REVIEWING SAFETY MANAGEMENT SYSTEM BY EVOLUTION OF SAFETY PERFORMANCE INDICATORS IN COMBINED CYCLE POWER PLANT

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ABSTRACT: Evolution of safety performance indicators is the best tool for gauging safety performance. The methodology adopted help in determining the main contributor for accident & determining the cause, leaning about what practice went wrong so that to prevent recurrence of such accidents & adopting best practices to improve safety performance. Safety Indices which include lagging & leading indicators is used as tool for safety performance measurement for assessment of relative performance of safety management system. In the present study we used quantitative technique for analyzing the safety management system of DCCPP Plant by evaluating safety performance indicator frequency rate/ Severity rate/Incidence rate/ Injury Index. Quantitative measurement of safety performance gives a proper valve & clear information about the most & least unsafe work in terms of lost time injuries & man days lost between the consecutive years & to find out the deficiency or draw back in safety management system & to suggest the safety measures area where safety improvement is necessary to raise its safety performance for fulfilling the objective of analyzing safety management system effectiveness & reliability. For each accidents IS 3786:1983 classifies a set of corresponding causes which identifies the root cause of accident it is observed that Industrial safety at DCCPP Plant has been maintained at a high level but spite of tightening of safety measures some fatalities have occurred which indicate further improvement in safety management system The study was limited to examine the trends for period 2012-2016. The safety performance is gauged as per IS 3786:1983 which is based on safety Indices Frequency rate, severity rate, & incidence rate.

***KEYWORDS*- Safety Performance, Accident Analysis, Quantitative Monitoring, Safety Performance Rating, Safety Appraisal, Safety Indices, Safety budget.**

1. INDRODUCTION

The trending of accident statistics data from previous years is necessary for appraisal of safety performance. The accident data pertaining used for computation of safety Indices frequency & severity rates which indication safety performance for the purpose of evaluating safety management system effectiveness & reliability. These quantitative appraisal methods of computation of safety indices is more consistent than that of qualitative appraisal method of questionnaire survey which depend on personal opinion & differ from person to person. Quantitative appraisal technique is more effective as it's indicate valves of safety performance which is easily understandable & it's not depend on person opinion. The objective of these quantitative safety appraisals is to measure & indicate the safety valves which indicate the effectiveness of safety management system, hazard identification system & other control techniques which are used to control the hazards in terms of total safety effectiveness or safety performance. The principal aim of safety performance appraisal is to find out limitation or deficiency or Area where safety improvement is necessary by designing all operation system safe & efficient. Encouraging workers for reporting hazard & accident, creating workers interest in enhancing safety management, checking effectiveness of existing system & finding area for improvement by suggesting safety measures to control hazard & to raise the safety performance valve. Analyzing accident statistics data appraisaling of safety indices indicate actual status of safety performance (CHONG; THUAN; 2014). The poor level of safety performance of in organization is primarily due to their reactive approach towards safety management. Accidents are caused because of lapses in safety management system like No accident reporting system, No management review, No enforcement of safety laws, No commitment regarding safety deficiencies (Siriruttanapruk & Anutakulnathi 2004). Lack of management control in coordination of activity & lack of communication & conflict between management & employee are the main contributing factor of accidents (TEO, LING, CHONG 2005, and LAUVER 2007). Another study conducted by (TOOLE, 2002) in U.S.A indicating that major causes of accident are due to lack of training, lack of knowledge, lack of skill, inadequate physical & mental condition & failure in enforcement of safety legislations are the contributing factors of accidents. As per study of (kozlovska & strukova 2012) stated that most of the jobs in industries are relying closely on contractor's man power which is generally belonging to unorganized sectors which are the major contributor to lost time injuries & man days lost.

