Incident Reporting Tool

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Abstract

Safety is one of the effective factors on the operation of construction projects and plays a key role in success of a project. Incident reports aid in identification of problems and accidents can be reduced based on corrective actions taken, thus improving the safety. Incident reporting systems are a good source to analyse, track and document all incidents that have taken place on a job site. Unfortunately, most incident reports are generally unstructured, providing little or no guidance. Therefore, most reports contain information only about what happened, as opposed to why an incident happened, making identification of possible hazards and prevention strategies extremely difficult. The study tries to address that the complexity of processes involved in construction can affect safety because of unpreventable workplace injuries. By understanding the situational elements of the prior incidents through incident reporting systems helps in developing preventative safety procedures. This paper aims to achieve the objectives of safe and transparent practice in our industry by developing a framework Safety Reporting Tool (SRT) which will help in apposite reporting as well as management of accidents. This data can be further compiled and can be used for developing an organizational safety plan as a proactive approach to prevent recurrence of unwanted incidents and also continuous improvement of safety operation of projects.

Keywords: Construction Safety, Incident Reporting, Reporting Framework, Reporting Tool.

1. INTRODUCTION:

Construction industry is one of the largest industries in the world. Construction along with its processes makes a complex system with different nodes linked and interacting with each other. Baccarini (Baccarini, 1996) proposes a definition of complexity of construction projects as "consisting of many varied interrelated parts and can be operationalized in terms of differentiation and interdependency". According to the statistics, the percentage of accidents is very high in construction industry than any other industry due to its complex, unpredictable and diversified nature (Ahmed, 2000). Therefore, improvement of safety in construction projects is the most significant concern. In order to minimise this rate, various efforts have been put in place including safe practices (Chan, 2008) . This resulted in devising various schemes which helped a lot in achieving a lower rate during last 20 years (Choudhry, 2008).

Contrary to this, common practice seen in construction industry of Pakistan which is gravely focused on achieving the desired outcomes; cost and time reduction, neglecting the safety perspective. Ineffective reporting mechanism is observed by the contractors who are reluctant to share the statistics mainly due to fact that it weakens their core competency and reputation in the market. (Farooqui, 2007) ; (Ali, 2006). In the view of gap observed, there is a dire need of a reporting mechanism. This paper aims to achieve the objectives of safe and transparent practice in our industry by developing a framework Safety Reporting Tool (SRT) which will help in apposite reporting as well as management of accidents. This data can be further compiled and can be used for developing an organizational safety plan as a proactive approach to prevent recurrence of unwanted incidents and also continuous improvement of safety operation of projects.

2. PROCEDURES AND METHODOLOGY:

2.1 Existed Tools Review and Framework:

An overview and analysis of twenty-five (25) existing tools to support and facilitate the design process and prepared the ground for the main study; some of them as an example, can be viewed in Table 1.

Table 1: Review of Existing Softwares

Type of Software	Software Name	Type, Developer	Software Name
1. Reporting	Techopedia	4. Management, ManageEngine	ServiceDesk Plus
2. Reporting	Intelex Safety	5. Management, Plan Brother	Incy.io
3. Reporting	Zendesk	6. Management, Hund	Hund

2.2 Safety Reporting Form:

Collecting evidence and accurate data of the incident is an important and tedious task as it requires systematic mechanism. To serve this purpose, a concise form is developed; Figure 1 shows a part of form to be filled by Supervisor, Safety Manager, Witness followed by the input from Investigator making it transparent and indubitable process.

