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A Study On Behavior Based Safety In Refinery

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ABSTRACT

This project is a perception survey of impact of behavior-based safety (BBS) on accident prevention in the construction project. Industry is becoming increasingly aware of the importance of taking human factors into account in safety management. Accidents are commonly attributed to at-risk behavior or human error. When accidents are investigated, many of the systemic causal factors are human in their origins, e.g.: inadequate training, bad design or poor safety culture.

Behavior-based safety programs have become a popular approach to managing the people issues in safety. It is a scientific way to understand why people behave the way they do when it comes to safety. If properly applied an effective next step towards creating a truly proactive safety culture, where loss prevention is a core value.

It assumes that majority of work related accidents are caused by workers at-risk behaviors which can be reduced through behavior modification. An exploratory cross-sectional employees' perception survey was used in conducting the study, using questionnaire / interactions administered on randomly selected employees of the two construction companies involved in the construction / maintenance project.

The results indicated that the implementation of behavior-based safety program in the construction project to a large extent reduced workers at-risk behaviors and accident rate. The research concludes that reduction in workers at-risk behaviors and accident rate is dependent on the implementation of behavior-based safety program in the construction project. Continuous review of employees' behavior reinforcement techniques, encouragement of workers to observe/correct each other's at-risk behaviors', provision of extensive training for B-Safe observers and continuous commitment of management/workers to the elimination of at-risk behaviors in the workplace.

1. Introduction

Some initiatives come from the employer, from the social partner organizations, from state regulatory bodies, and some worthwhile initiatives come from individual employees' own insights, ideas, training and development activities around health and safety.

Most employers and employees in the area of safety will agree that the ultimate aim of a safety initiative is a "total safety culture"; however, this concept is rarely defined. A total safety culture is a culture in which:

- individuals hold safety as a 'value' and not just apriority;
- individuals take responsibility for the safety of their co-workers in addition to themselves; and

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The following are some requirements for any approach to safety at work that brings about noticeable, lasting results and contributes to a total safety culture:

- A strong management commitment towards maintaining and improving behavioral safety, witnessed in the regular acts of individuals at management level
- 2. Respectful, trusting, open communication between management and employee groups about all aspects of safety in the workplace.
- An open, feedback-rich culture among employees, which enables employees to consistently learn and grow.
- A commitment to improving the profile of and attitude to health and safety, and increased employee engagement in safety.
- An emphasis on safe and unsafe behavior; not a sole dependence on lagging indicators such as safety statistics.
- A strong, consistent, timely reaction to the discovery of unsafe acts, whether they result in injury or not. Safety incidents are viewed as an opportunity to learn and improve.
- Generally transparent and fair leadership from all, including managers, supervisors, and owners.

2. Review of Literature

2.1 The BBS Approach and Safety Improvement:

It revealed that the behavior based process was developed in 1998 and was introduced as a part of a broader accident prevention programme, one that was initially focused on „conventional" safety. It revealed that behavioral safety does improve safety behavior and reduce injuries based on the studies reviewed. The concept of BBS approached refers to a systematic application of psychological research on human behavior aimed at changing unsafe to safe behavior, agreed among researchers.

Hence, BBS is an analytical or data-driven approached, where critical behavior get identified and targeted for change. Further highlighted that behavior based safety interventions are people focused and are often based upon one to one or group observations of employees performing routine works tasks, feedback on safety related behavior, coaching and mentoring.

2.2 Decision to Pursue BBS Process:

- Generally good level of management support, employee involvement
- Enjoying relatively low safety incident rates
- Looking for the next step improvement in the safety process
- Identified the BBS Process as a possible alternative
- Decided to investigate BBS Process

3. Objectives & Scope

The objectives of the research are as follows:

- To determine the extent at which reduction of workers at-risk behaviors dependent on the implementation of behavior-based safety program in the construction project.
- To determine the extent at which accident rate reduction is dependent on the implementation of behavior-based safety program in the construction / maintenance project.