Rajaprasad, S.V.S., Prasada Rao, Y.V.S.S.V., Venkata Chalapathi, P, (2013) developed an appropriate model for data envelopment analysis (DEA) which is a mathematical programming technique which have capability to incorporate multiple inputs & outputs which is used for evaluation of safety performance of construction segments, their methodology helps in improving performance by adopting best practices for each inefficient segments. In another study by (EI-Mashaleh, Rababen & Hyari 2009) stated that Safety Indices frequency rate/ severity rate/ Incidence rate/ Injury Index can be utilized to gauge the safety performance of industry over a period of time. The primary purpose basic purpose of measuring safety performance is to determine the basic information on the progress & current status of the policies, strategies, procedures & activities which are used by management to control risks to health & safety & describes how the safety indices incorporates quantitative management aspects & safety performance indicators which is useful for comparison purpose evaluating relative need for taking accident preventive measures, making an appraisal of the program of an accident prevention campaign which enables appropriate steps to be initiated to improve safety performance. Due to high risk involved in construction work having highest work related accident cases having highest frequency rate/ severity rate/ Injury rate & having maximum number of workers compensation cases all of these are reflected by their safety Indices. Safety performance states is reflected by the safety indices & used as a system to measure safety performance with an objective to evaluating its effectiveness. When safety indices valves indicate the status of safety management system elements like safety policy, safety organization, safe operating procedure, emergency preparedness plan whether they are working effectively or some is wrong happening in safety management as per(LARSON;POUSETTE;TORNER 2008). The safety performance indices of accident statistics data from previous performance data is useful for conducting HAZID & HAZAN process which helps in Implementation of control measures & designing accident prevention strategies(GURCANLI; MUNGEN 2013). In another study conducted on quantitative monitoring of safety indices in thermal power plant (Abhaynathh, K.; Jain, N. K.; Praveen, P. (2015) analyzed that safety performance measurement is a critical step in enhancing the safety culture of an organization through continuous improvement in safety indices.

A study was conducted on analysis of accident trends & modeling of safety Indices on major construction organization in India to examine the trends in safety Indices from the period 2008-2014 in the year 2016. They plotted & determined the trends of safety indices incidence rate, severity rate & frequency rate. They determine the relationship between safety indices frequency rate, severity rate, total man hours worked, number of near misses, number of lost time injury, allocation of safety budget & number of safety activity conducted by modeling the pattern of safety indices. The pattern showed that there is significant relationship exist between safety indices frequency, severity & incidence rate & the related independent variables near misses & safety budget allocation which influencing the associated safety indices valve. All variables of safety indices frequency, severity & incidence rate are of equal importance & weightage in evaluating overall safety performance (RajaPrasad, S.V.S & Chalapathi, and P.V.2016)

Safety performance of Industry is calculated as per BIS- IS (3786:1983) which is based on the method for computation of frequency rates & severity rates for industrial injuries & further classification of industrial accident with in objective to find root cause of accident thorough investigations of all relevant factors which are relating to the occurrence of accident by categorization of accident as per Indian Standard (IS 3786:1983). Analysis of man days lost & number of Injuries as per assigned code number which were based on Type of accident causing the Injury (B-2)/ Agency Involved in Injury(B-1)/ unsafe act causing the Injury(B-4)/ Nature of Injury(C-6) & location of Injury(B-7). The IS 3786:1983 is framed with an objective for evaluating safety related need for taking accident preventive measures & making an appraisal of safety performance program. Classification of accident provides root cause which was involving in lost time injury & Man days lost. So that proper safety & preventive measures like safety tools, personal protection equipment, adequacy of light, proper ventilation, safe working environment, safety procedures adherence, training & enforcement of safety practices adopted to prevent further reoccurrence of same type of accidents & Making employee more safety conscious & making appraisal of an accident prevention campaign to enable comparison. Find out extent of loss due to accident. Identify & locate material / machine/ tools/ jobs/ men/method which likely to produce injury. Analyze engineering revision for unsafe condition & unsafe action. Disclosing inefficient operating procedure, unsafe practices & improper supervision which are responsible of accident. This is a uniform system of recording the industrial accident associated with work injuries & determination of preventive corrective measures it's provide method to find out Injury rate for comparing safety performance & prescribed method for further classification of accidents for assessment of work injury.