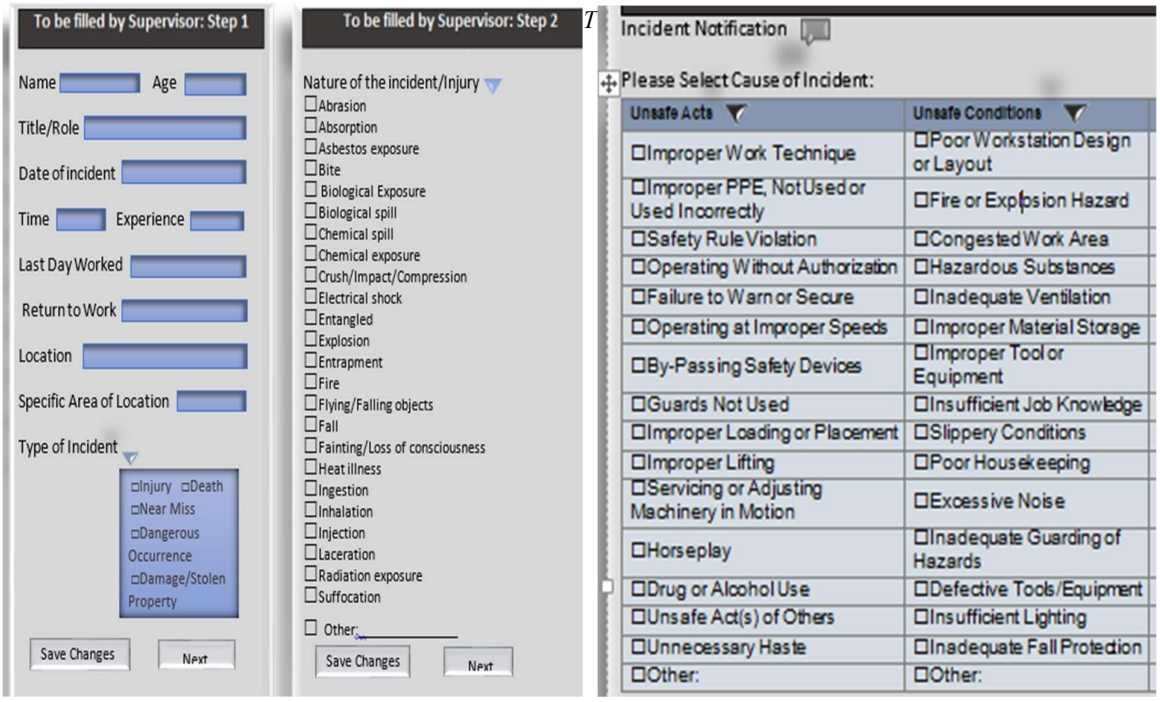

Figure 1: Safety Reporting Form

2.3 Investigation Process:

With the data inferred from the Safety Form, a Root Cause Analysis investigation identifies all the root causes associated with a problem to ensure there is no recurrence of the problem. Once recognised the causes will often be the result of physical factors, human factors, organisational factors.

2.3.1 Categorization:

To facilitate the investigation process, following levels of investigation are suggested and compiled in Table 2 ensuring the transparency of the process.

Table 2: Categories of Investigation

	Level 1: Concise	**Level 2: Comprehensive**	**Level 3: Independent**
When should it be used?	Incidents which resulted in no, low or moderate harm	Events which resulted in reportable incidents	Incidents with high level of media interest or mental health, homicides
Who should investigate?	Conducted by local staff, should add a person with knowledge of RCA	Conducted by an RCA experienced team not involved in incident.	Conducted by people who are independent to the provider, service or organization.
Analysis	5 Whys, Fish Tail analysis	5 Whys, Fish Tail analysis, High level of detail, Full use of analytical tools	High level of detail, Full use of analytical tools
Report	Often released as summary document and includes plans for shared learning locally and/or nationally	Full report with summary including recommendations for sharing locally and nationally	Full report with summary including recommendations for sharing locally and nationally

2.3.2 Evidence and Data:

Establishing the following facts from the form filled by Supervisor, Safety Manager and Witnesses in Step 2.2:

What: is the injury? Was the task assigned? Was the work process? Machinery/ plant/ equipment were in use? Safety rules were violated? Safe systems of work, permits to work, isolation procedures were in place? Training had been given?