In this paper two Oil & Gas construction projects were selected for BBS observation. Accident trends were observed before and after implementation of BBS and trends were analyzed.

4. Goals & Goal Setting

Identify and Select a BBS Partner to help implement a BBS Process at refinery

4.1 Feedback:

- Choose a goal relating to an activity - on a warehouse floor, 'use of machinery' could be the target activity.
- Then choose a goal for that activity, e.g. 'always travel at or below the recommended speed when operating a forklift truck'.
    - Agree that goal with those using the machinery and those in that vicinity.
    - Agree upon a measurement system to determine progress towards the goal.

5. Methodology / Planning of Work

Behavioural safety has provided a platform for constructive debate, and the conflicting opinions have challenged the safety professional to learn more about the psychology of injury prevention. However, presentations of behavioural safety are often not optimal with regard to gaining acceptance of BBS principles and promoting participation with BBS procedures. From the start, let's realize that employee participation is actually key to the wide Spread popularity and success of BBS. In other words, BBS has already done more to get line workers willingly involved in daily activities relevant to injury prevention than any other approach to occupational safety. It has provided principles employees can use to understand why at-risk behaviours occur and why some safe behaviours are not practiced on a regular basis. It has offered practical strategies for: (a) obtaining objective evidence of at-risk behaviours, (b) defining barriers to safe behaviour, (c) teaching ways to substitute safe for at-risk work practices, (d) holding people accountable to improve their safety-related behaviours and help others do the same, and (e) demonstrating the effectiveness of specific BBS procedures and thereby justifying continued management support.

Words are magical in the way they affect the minds of those who use them…words have power to mold men's thinking, to canalize their feelings, to direct their willing and acting.

This introductory quote from Aldous Huxley's "Words and Their Meanings" reflects the power of words to shape our feelings, expectancies, attitudes, and behaviours. People, in fact acknowledge the influence of words on behaviour when they say things like, "Say that enough times and you'll start to believe it," "Can I talk you into doing me a favor?", and "Do as I say, not as I do." Behavioural safety is an approach for analyzing what needs to be done to make safe behaviour more probable and at-risk behaviour less probable. Then, with BBS principles and procedures, line workers are empowered to help each other eliminate barriers to safe behaviour and factors that motivate at-risk behaviour.

The letters of SMART represent the essential components of an effective goal – Specific, Motivational, Attainable, Relevant, and Trackable. Goals for teams are SMARTS, with the added "S" referring to "Shared." Obviously, team members need to share the responsibility of reaching a team goal. Elsewhere I explain how to apply consensus-building exercises to get team buy-in and a shared commitment for a goal with SMARTS.

Teach employees (especially managers) to talk about zero injuries as a purpose or vision. The ultimate result of gaining and sustaining maximum employee involvement in BBS is an injury-free work culture. So our purpose for getting more people involved in BBS is to reach and maintain zero injuries. Participation is needed for various process activities that contribute to injury prevention and the attainment of our vision of injury free. These process activities can be defined in terms of a certain number of specific actions that need to occur in a given period of time in order to be "successful." Thus, teach workers how to set SMART goals for process activities. These activities and their associated goals change continuously, but the vision of "zero injuries" remains the same.

Both the quantity and quality of participation in BBS activities depend on the numbers you use to evaluate success or failure. The bottom-line measure – total Recordable injury rate (TRIR) – provides neither instructive guidance nor motivation to continue a particular safety process. It tells us nothing about why we're succeeding or failing (O'Brien, 2000). Yet companies are frequently ranked according to their OSHA recordable and lost-time injuries. And within organizations, individuals or work teams frequently earn a financial bonus according to outcomes. As per basic reinforcement principles of BBS, this motivates employees to cover-up their injuries and stifles the very kinds of communication needed to prevent injuries. Instead, keep score on the various proactive things individuals and groups do for safety. For example, monitor the numbers of near hits, property damage incidents, and injuries reported. Track the number of corrective actions implemented and evaluated, the number of environmental and behavioural audits conducted the number of environmental hazards eliminated, the number of safety suggestions and safety work orders submitted, and so on. Graph and post the percentage of individuals who participate in various safety-related activities, as well as the percentage of safe work environments and behaviours observed during systematic audits. Now you have an accountability system that can facilitate participation. To manage safety successfully, you must find ongoing objective and impartial measures of performance that enable regular evaluation of progress, and motivate employees to participate in an achievement-oriented process. The principles and procedures of BBS embrace ways to make this happen, including: Develop up-stream process measures such as number of audits completed or percentage of safe behaviours occurring.