2. SCOPE

The purpose of the study is too analyzed past accident data for reviewing the safety management system by evaluating the safety performance indicators which is the best tool for gauging safety performance of DCCPP plant. This study was limited only examined the trends of accident statics from period 2012-2016 as per Indian IS 3786-1983 which is focusing on quantitative monitoring of various safety performance indices. This will help management to concentrate on the area that needs more attention & to provide remedial action to stop or minimize the various losses due to accidents.

3. Definitions-

- Leading indicators: - It can be measured without an incident, accident, property damage occurring. Example: - Safety audits/ near miss incident inspected & inspection.
- Lagging indicators: - These indicators that show the number or Severity of event which have occurred. Example: - Lost time injury/ Minor accident/ Man days lost/Property damage.
- Accident: - An unplanned / unintended occurrence arising out of & in the course of employment of a person resulting in injury/ damage.

- Near miss:-Nothing really happened because another barrier stopped the event, near misses indicate holes in the layer of defense.
- Disability Injury (Lost time Injury) - An injury causing disablement extended beyond the day of shift on which accident occurred.
- Reportable accident: - Accident which occur disablement to work for a period of 48 hr. or more.
- Non-Disabling injury:-Injury requires medical treatment (First aid) only without causing disablement.
- Man days lost: Charges in days of earning capacity lost due to permanent disability (total or death) or due to partial disablement as specified in IS3786. Man day lost charged for death (6000days).
- Man hours worked: The total number of employees – hours worked by all employees working in the industrial premise. It includes managerial, supervisory, and professional, technical, clerical and other workers including contractor's labor.
- Frequency rate (F.R):- Number of lost time injuries per million man hours worked.

$$FR = \frac{\text{Number of lost time injury}}{\text{Total man hours worked}} \times 10^6$$

- Severity Rate (S.R): Number of man –days lost per million man hours worked.

$$SR = \frac{\text{Man days lost due to lost time injury}}{\text{Total man hours worked}} \times 10^6$$

- Incidence Rate (I.R):-Number of lost time injuries per thousand persons employed.

$$IR = \frac{\text{Number of injuries(lost time accident)}}{\text{Average number of persons employed}} \times 1000$$

- Injury index: - It is the product of Frequency rate & Severity rate divided by thousand.
- Frequency Severity Indexes (FSI) - It is the combination of two factors Frequency & severity rate. Since neither frequency rate nor severity rate alone can describe performance of overall performance of safety.

$$FSI = \sqrt{(FR \times SR)/1000}$$

- Safe-T-Score (STS):- For comparison of performance between two variable Safe-T-Score is used which is a statistical control Technique. The STS is a dimension less number. STS positive valve indicate downgrading condition & negative valve indicates improvement from the past. The Valve of STS in between + 2 to -2 indicates random fluctuation in variation which is not significant.

$$\text{Safe} - \text{T} - \text{Score} = \frac{(fr \text{ now} - fr \text{ past})}{\sqrt{\frac{fr(\text{past}) \times 10^6}{\text{man hours worked now}}}}$$

- Safety Activity Rate- The safety activity rate is the overall safety promotional & awareness activity which including safety training & safety inspection conducted in a year with respect to total employees present & man hours worked in a year. This emphasizes the cost of accident prevention activities against the cost of accident occurrences incidents.

$$\text{Safety Activity Rate} = \frac{(\text{safety activity number}) \ 5 \times 10^6}{\text{man hours worked} \times \text{total number of employees present in a year}}$$

- Safety Appraisal- It is the system for measurement of safety performance for evaluating its effectiveness & reliability. Two methods are adopted for safety appraisal- quantitative approach (frequency, severity, incidence rate) & qualitative approach (inspection, checks, audits & review)