2.3.3 Root Cause Analysis (RCA):

Based on the facts established above, there are certain steps that should be followed to facilitate identification of the root cause of the incident. The steps outlined below are the minimum requirements for completion of an RCA:

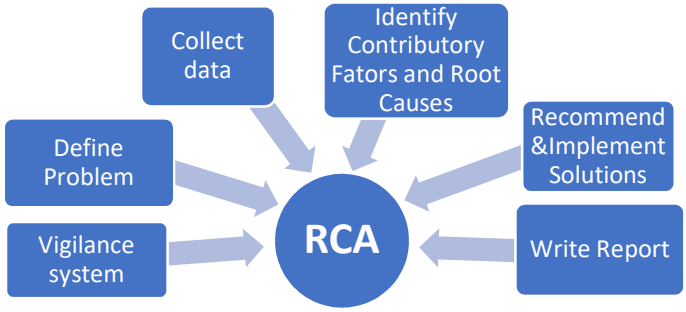

Figure 2: Overview of Root Cause Analysis

2.3.4 Report:

The main purpose of report formulation is to provide a formal record of the investigation process and share learning from the specific incident case to the third party.

2.4 Penalties:

Organization should take defensible disciplinary actions against an employee who violates a safety rule. Management should provide thorough safety training to all employees, and be sure that all safety rules are specific, clear, and follow OSHA or other safety guidelines.

Penalties are determined on a case-by-case basis. It also depends on the offence and type of duty holder the offender is. Some of the factors that are considered in deciding a penalty are severity of the contravention, risk of harm, compliance history of the work site party, including: orders, violation notices etc., also see if there is a commitment to health and safety.

2.5 Contractor Scoring:

This will achieve the secondary objective of the paper; introducing a transparent process of Contractor scoring based on safety performance (Table 3). This will prevent awarding of contracts to the contractors who are practicing unethical but lucrative methods.

Table 3: Contractor safety scoring during project execution

Category	Criteria	Score
Personnel	Knowledge and experience of Occupational Health and Safety With exceptional Performance; well above the acceptable standard	6
	Occupational Health &Safety representative's presence in critical on-site operations	7
Preparation	Safety Plan and provisions of safety in policy	10
	Submission of finalized safety plan earlier than the time required by contract	7
	Effective Hazard Analysis and Risk management	10
Implementation	Excellent safety induction/training program.	7
	Provision of safe conditions and proper PPEs	10
	Excellent safety performance in terms of KPIs	10
	Standard of monthly OH&S reports is excellent and submitted on time	5
	Monitoring and inspection	10
	Unbiased Internal audit culture	5
	Reporting of all incidents and accidents and prompt actions taken	7
	No repetition of the same non-conformance	6
	Total	100

2.6 Heat Map

Construction projects always encounter frequent safety issues such as falling from heights, being struck by/against objects, collapse, explosion, fire, cuts, and electrocution (Farooqui R. , 2011) (Zhou & Irizarry, 2016). Heat map is a powerful tool used to visualize the results of risk assessment process in a meaningful and comprehensive way. Heat maps provide a holistic view while making strategic decision. A brief overview of the most common types of heat maps used to visualize incident and accident data is as follows.

2.6.1 Trade Heat Map: The trade heat map indicates the proportion of accidents in relation to different trades included in construction projects e.g. welding, electrification, plumbing etc. (Table 4) The increasing intensity of red colour indicates the high frequency of accidents, pale green colour indicates less number of accidents

Table 4: Injuries according to Trades

Trade	Fatalities	LTI	RWC	MTC
Labour				
Mason				
Steel Fixer				
Plumber				
Welder				
Electrician				
Carpenter				
Heavy Equipment Operator				

LTI Lost Time Incident
RWC Restricted Work Case
MTC Medical Treatment Case

2.6.2 Incident Type Heat Map: This heat map highlights the frequency of occurrence of various types of incidents on construction sites. An illustration of the incident type heat map is given below. The increase in red color indicates higher number of incidents while increase in blue color indicates low number of accidents.

