agency
- Migrating Work force
- Infrastructure
- Transport
Challenges of Construction Industry in India

- Social Hazards At site
- Competent Man power
- Socio Economic Problems
- Environmental Impact Assessment
- Culture
- Unorganized Sector
- Labour Camps
- Awareness
- Training Infrastructure

Construction Activities
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.
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.
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.
The Factories Act (1948) And Rules

The BOCW Act And Rules (1996)

Statutes

The Workmen Compensation Act. (1923)

The ESIC Act And Rules (1948)
Reactive Approach

Incidence Investigation

At Site

Reporting Near miss, Accident, Fire

Data Management

Analysis, CAPA
REPORTABLE ACCIDENTS
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Year: 1994-95 to 2006-07

- 1994-95: 92
- 1995-96: 82
- 1996-97: 19
- 1997-98: 2
- 1998-99: 0
- 1999-00: 0
- 2000-01: 2
- 2001-02: 1
- 2002-03: 0
- 2003-04: 0
- 2004-05: 3
- 2005-06: 0
- 2006-07: 0

Trend: Decrease over the years.
SEVERITY RATE (SR)
Godrej & Boyce - Construction Div.

1994-95: 421.1
1995-96: 267.31
1996-97: 90.8
1997-98: 14.18
1998-99: 0
1999-00: 0
2000-01: 59.09
2001-02: 4.4
2002-03: 11.5
2003-04: 0
2004-05: 28
2005-06: 0
2006-07: 0
Mega Infrastructural Projects in India
Golden Quadrangle (Source: www.nhai.org)
North-South East-West Corridors  (Source: www.nhai.org)
Proposed River Links
1. Mahanadi-Burhabalang
2. Mahanadi-Godavari
3. Indravati-Wainganga
4. Wringing-Krishna
5. Krishna (Srisailam)-Pennar (Prodattur)
6. Pennar (Gandikotta)-Palar-Cauvery
7. Cauvery-Vaigai
8. Godavari (Inchampalli)-Krishna (Nagarjunasagar)
9. Krishna (Nagarjunasagar)-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; Nettavati-Hemavati; Pamba-Anchankovil-Vaippar)
16. Ken-Betwa
17. Parbati-Kalisindh-Chambal

Proposed Links of the Peninsular Component
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)
Corrosion Resistant Steel (CRS)

Strong Outer Layer – Ductile Core of Corrosion Resistant Steel
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](http://www.tatatubes.com/frames_pages/frames_closedstructurals.htm), 2003)

**Table**

<table>
<thead>
<tr>
<th>Property Of Closed Structurals</th>
<th>Application In Structural Systems</th>
<th>Steel Saved compared to conventional centre</th>
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</thead>
<tbody>
<tr>
<td>Symmetry about all axes</td>
<td>Tension Ties</td>
<td>15</td>
</tr>
<tr>
<td>Higher Radius Of Gyration</td>
<td>Compression Status</td>
<td>45</td>
</tr>
<tr>
<td>Higher Lateral Rigidity</td>
<td>Flexural Members</td>
<td>25</td>
</tr>
<tr>
<td>Higher Shear Area</td>
<td>Members Under Shear</td>
<td>40</td>
</tr>
<tr>
<td>Greater Enclosed Torsional Area</td>
<td>Members Under Torsion</td>
<td>80</td>
</tr>
</tbody>
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Engineered Steel Guardrail Systems

Steel Guardrail Systems
(Source: www.kirby-india.com, 2004)
Massive Pre-cast Piers used for flyovers without disruption of underlying 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)
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)
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