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HUMAN BEHAVIORAL COROLLARY ON INDUSTRIAL WORKPLACE

I. FAZIL, Z.U. KIRMANI, M. HANIF, A. SAEED and *A. KHURSHID

Attock Refinery Limited, P.O. Morgah, Rawalpindi, Pakistan

This paper highlights a number of initiatives taken for the introduction of behavior-based safety concepts and customized process control solutions to encourage and instill safe behavior in employees at Attock Refinery Limited (ARL), Morgah Rawalpindi, Pakistan. A Safety culture is entirely dependent on the attitude of employees towards safety. After all, those who actually perform the work are responsible for their safety as well as that of those around them, and also for any accident that occurs whilst they work. In 2005, ARL established a Health Safety Environment (HSE) Department reporting directly to the CEO and it now stands transformed into the HSEQ Department with Quality having been added to its portfolio, with the logic that it is the Quality of our systems and processes that also determines the possibility or otherwise of safe/unsafe behavior. The need was felt to measure, analyze and then control unsafe behavior at the workplace. In spite of providing safety systems and necessary hardware, incident data shows that the majority of misfortunes are triggered by employees' unsafe attitude, proclivity to take shortcuts and intuitive-based decisions, bypassing Standard Operating Procedures (SOPs). Human behavior is a very complex subject as it is linked not only to the workplace environment but has origins from home and upbringing as well. An attempt was, nevertheless, necessary to develop a tool of customized behavioral assessment tool in order to gauge the employees' behavior. On a scale of 1-100, marks were allocated to areas including safety attitude within the department(s), working conditions, supervisor's behavior towards worker safety, job loyalty, personal attitude towards job safety, seriousness towards safety, training and the employees' view about the HSEQ department. This study, based on one-on-one interviews with employees, yielded what we will term employees' potential towards unsafe behaviors, which would facilitate subsequent planning and customized training to overcome weak behavioral aspects of personality.

Keywords: Behavior based safety, Workplace safety, Behavioral assessment, Job safety, Quantification of behavioral safety.

1. Introduction

This paper highlights as to how Behavior-Based Safety was introduced at Attock Refinery Limited (ARL). Located at Morgah near Rawalpindi, Pakistan, ARL is a Refinery that began its operations in 1922, and its 85 years' existence has seen it being transformed into a state-of-the-art facility incorporating a mix of the old and the new in its hardware.

Following the establishment of an independent HSE Department in 2005 (now called the HSEQ Department); ARL felt the need for an independent Third Party Safety Audit by a Consultant of international repute to see where we stand vis-à-vis international practice, with a view to use this benchmarking as the basis for improving our HSE systems. DuPont carried out this Audit in 2006.

The Audit yielded an excellent evaluation of ARL's systems, as well as a road map to attain higher ratings against international benchmarks. The first recommendation, which was immediately implemented, was to form a Central HSE Committee chaired by the CEO and with each of his direct reportees as not only members of this Committee but also heading one important specified area related to HSE.

From amongst many recommendations, one was to conduct "Behavior and System Audits" and ensure their follow-ups. The Behavior and System Audit (BSA) Sub-Committee (hereafter referred to as BSA for ease of context) was formed with a clear focus on the behavior audit process, track the timeliness and quality of follow-ups.

The BSA, in 2007, thoroughly analyzed two years incident and investigation data and identified that most of the workplace incidents are triggered by unsafe behavior, persistence of inherited traditional beliefs and overconfidence of workers. A need was also felt to develop a tool to put all the data into a systematic format suited to analysis, and subsequent correctional plans.

The BSA first reviewed different behavior audit

* Corresponding author : amir@arl.com.pk

systems being implemented in different industrial organizations and analyzed if they can be adopted at ARL. Eventually, however, BSA developed an in-house questionnaire on “Behavioral Safety at Workplace”.

The model behind the Cornell Selectee Index, a questionnaire designed to indicate the presence of emotional maladjustment which can be answered by a ‘Yes’ or ‘No’ was used as the basis [1]. Each question is aimed at revealing the presence of some emotional difficulty, maladjustment tendency, or psychosomatic reaction. In addition to this the Thurstone equal-appearing interval scale was adopted to collect opinions, ranging from very positive to very negative about a certain object, person and activity [2].

The questionnaire was designed keeping in view ease of response from ARL’s employees to gauge their understanding about Safety.

