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# LEARNING AND FORGETTING IN INDUSTRIAL SYSTEMS

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**ABSTRACT:** This paper provides an overview of a research program examining the antecedents and consequences of Human Interface while learning and forgetting in Industrial systems. Different case studies are presented and analyzed leading to an understanding through inter linkages of Human interfaces during an important safety practice of permit to work system in different organizational context. Findings from a series of case studies from previous experiences are reviewed and deconstructed in order to understand the potential impact of such adventurism. Various derivative inter-linkages also lead to an examination of organizational culture, leadership role and human behavior. This study reveals the intricacy involved in such complex involvements and confused outcomes by learning and then forgetting thereby proving their contribution as potential causes leading to an incident or accident in future.

### **KEYWORDS**

Permit to work, Safety, Accident, Culture, Risk assessment

### Introduction

Looking out in the past experience in various Industrial establishments and co-relating with the accidents that do occur on almost daily basis on roads, it becomes almost imperative to re-visit the facts from the human viewpoint. Safety is not a new field but an inherent part of industries worldwide. There are researches to understand the incidents and accidents from the bird's view of other countries, but it is not providing any solutions to the new perspective.

Research on industrial accidents investigations suggests that human errors account for 90% of accidents in nuclear industries, 80% of accidents in chemical industries, 75% of maritime accidents, and 70% of aviation accidents (Jahangiri et al., 2016). The permit to work (PTW) system has been considered as a key mechanism to minimize human errors and hence a core element of safety management systems in different organizations (Haji Hosseini et al., 2012). It being the backbone of getting various jobs done can prove to be a potential cause for an accident leading to ill reputation to any organization beside incurring financial losses.

There arises doubt in the human mind whenever we look into the gruesome facts from various newspaper reports and industrial accidents. Difficulty remains to understand as to How human mindset is un-safe in certain cultures? Is it the training or grooming or thinking or learning? Is it a culture or thought process? Is psychological or sociological? One of the researches mentions that safety in a set up depends upon safety compliance and safety participation. Safety compliances refer to various existing procedures, SOPs, Guidelines and systems that are being practiced all over the world and guite popular in the Industrial world. These compliances get ineffective after an extent unless the other half of safety participation is not practiced. Safety participation is related to Human behavior and attitude. Human behavior is an important element in practicing of applicability of safety management systems. It is not some role specified for individual perceptions.

After interviewing some safety professionals with varied experience of 1-12 years in oil and gas sector at various locations and from different background, some interesting facts have emerged. The questions were quite subjective but based upon:

- 1. Whether Incident/Accident investigation system has failed? Yes/No? Why so?
- 2. Whether Permit to work system is quite effective? Yes/No? Why so?
- 3. Whether safety officer is able to drive systems to its effectives? Yes/No? Why so?

The questions were based upon one to one interrogation sessions but taken up one by one. These questions have inter-linkages. Questions were chosen deliberately as they address the important elements in any industrial setup, e.g. Incident investigation and permit to work systems. These elements have human interface with an entwined role of safety officer. Hence the third question has emerged out of these deliberations. With these discussions, it has emerged that these systems need a push or pull effect in any organization amongst various human interfaces as an integral part in various groups and sub-groups.

It has emerged that there are various elements that have brought forth the fact that Incident investigations are copy paste efforts designed to suit the tastes of local and senior leadership. There is also mis-representation of facts wherein, the various causes leading to an incident are not properly identified, recorded and investigated. This is allowing the carcinogenic aspect of the disease to re-appear. Investigations are done in-order to achieve short term results and keep the organizations' reputation intact.

Human error has been defined as any improper decision or behaviour which may have a negative impact on the effectiveness, safety, or performance system. PTW, often used in high risk jobs, is a formal written system to control certain types of works which are identified as potentially hazardous. In this system, responsible individuals are supposed to assess work procedures and check the safety at all stages of the work.

In Permit to work systems, it has emerged that groups are not taking a united approach and relying upon a safety professional to close the loop as this element (PTW) is related to safety Management systems. Though safety professionals understand the PTW, their behavior change when they are left alone at site to incorporate and supervise the PTW. Since the system gets confined to few individuals they again represent the facts as suitable to keep their respective career in good faith. Permit to work system has remained a core element of safety management systems in different organizations. It being the back bone of getting various jobs done can prove to be a potential cause for an incident leading to ill reputation to any organization beside incurring financial losses. Safety cultures evolve gradually in response to local conditions, past events, the character of leadership and the mood of the workforce. How can this adaptation go wrong? Why do certain organizations come to value either the wrong kind of excellence, or pursue goals that carry serious safety penalties? In almost every kind of hazardous work, it is possible to recognize typical accident patterns. That different people are involved in these events clearly implicates causal-factors relating to the workplace and the system at large. Local traps, involving error provoking tasks and work conditions, have the power to lure people into repeated sequences of unsafe acts (James Reason Achieving a safe culture: theory and practice).

SHERPA is one of the most valid methods to identify and predict human errors. In this method, human errors are classified into five groups: action error, checking error, retrieval error, communication error, and selection error (Stanton & Salmon, 2004).