- Set process-oriented goals that are specific, motivational,
- achievable, relevant, traceable, and shared.
- Discuss safety performance in terms of accomplishment– what people have done for safety, and what additional achievement potential is within their domain of control.
- Recognize individuals appropriately for their accomplishments.
- Celebrate group or team accomplishments on a regular basis.

5.1 Factors Affecting Safety Performance

There are many factors which can affect the safety performance as the safety at work is a complex phenomenon, and the subject of safety performance in the oil and gas industry is even more complicated to understand.

Human factors

Human factor is important sub dimension to explain human involvement towards safety behavior and its nature how human deals in with life. The workplace safety can be improved the workers need to give importance to safety measure and related issues. It is a combine effort to recognize and then feel the responsibility to improve the safety conditions. When the organization and job factors, and human and individual characteristics which influences behavior at occupation in a manner that can help the occupational safety and workers health

Behavioral factors

The behavioral factor of safety refers to employee motivation and performance improvement through behavior constrains. Behavior factors base on safety provide more focus on effort of behavior rather than results such as accidents recorded. The behavior base safety refers to the behaviors which lead to reduction of risk behaviors and as a result reduce accidents and injuries. When the accident or injury is recorded which is related to behavior occurs, it is highly likely that the similar attitude has not caused injury when previously experienced. Behavior based safety involvement are workers more emphasis on group observation of workers performing regular work. If safety oriented programs are encouraged works can change their behavior and mold their attitude to act safely.

Economic Factors

The economic factors deals in term of monetary values which are associated with safety such as, hazard pay. Compensation base on the accident is very important. In most of the cases money can never compensate the life of any worker who lost his life but can only temporarily relief the pain of one who had losses one. The economic factor depends on the organizational polices and may vary from company to company. Therefore there is a difference procedure for payment to individual in term of overtime, bonus or profit sharing, which likewise

motivate worker or encourage the workers operational duties within the organization. The economic factor can also improve the occupational safety by providing appropriate equipment and other relevant safety prevention tools.

6. Management Practices on Safety Performance

Management practices are aimed to prevent occupational accidents at work, which is an approach to control the workplace accidents. In essence, some authors have established about management practices, according to Ali, Abdullah & Subramanian (2009), stated that management practices are an important factor of an organization's and it plays an effective role in reducing workplace injuries. The extract of the definition of management practice is to share the common beliefs and values that safety is at preference. The effectiveness of the safety depends on how it can be achieved when there is a proper management of the interaction between people and technology. However, occupational accidents in the workplace do occur when there is no proper integration between the people who are tends to be safe and unsafe behavior as per their feedback.

The basic behavior-based process consists of identifying observable safe behaviors upstream in the process. Then, identification of the antecedents (activators) that encourage these safe behaviors is required for workers to practice it. Recognition of antecedents that discourage safe behaviors is required and removes them. Behaviorist theory said those consequences (reinforcement)that are positive, immediate and certain (rewards) will keep employees working safely. Negative consequences which are immediate and certain (rewards) discourage unsafe behaviors.

7. Management Practices on Safety Performance

An initial commitment of support needs to be made by all key players.

