

PREPARATION OF CONSTRUCTION SAFETY AUDITS FOR SAFETY MANAGEMENT IN INFRASTRUCTURE PROJECTS

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Abstract:-

Safety audit is carried out to ensure that unsafe acts and unsafe conditions are brought to a minimum level so that there is a safe work environment. Safety audit is to evaluate design and identify potential safety hazards during construction of bridge before open it to traffic and to suggest measures to eliminate or mitigate those problems. The purpose of safety audit is to ensure that there are definitions and safe procedures for works and the set definitions and safe procedures are practiced. Components of a safety audit may depend upon the type of occupancy but it surely indicates that the management has an attitude towards safety.

Bridge safety is now recognized as one of the major socioeconomic concern. Increasing traffic volumes, the rapid growth in traffic, and the higher speeds made possible by construction improvement and rehabilitation of bridges can all add to the safety problem. The concept of bridge safety auditing is becoming more widespread and the number of countries adopting safety audit procedures and practices is increasing worldwide. The evaluation of bridge projects during design and construction to identify potential safety hazards which may affect any type of user before the project is opened to traffic, and to suggest measures to eliminate or mitigate those problems.

Keywords: -

safety audit, safety policy, safety acts, safety programs.

1.Introduction:-

Experience around the world has demonstrated that it is possible to substantially reduce potential safety problems by implementing systematic safety checks of proposed bridge projects at various stages in the planning, design and construction process. These systematic safety checks known, when formalized, as bridge safety audits enable many obvious potential hazards to be identified and eliminated before construction. The bridge safety auditing alone cannot solve all the safety concerns but can play an important part in preventing the accidents. Safe and healthy working conditions do not happen by chance. Employers need to have a written safety policy for their enterprise setting out the

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safety and health standards which it is their objective to achieve. The policy should name the senior executive who is responsible for seeing that the standards are achieved, and who has authority to allocate responsibilities to management and supervisors at all levels and to see they are carried out.

1. Objectives of the Paper:-

- To prepare the check list
- To increase the safety by continuous adaptation to the latest safety requirements.
- To make safety implications of decisions more transparent
- To establish a constant exchange of best practice in terms of infrastructure safety management.
- To get safety benefits to employees, employers and customers.
- To adopt the Safety Audit in infrastructure project. Safety health Program & safety policies.

2. Future scope of the study:-

3.1 Safety Acts:-

Authority and carry out periodic safety audit at site. Contractor shall not be self-complacent with mere compliance with sections and rules of various Acts and Rules applicable to construction safety. He shall promote health, safety and environment practices by identifying the personnel and assigning specific responsibilities to them so that proper safety is implemented at site and a safety culture is created among his all employees and workmen and maintained until completion of the project.

1. The Employees' State Insurance Act, 1948
2. The Child Labour (Prohibition and Regulation) Act, 1986.
3. The Building and Other Constructions Workers' (Regulation of Employment and Conditions of Service) Act, 1996.
4. The Contract Labour (Regulation and Abolition) Act, 1970.

3.2 Insurance:-

Under the Constitution of India, Labour is a subject in the concurrent list where both the Central and State Governments are competent to enact legislations. As a result , a large number of labour laws have been enacted catering to different aspects of labour namely, occupational health, safety, employment, training of apprentices, fixation, review and revision of minimum wages, mode of payment of wages, payment of compensation to workmen who suffer injuries as a result of accidents or causing death or disablement, bonded labour, contract labour, women labour and child labour, resolution and adjudication of industrial disputes, provision of social security such as provident fund, employees' state insurance, gratuity, provision for payment of bonus, gulating the working conditions of certain specific categories of workmen such as plantation labour, beedi workers etc.

3.3 Development of Construction Safety Programme:-

A construction safety Programme is a set of procedures, rules and regulations in the form of a check list that is to be followed by all the workers. It includes the emergency procedures, use of personal protective equipment, evacuation plan, etc.

A construction safety programme is a document, usually a check list, containing all the necessary and important information that is to be followed by the workers of the construction premises to take care of their own safety, the safety of their co-workers. A construction safety programme, generally, covers the

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security procedures, the emergency procedures, in some cases the first aid procedures, the use of proper personal protective equipment, temporary and permanent fencing, etc.

