

# TO STUDY THE IMPORTANCE AND CURRENT PRACTICE OF SAFETY IN CONSTRUCTION INDUSTRY CASE STUDY ON AHMEDABAD AND GANDHINAGAR

<sup>1</sup>Nisarg Jani, <sup>2</sup>Jitendra Patel

<sup>1</sup>Pursuing post-graduation in Construction project management, <sup>2</sup>Assistant Professor Indus University,

<sup>1</sup>Department of Construction Project Management,

<sup>1</sup>IITE Indus University, Ahmedabad, India

**Abstract**— *the construction industry involves risky and unhealthy operations which result in many human tragedies, discourage workers, disrupt construction, delay progress, and adversely affect cost, productivity, and reputation. Construction project can never achieve its objectives unless construction professionals become aware of the safety-related issues. This study has been conducted questionnaire checklist survey among the contractors and safety engineers of various construction projects, for testing their experience in safety management system*

**Index Terms**— *Safety, Safety Management, Hazard, Hazard Identification, Quantitative Analysis, Gap Analysis*

## I. INTRODUCTION

“Safety management is a term used to refer a comprehensive business management system designed to manage safety elements in the workplace.” Site Safety is a small independent organization set up by the construction industry. It is a single job to reduce construction injuries and deaths by taking the lead in promoting construction site safety. Each project has a safety management in place that outlines the policies, processes, instruction, and documentation that will serve to establish the culture of safety. [14]

As construction projects become high-rise and large, accidents in construction sites are transforming into death, and effects of damages are increasing. Under the situation, the importance of safety management is gaining more attention. Real-time safety management at large and complicated construction sites is required to overcome problems. [14]

Safety is the state of being safe; freedom from danger, risk, or injury. It is the absence of danger. Basic terms involved in safety are:

- Accident
- Risk
- Hazard
- Danger

### **Accident:**

Events or conditions those are not planned or expected. Unfortunate events as a result of negligence or ignorance. Events occurring unintentional. [15] various sources responsible for the accident at construction sites can be explained as below.

- 56% falls from height.
- 21% trapped by something collapsing or overturning.
- 10% struck by a moving vehicle.
- 5% contact with electricity or electrical discharge.
- 4% struck by a flying/falling object during machine lifting of materials.
- 3% contact with moving machine.
- 1% exposure to a hot or harmful substance.

### **Risk:**

As per OHSAS- 18002 it can be defines as, Combination of likelihood or probability and consequences/effect for a particular hazard to happen. [15]

Examples of risks involved in various works are:

- o Grinding: - it involves the risk of eye injury or blindness.
- o Welding: - it also involves the risk of eye injury or blindness.

### **Hazard:**

Defined as source or condition which has potential to cause injury and/or ill health to humans, damage to property or damage to workplace or environment or combination of any of the above. Hazard may cause harm if not in control. (Uncontrolled hazards)

The leading safety hazards on construction sites include: falls, caught between objects, electrocutions, and struck by objects. [15] All four of those hazards have caused injuries and deaths throughout the world of construction sites. Failures in hazard identification are often due to limited or improper training and supervision of the construction site workers.

Examples of areas where there are limited training includes: tasks in design for safety, safety inspection, and monitoring safety. Failure in any of these areas can result in an increased risk in exposing workers to harm in the construction environment. Falls are the leading cause of injury in the construction industry, is particularly for elder and untrained construction workers. [15]

In the Occupational Safety and Health Administration (OSHA) Handbook (29 CFR) used by the United States, fall protection is needed in areas including but are not limited to: ramps, runways, and other walkways; excavations; hoist areas; holes; form-work; leading edge work; unprotected sides and edges; overhand bricklaying and related work; roofing; precast erection; wall openings; residential construction;

and other walking/working surfaces. Other hazards found on construction site includes: asbestos, solvents, noise, and manual handling activities. [16]

#### **Danger:**

It shows the tendency of a hazard hit/struck an employee in a risky situation.[15]

#### **Examples:**

1. Employees who regularly handle chemicals will be more vulnerable to the dangers of the chemicals than other employees who rarely do.
2. The risk is higher for workers, handling the concentrated acid compared to workers who handle dilute acids.[15]

## **II. NEED OF STUDY**

Safety in construction is a prime requisite but it often gets neglected on work sites. The wide range of construction activities involving complex techniques have led to many new problems of safety. Proper steps should be taken to improve safety on construction site so that loss of limb and life, suffering and damage resulting from avoidable accidents can be prevented. Promotion of safety measures at site will result in a better work environment, higher productivity and greater contentment among workers.

## **III. AIM OF STUDY**

To assess the importance and current practice of safety practice in construction industry: Case Study on Ahmadabad and Gandhinagar city.

## **IV. STUDY AREA PROFILE**

### **General Location of Ahmedabad and Gandhinagar City:**

**Ahmedabad** has been known for its quick and rapid economic growth for the past decade or so. [27] It is the largest city and former capital of Gujarat, which is a state in India. [29] The city lies on the Sabarmati River and it is one of the finest city of western India. Having been established by the king Ahmed shah badshah in 15<sup>th</sup> century. The city has come a long way to become the industrial hub of nation. The city boasts with the metropolis with the six largest population in the nation and is classified as one of the best place to live in India in some reports. [27]

**Gandhinagar** is the capital of the state of Gujarat in Western India. Gandhinagar is located approximately 23 km north of Ahmedabad, on the west central point of the Industrial corridor between Delhi, the political capital of India, and Mumbai, the financial capital of India. Gandhinagar, Gujarat's new capital city, lies on the west bank of the Sabarmati River

## **V. DATA COLLECTION**

The interview was conducted with the project manager, planning managers, senior engineers of contractor's team having the experience of 1-10 years. This is because aim of survey is to get the techniques practiced in industry listed above. And this acquired by interviewing people having experience and skill in the same field. Now, the data was collected and mode method is used to get resultant response from the samples of questionnaire interviewed. For case study, Data analysis was undertaken using this method.