- Meticulous and consistent communications need to occur between process leaders and organizational leaders
- Potential barriers need to be identified and addressed in the strategic plan.
- Expectations need to be clear and progress toward goals needs to be regularly measured.
- Ownership and accountability need to be defined and reinforced at all Levels

Identified Key Factors for a Successful BBS Process:

- Participation in the process needs to be growing and regularly measured.
- A careful separation needs to be maintained between BBS and any disciplinary measures.
- It has to have a review and continuous improvement process for sustainability.

8. Behavior Based Safety (BBS) Approach

Within BBS, behavior is explained in terms of the ABC model (Antecedent, Behavior, and Consequence).

Antecedent

A stimulus or event that occurs before a behavior in time. This stimulus or event may result in the behavior. Work examples Include goals, policies, training, job aids, and guides.

Behavior

Anything that we can see an individual do, or say.

Consequence

A stimulus or event that occurs after a behavior in time. This consequence could increase or decrease behavior in the future, depending on its reinforcing or punishing properties. Work examples include feedback, recognition, task completion, goal achievement, rewards.

Developed a Step Approach

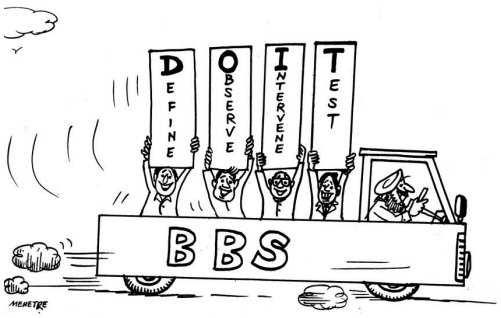
Step One-Site Preparation and Site Assessment

Step Two-Training and Process Kickoff

Step Three-Ongoing Activities and Continual Improvement

BBS – BUILD BUSINESS SAFELY

- Generally safety function is organized by the HSE Dept.
- BBS means to include everyone to care for and remove/correct
- Unsafe behavior on the spot.
- Unsafe behavior is recognized as the root cause for all Accidents.



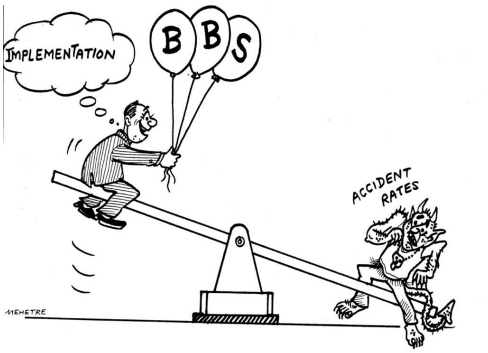
Questions asked by management before BBS launch

- How to select observers?
- Are there any implementation problems?
- Who should form a steering committee?

- Is separate training necessary for observers?
- Is training required for steering committee?
- Who should be an observer?

Steering BBS Team for Each Location

- Formation of Steering BBS Team for each location
- Ensuring strong leadership drive by all OICs/HODs for BBS project activities.



BBS LEADS TO REDUCTION IN UNSAFE BEHAVIOURS AND THUS A FALL IN ACCIDENTS

Strategic Plan/ Deployment

The steering team members are selected based on the needs and culture at the location.

In addition, they also play a key role in developing site strategy, which minimizes perceptions of change and tailors the process to the individual site.

Team can be formed from existing committees/ teams

Develop the Observation Process

Observer Process

The steering team selects observers best suited to the behaviours and locations identified in the site assessment. Based again on the site assessment, the choice of observers could be any combination of management and floor employees.

Attitude of Leaders

The coach of an athletic team can make or break momentum. Coaches initiate and support momentum by helping both individuals and the team recognize their accomplishments. This starts with a clear statement of a vision and attainable goals. Then the leader enthusiastically holds individuals and the team accountable for achieving these goals.