4. Case Study:-

For the safety and audits in infrastructural projects, we have taken two case studies of infrastructural projects and prepare the safety checklist accordingly, for sample-I “Construction of ROB on T. C. College to Bhigavan” (One span of 40.80 m over Railway line and Two Vehicular under Pass, A1 (5.5 m ht. × 8.5 m width) and A2 (5.5 m ht. × 13 m width) and for sample-II “Construction of Flyover and Grade Separater at KSB Chowk, Chinchwad, Pune”

5. Construction Safety Audit Checklist:-

PARTICULARS	Yes	No	N/A
JOBSITE GENERAL			
1. Posters and safety signs/warnings posted	Y	-	-
2. Safety meetings held periodically	Y	-	-
3. First aid kit available and adequately	Y	-	-
4. Stocked Job related safety training	Y	-	-
5. Accident reporting procedures established	Y	-	-
6. Injury records being kept	Y	-	-
7. Emergency telephone numbers posted	Y	-	-
8. Traffic routes identified	Y	-	-
HOUSEKEEPING AND SANITATION			
1. Warning signs in-place	Y	-	-
2. Open ditches protected	Y	-	-
3. Hazard lights utilized	Y	-	-
4. Equipment secured	Y	-	-
5. Utility ditches flagged or barricaded	Y	-	-
ORDERLINESS AND MATERIAL STORAGE			
1. General orderliness	Y	-	-
2. Regular disposal of waste	Y	-	-
3. Spills cleaned up promptly	Y	-	-
4. Drinking water available	Y	-	-
5. Sanitary facilities	Y	-	-
6. Men lifting properly	Y	-	-
FIRE PROTECTION /PREVENTION			
1. Fuel supplies protected from accidental impact	Y	-	-

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2. Available fire extinguisher training accomplished	-	N	-
3. Phone number of fire department posted	Y	-	-
4. Fire extinguisher provided on appropriate equipment	-	N	-
5. Flammable liquids properly stored	Y	-	-
PERSONAL PROTECTIVE EQUIPMENT (PPE)			
1. Employees issued PPE where needed	Y	-	-
2. Employees trained in use of PPE	Y	-	-
3. Inspections being done before and after use	Y	-	-
4. Adequate fall protection	Y	-	-
5. Eye Protection	Y	-	-
6. Face protection (glasses, goggles)	Y	-	-
7. Foot protection	Y	-	-
8. Hand protection, gloves	Y	-	-
9. Head protection, hard hats	Y	-	-
10. Physicals accomplished as required	Y	-	-
CONFINED SPACE PROCEDURE			
1. Confined Space entry training	-	-	N/A
2. Emergency equipment for standby person	-	-	N/A
3. Permit required precautions taken	-	-	N/A
4. All required signatures for entry/testing	-	-	N/A
5. Permits posted prior to start of work	-	-	N/A
ENVIRONMENTAL			
1. Posting temporary waste area properly	Y	-	-
2. Hazardous waste management	Y	-	-
3. Hazardous waste storage	-	N	-
4. Communications for emergencies and operations	-	N	-
5. Waste storage and area fence integrity – Locked gates	-	N	-
HAZARD COMMUNICATIONS			
1. Written program	-	N	-
2. Material properly stored and labelled	Y	-	-
3. Log of all chemicals on site available	Y	-	-
4. Employees trained in Hazard Communications	Y	-	-
HOISTS AND CRANES			
1. Rented cranes inspected & all deficiencies corrected	Y	-	-
2. Operators properly trained/licensed	Y	-	-
3. Equipment firmly supported	Y	-	-