**In this stage the prepared questionnaires were asked to the site engineers/safety engineers/site supervisors at 50 construction sites and the answered questionnaires were collected. The results of 5 out of 50 questionnaire survey in the form of table frequency are given below and other is given in Microsoft Excel Spread Sheet.**

### **1. Personnel protective equipment**

Site. No	Safety helmet	Safety Shoes	Safety belt	Safety gloves	Safety glasses
1	Yes	Yes	Yes	Yes	Yes
2	No	No	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes
4	No	Yes	Yes	Yes	No
5	Yes	Yes	No	Yes	No

Table-1 PPE

### **2. Welfare facilities**

Site. No	Drinking water	Rest room	Dining room	Sanitary room	Change room
1	Yes	Yes	No	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	No	Yes	Yes
4	Yes	Yes	No	Yes	No
5	Yes	No	Yes	Yes	Yes

Table-2 welfare facilities

### **3. Safety Features**

Site. No	Safety in scaffolding	SITE:1	SITE:2	SITE:3	Site:4	Site:5
1	First aid kit	Yes	Yes	Yes	Yes	Yes
2	Fire precautions	No	Yes	Yes	Yes	Yes
3	Electrical installation safety	Yes	Yes	Yes	Yes	Yes
4	Designed scaffolding	Yes	Yes	Yes	Yes	No

5	Periodic medical check up of workers	Yes	No	Yes	No	Yes
6	Warning signboards	Yes	No	No	Yes	No
7	Proper illumination at work area	Yes	Yes	Yes	Yes	Yes
8	Special storage area	Yes	Yes	Yes	Yes	No
9	Site training	Yes	Yes	No	No	No
10	Barricades	Yes	Yes	Yes	Yes	Yes
11	Maintain near mess logbook	No	No	No	No	No
12	Site supervisor	Yes	Yes	Yes	Yes	Yes
13	Safety net	Yes	Yes	Yes	Yes	No
14	Site security	Yes	Yes	Yes	Yes	Yes

Table-3 Safety features

Total Percentage of Similarity, Narrow and Wide gap about all activities for individual sites are given in Table-4 as below:

GAP	PERCENTAGE (%)					
	Site:1	Site:2	Site:3	Site:4	Site:5	Site:6
Wide	11	20	14	27	34	10
Narrow	0	0	7	2	0	7
Similarity	89	80	80	70	66	84
GAP	PERCENTAGE (%)					
	Site:7	Site:8	Site:9	Site:10	Site:11	Site:12
Wide	12	43	36	27	14	28
Narrow	7	0	0	0	0	0
Similarity	81	57	64	73	86	72
GAP	PERCENTAGE (%)					
	Site:13	Site:14	Site:15	Site:16	Site:17	Site:18
Wide	11	40	66	9	25	19
Narrow	13	0	0	0	0	0
Similarity	75	60	34	91	75	81
GAP	PERCENTAGE (%)					
	Site:19	Site:20	Site:21	Site:22	Site:23	Site:24
Wide	25	25	30	39	14	48
Narrow	16	0	0	0	7	0
Similarity	59	75	70	71	80	52
GAP	PERCENTAGE (%)					
	Site:25	Site:26	Site:27	Site:28	Site:29	Site:30
Wide	41	20	39	23	2	0
Narrow	0	0	7	7	7	0
Similarity	59	80	55	70	91	100
GAP	PERCENTAGE (%)					
	Site:31	Site:32	Site:33	Site:34	Site:35	Site:36
Wide	57	31	5	43	20	70
Narrow	0	0	0	7	0	0
Similarity	43	69	95	50	80	30
GAP	PERCENTAGE (%)					
	Site:37	Site:38	Site:39	Site:40	Site:41	Site:42
Wide	32	57	54	25	25	68
Narrow	0	0	0	9	0	0

Similarity	68	43	46	66	75	32
<b>GAP</b>	<b>PERCENTAGE (%)</b>					
	<b>Site:43</b>	<b>Site:44</b>	<b>Site:45</b>	<b>Site:46</b>	<b>Site:47</b>	<b>Site:48</b>
Wide	20	14	30	22	28	45
Narrow	7	0	0	0	0	0
Similarity	73	86	70	78	72	55
<b>GAP</b>	<b>PERCENTAGE (%)</b>					
	<b>Site:49</b>			<b>Site:50</b>		
Wide	0			0		
Narrow	0			0		
Similarity	100			100		

Table-4

After scrutinizing the all questions and their answers into Microsoft Excel Spread sheet, Bar chart of total percentage of similarity, narrow and wide gap about all activities for individual sites and response for it by 50 construction firms are made, which are in following Graphs.

## VI. CONCLUSION

### Research specific conclusion:-

There are numbers of construction sites are available in India which preferred safety standards for the entire growth of the individual construction firm. From the above study it is observed that many of the construction sites can't adopt special provision regarding safety due to some reason. Basic reason behind this is the lack of awareness among the construction people and contractors and they believe that the adoption of safety standards on existing sites is expensive. From the present study it is evident that high rise building sites follow special safety provision but they are not enough to prevent hazard. People engaged in such construction do not follow safety provision, do not use laws and standards and lots of accidents occur at sites. These results into economic loss of construction company as well as customers, loss of life. From the studies it is observed that wide gap in construction industry is 28%, narrow gap is 2% and similarity gap is 70%.

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