A positive coach can even help members of a losing team feel better about themselves, and give momentum a chance. The key is to find pockets of excellence to acknowledge. This builds self-confidence and self-efficacy. Then specific corrective feedback will be accepted as key to being more successful, and to building more momentum. It does little good for safety leaders to reprimand individuals or teams for a poor safety record, unless they also provide a method people can use to perform better. And the leader must explain and support the improvement method with confidence, commitment, and enthusiasm. For momentum to build and continue, support means more than providing necessary resources. It means looking for success stories to recognize and celebrate. This helps to develop feelings of achievement among those directly involved (the team) and an optimistic atmosphere from others (the work culture). These are the ingredients for safety momentum.

BBS Practical Awareness

- One-day BBS practical awareness training as BBS observers for each location,
- Issuing BBS sticker to be put on the helmet as an identity;
- Issuing Training Attendance Certificate to all participants as motivation factor.
- Participants Evaluation of BBS Training

BBS Monthly Review

- BBS Monthly Review by Steering Teams by each location and Compliance with its proceedings
- Corporate Apex Implementation Team Review on BBS monthly progress
- Including BBS awareness training in contractors / Vendors.
- Rewarding best BBS observers based on maximum observation.
- Celebration of BBS annual day

Visible Outcomes

- Comparing injury data every 6 months before/after launch date of BBS and
- Observable decline in unsafe behaviors/ conditions
- Organizations that fail to take a scientific approach to safety's human-behavior element are gambling with their futures and are ultimately only safe by accidents.

FINALLY

Our target is zero accident by focusing on 'Zero Unsafe Behavior' which is the root cause of any incident by involving all employees and contractors' workmen in BBS approach.

BBS Recommendations

- Safety Statistics board should also reflect the percentage of SUSA.
- Safety Motivation / Recognition need to be introduced in the plant. BBS Observations to be linked to performance objective.
- HSE Index should include the monthly % of Unsafe/at-risk.
- Behavior which is the "root cause" of any incident in the plant.

Lesson Learnt

- Secure top senior and location management support for the effort Communicate process expectations up front before you begin to implement a site process
- The process kickoff can take longer than expected Communicate Successes and Activities Widely
- Its hard work to maintain momentum and Growth
- Done correctly, the process is a very positive addition to the safety effort.

9. Conclusion

The main objective of this paper was to review the related empirical literatures and highlight the need to investigate safety performance with respect to oil and gas industry. Base of the past

Literature it is concluded that there is an influence of organizational factors on the work place safety performance oil and gas industry.

On the other hand the dimension of managerial practices such as training, reward, management commitment seems to be the factors which can help to prevent work place injuries.

The second variable which is use as an independent variable is defining work place leadership style influence on safety performance. Base on the past literature, explaining the influence of leadership style on workplace safety performance, has found to have a positive significant relationship between leadership style and work place safety performance. These studies suggest improving safety performance by providing a well-managed system that includes the consideration of leadership style, work place training and a feedback or reporting system for any injuries happened on the work place.

However, management practices in this study have investigated the nature of occupational injuries at work, which is an approach to control and prevent the workplace injuries. If proper procedures and knowledge for safety is provided to the workers the human error can be reduced and work place injuries can be controlled

The BBS approach summarized here provide stools and procedures employees can use to take control of their own safety performance, thereby enabling a bottom-up empowerment approach to reducing occupational risks and preventing workplace injuries.

It was recognized that the BBS process provided progress - but not the total desired results. BBS addresses only improved safety – and then only in a behavioral context. It was found that as a result, BBS produces only partial results. The focus is only indirectly on an employee's motivation through a four-tier approach:

1. Management commitment & employee participation

2. Worksite Analysis

3. Hazard Prevention and Control

4. Safety and Health Training

It is inevitable that some positive results will be achieved, since the focus is (to whatever extent) on the person and the workplace.

Observable behaviour alone does not identify the whole person who comes to work. Therefore, these initiatives still ignore the root of the issue – the fact that behaviour is not a force unto itself: it is merely the mirror of the motivational drives of the individual concerned. And to complicate things, each individual has a unique set of motivational drives.

It can thus be concluded that BBS is a driver for culture change.

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