Table 5: Incidents on site

Incident Type	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Fall from a higher level												
Fall on same floor level												
Struck; by objects												
Electric Shock												
Struck by falling objects												

2.7 Graphs:

After getting improved data from investigation, following graphs can be generated:
Age of Workers, Trade, Experience of Workers Location vs. Frequency of Accidents

3. RESULTS AND DISCUSSION:

A framework SRT has been formulated as it provides a structure for mapping out, defining, and analysing the process, which is the primary objective of this paper. Absence of comprehensive knowledge about reporting of incidents, results in safety issues and ultimately affecting the KPI's of projects.

This study tried to address the importance of a well-structured reporting mechanism and presented a model in the form of a Safety Reporting Tool (SRT) which will prove to be beneficial in guiding and management of incidents if adopted and accepted religiously within the organization.

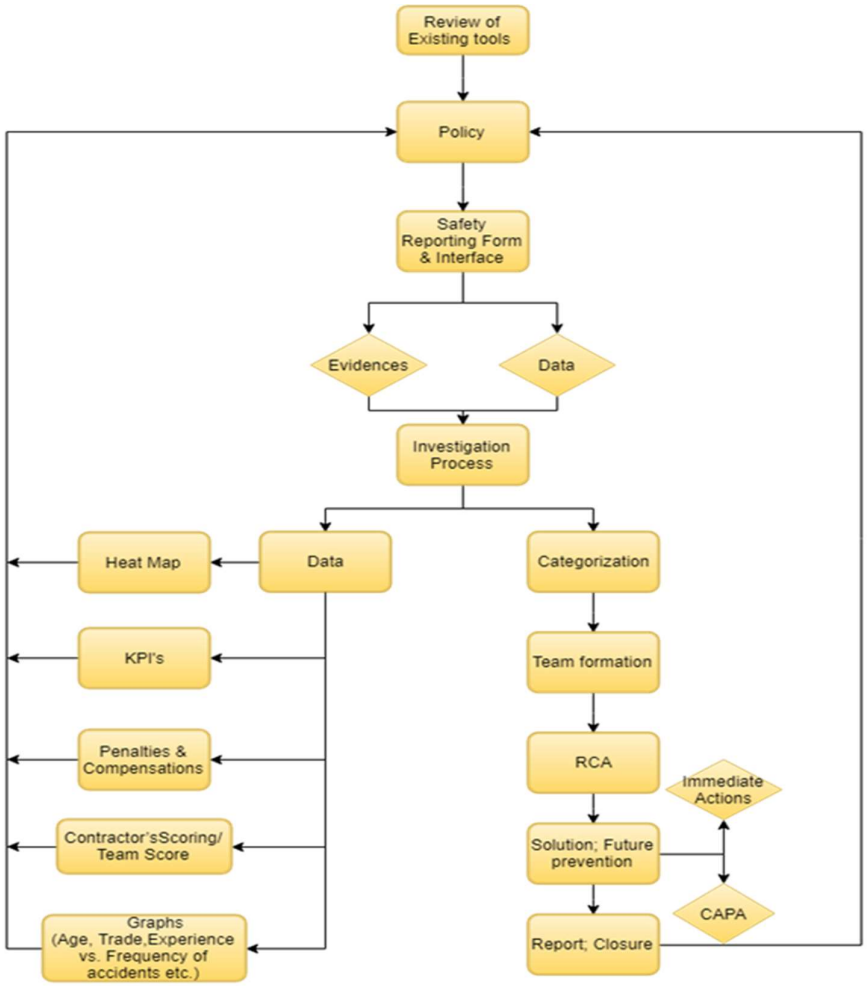

Figure 3: Framework of Incident Reporting Tool

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