4. METHODOLOGY-

The purpose of the study is too analyzed past accident data for reviewing the safety management system by evaluating the safety performance indicators of DCCPP plant. This study was limited only examined the trends of accident statics from period 2012-2016 as per Indian IS 3786-1983 which is focusing on quantitative monitoring of various safety performance indices. This will help management to concentrate on the area that needs more attention & to provide remedial action to stop or minimize the various losses due to accidents. The data was collected directly by approaching safety department & time office of DCCPP Plant. These data was collected from the year 2012 to year 2016 these data collection was restricted to five year. Analysis of these accidents data are the source of information for taking further preventive corrective measures. After statistical analysis & trending of accident data further classification of these data as per IS 3786-1983 done with the objective to find root causes of accident through investigations of all relating factors to the occurrence of accident by categorization of accident as per Agency involved , Type of accident, unsafe act or unsafe condition, unsafe personal factor, nature of injury & location of injury these classification of accidents provides root cause which was involving in lost time injury & man days lost. The trending of accident statistics data from previous years is necessary for appraisal of safety performance. The principal aim of safety performance appraisal is to find out limitation or deficiency or Area where safety improvement is necessary by designing all operation system safe & efficient

The methodology of this study involves 1) literature survey to identify the factors affecting safety management system 2) Identified factors concerning safety performance by trending accident statistics data 3)Computation of safety indices that are

frequency, severity, incidences rate, injury index, safety activity rate & frequency severity index 4) data Analysis- safety indices of each year are compared with those of previous years from 2012 year to 2016 year all this are compiled & Analysis in tabular & graphical forms 5) These data's are gathered & analyzed to draw conclusions & to find which circumstances that contributed to root cause of the accident.6) .After statistical analysis & trending of accident data further classification of these data as per IS 3786-1983 done with the objective to find root causes of accident through investigations of all relating factors to the occurrence of accident by categorization of accident as per Agency involved.7) Find out the deficiency or draw back in safety management system & to suggest the safety measures area where safety improvement is necessary to raise its safety performance & prevent further reoccurrence of same type of accidents

5. DATA ANALYSIS

Table-5.1 YEAR WISE COMPARISION OF LEADING INDICATORS (SAFETY ACTIVITY)

		2012	2013	2014	2015	2016
1	Safety Training & Promotion Activities					
	• Number of training programs conducted (Including tool box & safety induction training)	397	364	451	438	510
	• Number of new posters displayed/ replaced	90	138	63	110	160
	• Number of safety competitions conducted	08	12	12	10	12
	• Number of safety seminars conducted	02	01	02	02	03
2	Fire safety & First aid					
	• Number of fire emergency drills conducted	02	06	07	06	06
	• Number of persons trained in fire safety	104	132	158	198	201
	• Number of persons trained in first Aid	54	30	62	56	72
	• Number of fire safety inspections carried out	06	20	29	31	36
3	Safety Surveillance					
	• Number of Material Handling equipment inspected & tested	64	119	168	210	189
	• Number of housekeeping Inspection carried out	06	13	20	18	22
	• Number of safety related deficiencies cleared	88	138	152	169	243
	• Number of safety audit (external & internal)	03	04	02	02	03
4	Safety Committee Meetings					
	• Fire protection committee meeting	02	02	02	02	02
	• Apex safety committee meeting	04	04	04	04	04
	Total Safety Activity Number	830	983	1132	1256	1463
5	Safety Activity Rate	2.11	1.94	1.54	4.73	6.85

"Figure 1"-Safety Activity Rate

Safety activity rate are the leading indicators which prevent the future events by conducting safety training, awareness programs, safety inspection, safety audits & safety related equipment inspection which are useful tools to educate the employees & making them alert in identification of hazards, safe operating process Safety activity is the safety budget which emphasizes the cost of accident prevention activities against the cost of accident occurrences incidents.