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4. Power lines de-energized, clearances maintained	Y	-	-
5. Signalmen work as instructed and trained	Y	-	-
6. Swing radius barricades	-	N	-
HEAVY EQUIPMENT			
1. Operators qualified/tested	Y	-	-
2. Regular monthly inspection, maintenance & service	Y	-	-
3. Correct parking procedures	Y	-	-
4. Speed limit control	Y	-	-
5. Back-up alarms	Y	-	-
6. Flagmen where needed	Y	-	-
MOTOR VEHICLES			
1. Regular inspection, maintenance, and service Licensed operators, on and off road	Y	-	-
2. Current licenses maintained	Y	-	-
3. Local and state vehicle laws and regulations observed Speed limit control	Y	-	-
4. Weight limits and load sizes controlled	Y	-	-
5. Parking not to obstruct traffic or work operations	Y	-	-
ELECTRICAL SAFETY			
1. No exposed electrical wires	Y	-	-
2. No broken insulation on cords Controls are labeled	Y	-	-
3. To inspect electrical tools before use;	Y	-	-
HAND TOOLS			
1. Proper tool for each job	Y	-	-
2. Inspection & maintenance	Y	-	-
3. Neat storage	Y	-	-
4. Safe carrying	Y	-	-
5. Tool defects – repair facilities	Y	-	-
BARRICADES			
1. Floor openings	-	-	N/A
2. Roadways, sidewalks	Y	-	-
3. Adequate lighting	Y	-	-
4. Traffic controls	Y	-	-
5. Trenches and excavations	Y	-	-
6. Signs as required	Y	-	-
LADDERS			

1. Ladders inspected & in good condition	Y	-	-
2. Ladders secured to prevent slipping, sliding, or falling	Y	-	-
3. No painted ladders	Y	-	-
4. Aluminium ladders of sufficient strength for task	-	-	N/A
5. Metal ladders not used near electrical equipment	Y	-	-
SCAFFOLDING			
1. Erection properly supervised	Y	-	-
2. All structural members free from defects and meet safety factor	Y	-	-
3. All connections secure	Y	-	-
4. Scaffolds erected on solid footing	Y	-	-
5. Scaffold plumb and square, with cross bracing	Y	-	-
6. Guard rails, intermediate rails, and toe boards in place	Y	-	-
EXCAVATION AND SHORING			
1. Adjacent structures properly shored	Y	-	-
2. Shoring and sloping for soil type	Y	-	-
3. Adjacent roads and sidewalks supported and protected	Y	-	-
4. Soil material stored away from edge, minimum two feet	Y	-	-
5. Excavation barricaded and lighting provided	Y	-	-
6. Equipment kept a safe distance from edge of excavation	Y	-	-
PILE DRIVING			
1. Proper storage of piles	Y	-	-
2. Material handling controlled	Y	-	-
3. Equipment inspected and maintained	Y	-	-
4. Pile driving rigs properly supported	Y	-	-
5. Cofferdams maintained and inspected	-	-	N/A
6. Adequate pumping available	-	-	N/A
7. Proper signalling	Y	-	-
8. Barricades for piled river work area and cofferdam edges	-	-	N/A

Conclusion:-

From the above prepared checklist for audits in infrastructural projects and construction industry safety management with safety policies are subjects of very importance. Importance of safety management and safety policies in the infrastructure project (Bridge) has been explained. Also, importance of safety audit study in infrastructure projects is shown.

The objectives of paper aimed at minimizing construction accident and introducing safety audit in infrastructure projects. Study related to safety management and safety audit in infrastructure project is provided to understand the basic concept and importance. Safety audit is an effective tool to minimize/eliminate accidents on infrastructure projects, while planning and establishing a system, safety audit is important to maintain the system. Safety audit not only ensures that the system is maintained but also

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ensures that the standards go strictly enough to restrict the accidents from occurring in the concerned premises.

Recommendations:-

From the whole work done and the learning's, it has been identified that if safety audit is introduced then the system would be more effective and efficient. The following points describe such recommendations:-

- By adopting safety management and safety policies mere not sufficient tool by itself. Proper decisions should be taken to introduce safety audit in infrastructure projects accordingly.
- As far as India is considered, there are no such regulations for safety audit though the construction act has been framed but it should be enforced to avoid future accidents.
- Safety manager should have high commitment to all aspects of health & safety at all levels.
- The management and other members of staff must alert to health & safety issues and they should learn to improve on existing procedures and practices.

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