The Behavioral Safety Questionnaire comprise of thirty two questions distributed amongst the following eight areas:

1. Safety Attitude within the Department
2. Personal Attitude to Safety
3. Working Conditions at Workplace
4. Supervisor Attitude to Worker Safety
5. Job Loyalty shown by the Employee
6. Serious Attitude to Safety
7. Training Provided / Needed
8. HSEQ Department Attitude

2. The Approach

Traditionally, safety management has been top-down driven, with a tendency to make line managers responsible. This means that floor level workers most likely to engage in unsafe behavior or to be hurt have traditionally been detached from the safety improvement process. Behavioral based safety approach is ‘bottom-up’ so that those most likely to be hurt are actively engaged in eliminating the occurrences of unsafe behaviors. Without workforce involvement, the ownership of, and commitment to, the process will be lacking and the initiative will probably fail.

Even a minor lapse/unsafe behavior by employees or contractors in the petroleum refining business have the potential to lead to a total disaster. Organizational efficiency is also hampered by the fact that we have inherited a number of beliefs and behavior patterns from bygone and simpler days. [3, 4]

The results of a well planned and implemented behavioral safety system can lead to inculcating workforce stewardship of safety systems, lesser accidents or incidents, near-misses and property damage, acceptance of the Safety System and increased reporting of defects, near misses, and accidents.

In view of this factor, Psychoanalysis of 100 % employees working in plants, crude and product handling departments was initially targeted through a customized workplace questionnaire filled out through one-on-one interviews. Cross departmental interviewers were selected to allow the interviewee to answer candidly without fear/hesitation. Standardized questioning style and recording techniques in a warm and accepting environment were followed to eliminate biases. After identification of faulty areas of behavior individual and group therapies where applicable have been used.

3. The Questionnaire and Interviews

One hundred and eighty eight (188) employees from Operations, Maintenance and Health, Safety, Environment and Quality (HSEQ) department were selected for interviews. Nineteen interviewers from different disciplines asked the thirty two questions and recorded their replies on the questionnaire, which is given in Table 1.

4. Compilation of Data

Once the Behavior Safety Questionnaire was filled out for 188 employees, the next step was to convert the qualitative answers to quantitative data so that further statistical analysis, short listing of group of employees for psychological therapies could be targeted.

First, the 32 questions of the Behavior Safety Questionnaire were categorized in eight disciplines i.e., Safety Attitude in Department, Personal Attitude to Safety, Working Conditions at Workplace, Supervisor Attitude to Worker Safety, Job Loyalty shown by the Employee, Serious Attitude to Safety, Training Provided / Needed and HSEQ Department Attitude.

Table 1. Key - questionnaire for measuring safety behavior along with benchmarking.

Sr.#	Question	Response						Area
1	Has anyone from your department talked to you about your safety?	Yes	2	No	0	Occasional	1	D
2	How often does your department talk about your safety? Once in a	Month	2	Year	1	Never	0	D
3	Did anyone from your department talk about refinery safety?	Yes	2	No	0	Occasional	1	D
4	Are you satisfied with your working conditions?	Yes	2	No	0			WC
5	Do you enjoy your work?	Yes	2	No	0			WC
6	Your work-load is	Too much	0	Manageable	2			WC
7	When you make mistake what is your immediate fear	Refinery loss	2	In charge's Anger	0	Job security	1	WC
8	Is refinery safety important or your life?	My	2	Refinery	1	Don't know	0	PATS
9	When you see a fellow workers doing unsafe work what will you do?	Ignore	0	Stop him	2	Inform Incharge	1	PATS
10	If you become In charge of your section what steps you will take to improve safety of your section?	Improve existing system	2	Happy with existing system	0			PATS
11	Do you wear PPE's to avoid punishment?	Yes	0	No	2			PATS
12	Do you feel easy to work without PPE's?	Yes	0	No	2			PATS
13	Does your peer worker ask you to wear PPE, s?	Yes	2	No	0			PATS
14	Do you think that you work more efficiently without PPE's?	Yes	0	No	2			PATS
15	After noticing that something unusual was happening in process which you have not experienced earlier, what did you do next?	Inform Incharge	2	Take Action Yourself	0	Take advice from co worker	1	PATS
16	If your Incharge asks you to do a job for which you are not properly trained what will you do?	Refuse	2	Agree to Work	0			PATS
17	Whose responsibility is the Area Safety?	Mine	2	Incharge	1	Top Mangt	0	PATS
18	Whose responsibility is Refinery Safety?	Mine	2	Incharge	1	Top Mangt	0	PATS
19	Whose responsibility is Personal Safety?	Mine	2	Incharge	1	Top Mangt	0	PATS
20	Do you intend to finish the job early at any cost to make your Incharge happy?	Yes	0	No	4			SATS
21	Do you intend to finish the job early at any cost in overall interest of refinery?	Yes	0	No	4			SATS
22	Before starting a job do you think about its safety aspects?	Yes	4	No	0			SATS