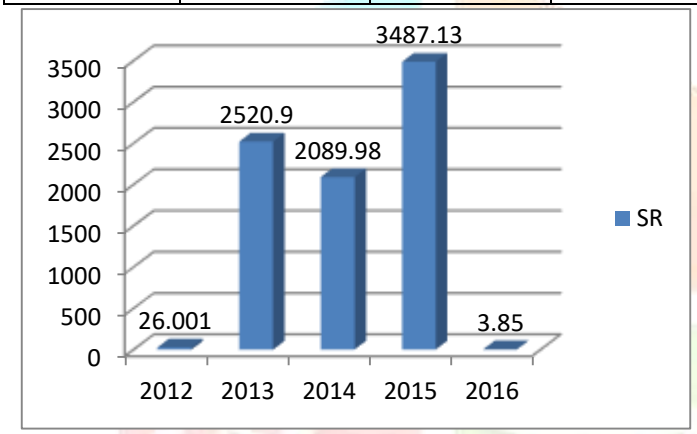
Table-5.2 YEAR WISE COMPARISION OF LAGGING INDICATOR (ACCIDENT DATA)

YEAR (1 APRIL-31MARCH)	Regular Employees	Contract Employees	Total Employees	Man Hours Worked	Near Miss Accident Reported	Safety Activity Number	Lost Time Injuries	Fatal Injuries	Man Days Lost
2012-2013	359	572	931	2115232	17	830	2	0	55
2013-2014	373	678	1051	2404688	34	983	3	1	6062
2014-2015	412	872	1284	2917248	64	1132	5	1	6097
2015-2016	326	438	764	1735808	88	1256	3	1	6053
2016-2017	268	416	684	1559520	93	1463	1	0	6

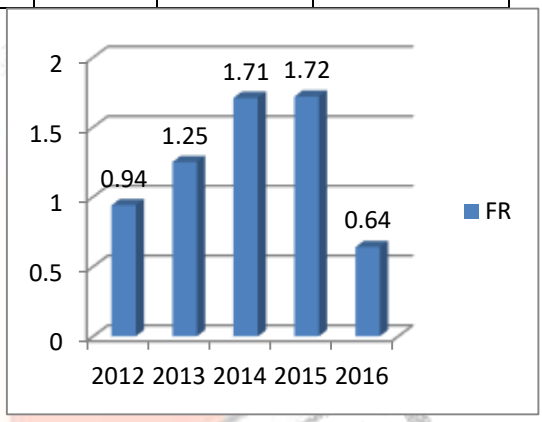
For fulfillment of Objectives Quantitative approach is adopted. Year wise comparison of these safety indices (lagging indicators & leading indicators) from data from past five years (2012-2016) is studied. The accidents appraisal is based on a set of parameters that include lagging indicators which include number of reportable injuries their severity & leading indicators which include safety training imparted to personnel, adherence of procedure, use of permit to work system, near missed accident reporting system & management effect towards improved safety culture.

Table-5.3 YEAR WISE COMPARISION OF VALUE OF SAFETY INDICES

Year (1 April-31march)	Frequency Rate(FR)	Severity Rate(S.R)	Injury Index(I.I)	IR	NMA	Safety Activity Rate	Frequency Severity Index(FSI)
2012-2013	0.94	26.001	0.0245	2.15	17	2.11	0.157
2013-2014	1.25	2520.90	3.143	2.85	34	1.94	1.773
2014-2015	1.71	2089.98	3.580	3.89	64	1.51	1.892
2015-2016	1.72	3487.13	5.997	3.93	88	4.73	2.448
2016-2017	0.64	3.85	0.0024	1.46	93	6.85	0.045



"Figure 2"-Severity Rate Comparison



"Figure 3"-Frequency Rate Comparison

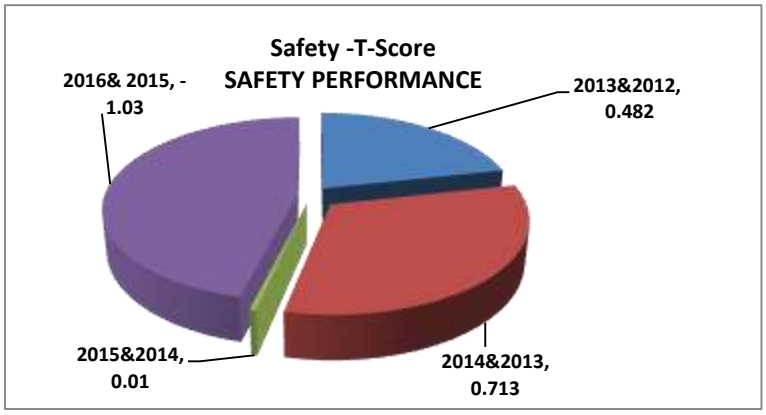
The Injury statistics- frequency rate/ severity rate/ Injury index & Incidence rate of each year are compared with those of previous years from 2012 year to 2016 year all this are compiled & Analysis in tabular & graphical forms**.** The trending of safety indices shows fluctuating valve with maximum valve during 2015-16 with maximum frequency rate, severity rate, Injury Index, Incident rate & frequency severity index & the trending related to safety indices reached minimum valve in the year 2016-17. The safety performance is poor in the year 2014 & year 2015 as compared with other year due to large contractor worker involvement in the plant because of plant stud down activities Large contractor man power are engaged. The year 2016-2017 having the best safety performance that indicating considerable effect are put in improvement by increasing safety activity rate & implementation of low level event investigation policy which improving the near miss accident investigation by uncovering all possible causes of future accident. The year wise trending of safety indices valve shows that total contract employees worked, total man hours worked, near miss accident reported, safety activity number, lost time injuries & man days lost have a direct positive association with the frequency & severity rate. The variables in safety indices frequency, severity & incidence rate are independent & not having any influence & relation with each other, since valve of one variable is not affecting the other but two independent variables safety activity rate & number of near miss accident reported were indirectly influencing the safety indices variable & having positive impact on overall safety performance rating.

Maintaining safety management for contractor is a challenging task of any organization because of the high severity of injuries due to the presence of unskilled, illiterate and migratory workers, lack of coordination and safety awareness among workers, nature of working conditions. Managing safety among contactors labor which are from unorganized sector is one of the most difficult task in power plant. Most of the contract labor is employed temporary basis for one phase of the project by some agency & soon after completion of that phase move to other place with new employer & so on this temporary workmen are quite not appropriate for the job comprises of unskilled labors- quite a few being seasonal agricultural workers their level of literacy is also generally low.

Table-5.4 Analysis Of Safety Performance

ANALYSIS OF SAFETY PERFORMANCE (SAFE-T-SCORE)	
Safe-T -Score Between year(2013 & 2012)	0.482
Safe-T -Score Between year(2014 & 2013)	0.713
Safe-T -Score Between year(2015 & 2014)	0.010
Safe-T -Score Between year(2016 & 2015)	-1.03