23	When your supervisor wants to do a job which you think is unsafe, what will you do?	To finish the job to meet production target, or					1	SATS
		To finish the job for benefit of refinery, or					1	
		To delay the job due to unsafe condition					4	
24	Do you like to wear PPE's?	Yes	3	No	0			SATS
25	You have not personally done a job; however you have assisted or seen that job being done by your peer worker. In case your peer worker is absent what will you do?	Refuse	3	Start Work	0	Consult Incharge	3	SATS
26	How does your Incharge react when you cannot finish job in time?	Quiet	3	Bullying	0	Helping	4	SATW
27	When you make mistakes you feel	Embarrassed	1	Humiliated	2	Indifferent	0	JOB LOY
28	Have you got any training related to your work?	Yes	3	No	0			TR
29	Do you think that you need work related training?	Yes	3	No	0			TR
30	How does HSE department staff behave in case of incident?	Advice	1	Counseling	2	Monitoring	0	HSE
31	Do you think that HSE department staff is friendly?	Yes	3	No	0			HSE
32	What in your opinion is the role of HSE?	Authoritative	0	Friendly	3			HSE

Safety Behavior Marking

S.No.	Area	Total Marks	Marks Obtained	Benchmark
1	Safety Attitude within Department (D)	9	0	6
2	Working Conditions (WC)	9	0	8
3	Personal Attitude Towards Safety (PATS)	30	0	24
4	Serious Attitude Towards Safety (SATS)	27	0	22
5	Supervisor Attitude Towards Worker Safety (SATW)	7	0	4
6	Job Loyalty (JOB LOY)	3	0	2
7	Training (TR)	6	0	6
8	HSEQ Department Behavior (HSE)	9	0	8
	Total Marks	100	0	80

Table 2. Summary of Behavioral Safety Study

Grades	No. of Employees out of 188	% age	Type of Therapy Required
Grade "A" (>75)	9	5	No
Grade "B" (>60 & <76)	137	73	Group
Grade "C" (>50 & <61)	37	20	Individual
Grade "D" (<51)	5	3	Individual

After categorization, all available answers to the 32 questions were rated from 1 to 4 keeping in view the criticality and nature of that aspect as well as Attock Refinery Limited safety culture. For example, reference to Table-1 "Questionnaire for Measuring Safety Behavior Alongwith Benchmarking" if the interviewer asks the interviewee question-1 "Has anyone from your department talked to you about your safety"? The available answers to this question are "Yes", "No" and "Occasional". If the interviewee says "Yes" he will get '2' marks, if he says "No" he will get '0' mark and if he says "Occasional" he will get '1' mark. In this way, all 32 questions were numbered and employees' scores are calculated as a whole, as well as for each of the eight disciplines.

Benchmark was obtained by giving numbers to highest scores for desired answer to that particular question for each of the eight disciplines. In this way the highest number was allotted to the desired safety behavior. For example, for first discipline "Safety Attitude in Department", three questions were asked having total numbers '9', but the desired / obtainable benchmark was '6'. In a similar manner, numbers were allotted to other seven disciplines based on their importance in our workplace culture. Therefore, final benchmark of '76' was fixed for most desirable safety behavior at workplace.

After getting quantitative figures for 188 employees, the marks were categorized in four grades and results achieved are given in Table 2.

5. Conclusion

The 32 questions of the Behavior Safety Questionnaire sub-categorized into 8 disciplines identified weak areas of behavior needing attention. After getting quantitative data for 188 employees, the scores / ratings were categorized into 4 grades. This grading also helped in prioritizing training needs to groups of workers. Finally, it was concluded that 23% employees of sample population scored equal to or less than '60' marks and need ARL's immediate attention and therapy/counseling to avoid any misfortune.

References

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[3] H.C. Lindgren, "An Introduction to Social Psychology", California State University at San Francisco, Wiley Eastern Limited, Page 423.

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