"Figure 4"-Frequency Rate Comparison



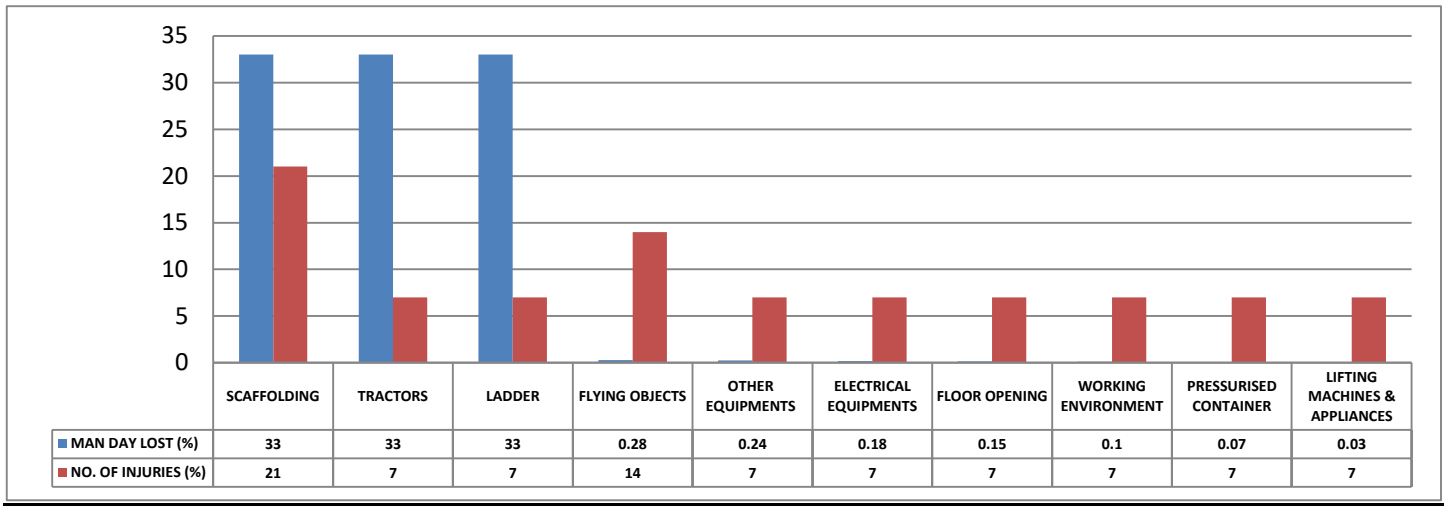
The above figure shows the result of analysis of safety performance (Safe-T-Score) valve. The best safety performance valve of Safe-T-Score is -1.03 which is achieved by conducting highest safety activity rate of 6.85 which is highest in comparison with the previous year safety activity rate.

6. ACCIDENT DATA CATEGORIZATION AS PER (IS 3786-1983)

Table-6.1 Number of Injuries & Man-Days Lost As Per Agency Involved In Injury (B-1)

Agency Involved In Injury(B-1)	Is code-B1	2012-2013		2013-2014		2014-2015		2015-2016		2016-2017		Total	
		No. Of Injury	Man Days Lost	No. Of Injury	Man Days Lost	No. Of Injury	Man Days Lost	No. Of Injury	Man Days Lost	No. Of Injury	Man Days Lost	No. Of Injury	Man-Days Injury
Floor Openings	2425	0	0	0	0	1	28	0	0	0	0	1	28
Electrical Installation	224	0	0	0	0	1	32	0	0	0	0	1	32
Flying Objects Other Than Due To Explosion	233	1	43	0	0	1	9	0	0	0	0	2	52
Stairs	2423	0	0	0	0	1	28	0	0	0	0	1	28
Tractors	2131	0	0	1	6000	0	0	0	0	0	0	1	6000
Scaffolding	228	0	0	1	18	1	6000	1	34	0	0	3	6052
Ladder	227	0	0	0	0	0	0	1	6000	0	0	1	6000
Ventilation Duct	232	0	0	1	44	0	0	0	0	0	0	1	44
Pressurized Container	2212	1	12	0	0	0	0	0	0	0	0	1	12
Lifting Machines & Appliances	211	0	0	0	0	0	0	0	0	1	6	1	6
Working Environment	24	0	0	0	0	0	0	1	19	0	0	1	19
Total		2	55	3	6062	5	6097	3	6053	1	6	14	18273

Statistical analysis of accident data & further classification of data as per IS 3786-1983 done. The factors considered for analysis are Agency of accidents (B-1), Type of accidents (B-5), as per unsafe act or unsafe condition (B-3) & Potential nature(C-6) & location of injury (B-7).



"Figure 5" Agency Involved In Injury (B-1)

There were 14 reportable lost time injuries & 03 fatal Injuries which contributed to 18273 man days lost from year 2012 to year 2016, year 2014-15 from were major contributor of man days lost 6097(33 %) which including 05 lost time Injuries (36 %) which also involving maximum contract employees involvement (25 %) & maximum man hours worked (27 %) approximately 872 contract employees are engaged for completion of project activities. Year 2015-2016 reported highest frequency rate of 1.72 highest FSI (frequency severity index) of 2.44 highest Injury Index rates of 5.99 highest Severity rates of 3487 with number of lost time injury 03 which contributing 21 % of total accident & 33 % of total man days lost. The number of Injuries rates (FR/ SR/ FSI/I.I/I.R) & Number of lost time injuries reported were lowest in year 2016-2017 with only 01 lost time injuries accounting to lose of 0.03 % man days lost. Though FR/ SR/ I.I & I.R have reduced for year 2016-2017 in comparison to previous years with best safety performance value Safe-T-Score valve of -1.03 which is achieved by conducting highest Safety Activity rate of 6.85 which is highest in comparison with previous years.

Scaffolding & Ladder are the two agencies which jointly contributing to 66 % of man days lost including two fatalities. From fall of objects which contributes to 29 % of reportable injuries with one fatal accident. 65 % of the Injuries are due to unsafe act which is because of taking unsafe position or posture all this contributing to 66.57 % of man days lost. Fracture is the single largest incident which contributing to 36 % in nature of injury with almost lowest contribution 1 % in man days lost. Hazardous arrangement & procedure was the unsafe condition responsible for 36% of the total injuries contributing 33% of total man days lost. Second most contributing unsafe condition is use of improperly guarded machines which is responsible for 14 % of total injuries & 33 % of total man days lost. Abdomen (including internal organ) is the major location & nature of injury which include 43 % of total reportable injuries contributing 66 % of total man days lost. In year 2013 & year 2015 two fatalities occurred which were due to injury in the lower abdomen. No reportable fatal injuries was reported in the year 2016-2017 with least loss time injuries of 01 & least loss of man days lost of 0.03%. Year 2016-2017 have best safety performance having Safety T Score valve of -1.03 which is due to the continuous improvement by conducting maximum safety activity of 6.85 which include maximum number of safety training/ safety Inspection/ safety Audits/ inspection of material handling equipment. Maximum number of near miss accident were investigated in year 2016 various safety promotion activities awareness activities increased continuously from year 2012 to year 2016.

7. RESULTS-

In all activities the root cause of incidents are classified in to four categories as below- Lack of resources, Lack of system, Inadequate knowledge about the system & Negligence.

- Lack of resources- Non availability of skilled manpower, inadequate scaffolding materials, no barricades, improper cable routing, inadequate supervision etc.
- Lack of system- No system of verification work methodology, issue of key only after ensuring confined space entry permit, area inspection before closure of confined space etc.
- Inadequate knowledge about the system- improper material lifting practices, entry into the confined space without permit, working without JHA & permits, safety training etc.
- Negligence- failure to follow the work procedure, failure to ensure work permits by engineer, crane operation without barricades , site safety instructions etc.

8. FUTURE SCOPE-

The drawback or limitation of the study is that IS 3786:1983 & other method used for computation of frequency rate & severity rate which indicate the safety performance are partial indicators as they only concern with Human injuries accounting lost time injury

& man days lost. They do not including property damage or time losses due to accident only concerned with direct loss which is partial indicator as indirect cost of accident is more than direct cost. It is not practicable to take decisions or to implements safety strategies as they are partial indicators. The philosophy of total loss control or Total loss prevention which accounting both Human injury & property damage should be used for computation of safety performance. Total loss control is the assessment of total loss potential including all downgrading incident like injury, accident, occupational disease, pollution, fire, explosion& any other property damage.

9. CONCLUSION-

Accident statistics and investigation records are very useful input for formulation of the safety system of an organization. Incident investigation is a method of finding the root cause and gives recommendations for correcting the same. The two independent variables near miss accident reporting & safety budget having positive impact on overall safety performance rating. The safety performance can be improved by improving the safety activities through the allocation of sufficient annual budget & encouraging for reporting Near miss incidents .Near misses are the indication of site conditions and the safety culture and its shows the area need for improvement. Reporting culture can be improved by motivating the people & increasing their participation in safety activity. This will lead to achieving the goal of zero accident which is the ultimate objective of a safety management system.

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