Until recently, relatively little attention had been paid to this human interface complexity within the PTW system. There might be some standard instructions for making it work in any organization. If a job is finished safely, then the matter gets closed. If an incident happens, then incident investigation takes over wherein examination of PTW system is one of the components for investigation. There are surprisingly little known factors that lead to Human Interface and its impact on PTW system. The current paper provides an overview of a research program that tries to examine the antecedents and consequences of Human Interfaces in the PTW system. We are examining the impact of inherent communication, interpretation of instructions, worker's behavior in stress, leadership role and margin of error. Furthermore, this work is of examining the effectiveness of the PTW system at the job site which is full of hazards and how the model can be fine tuned to its stress free support and potential effectiveness.

Hoboubi et al., (2014) studied "the human error probabilities (HEPs) in a PTW using an engineering approach and estimated the HEP to range from 0.044 to 0.383". In another study conducted by the same authors human errors in the PTW system were identified and analyzed using the predictive human error analysis technique. The most important identified errors in that study were inadequate isolation of process equipment, inadequate labelling of equipment, a delay in starting the work after issuing the work permit, improper gas testing, and inadequate site preparation measures. Haji Hosseini et al., (2012) evaluated the factors contributing to human error in the process of PTW and found a significant correlation between the errors and training, work experience, and age of the individuals involved in work permit issuance.

However, as mentioned above, a limited number of researches have analyzed the PTW process from the human error point of view. Moreover, none of the research has studied the role of human interface on PTW using case study method. Thus, the present study aimed to identify and analyze human errors in PTW process.

Various cases that were encountered in past belonged to two different set of organizations with altogether different set of cultures. These small incidents are part of actual experiences that the author experienced during the course of his career.

One of the companies being referred to a Government owned Public Sector Undertaking. This company is the largest state-owned natural gas processing and distribution company in India. It has the business segments related to Natural Gas, Liquid Hydrocarbon, Liquefied Petroleum Gas Transmission, City Gas Distribution and Exploration & Production. It owns the country's largest Natural Gas and LPG cross country pipeline network.

The other company is in the business of manufacturing Fertilizers and is part of a very large private conglomerate in India. It is among the largest private sector fertilizer companies in India. It owns one of India's most energy efficient manufacturing facilities. This company manufactures and markets urea, agricultural seeds and agrochemicals. It is the 8th largest urea manufacturer in India.

In PTW system, prior to any job being undertaken at Plant premises, the job site is initially witnessed by three departments of an organization – Operations, safety and Maintenance. Professionals from three departments visit the job site, discuss and make recommendations vide Job Hazard analysis. The same is then referred with Risk Assessment for deriving Hard controls. These Hard controls need to be taken care of at job site. The same need to be witnessed by safety representative. Based upon his clearance, the Operation issues the PTW to maintenance. Then follows the safety supervision by the Maintenance engineer through third party contractor, safe work witnessing by safety and hassle free safe handover back to operations. The flow as described remain quite stressful during the job being undertaken as it involves professionals and workers from the three departments. Looking into PTW, it becomes a planning which involves human interfaces wherein an outcome can be successful safe completion or an unexpected incident.

The work permit system is a key mechanism to minimize human errors guaranteeing workers and facilities' safety. The proper application of this system depends on all involved employees including work permit issuers, supervisors, and workers (Barry, 2002). The process of work permit issuance is one of the critical and human error tending tasks (Mostia, 2002). Any error committed by the involved employees can diminish system's safety leading to accidents.

## **Interpreting Case Studies**

In order to understand the Human interface in the permit to work system, the following Case studies were decoded:

### PTW as a formality

Safety officer reached his desk on Monday after spending a weekend. He got a call from O&M department (retrieval error) that they planned a job on pipeline during this weekend (selection error) wherein some draining of muck from LPG pipeline was involved (checking error). The job was completed safely (Action error) without any hindrance. Since the job was completed, safety officer was requested to sign on the blank space of PTW format wherein his signature was required (Communication error). The format was available in the control room and after the signature of safety officer the PTW process was completed. This helped them regularize the future audit requirement (Action error).

## Analysis

PTW are signed jointly after site inspections. This case evidenced a communication gap which was addressed by getting signature of safety officer later on. It seems that PTW system here is a document completing exercise in order to emerge corrigible in an audit instead of practicing safety.

### Work without safety inspection

In one of the jobs involving pipeline cleaning for muck, the outsourced firemen were deployed at the work site (selection error) and were ordered by O&M to pour water on the drain point of the PIG barrel to clear the muck (Action error). Safety officer was not called imagining the fast completion of task (communication error). LPG barrel was not isolated assuming the abundant muck blocking the drain point. In the haste, no permit was taken as the job (retrieval error) involved senior professionals who wanted to regularize the uninterrupted LPG flow to customers. Unfortunately, it was small quantity of muck (checking error). LPG started draining, drain point could not be closed because of cold burn situation.

#### Analysis

It seems that work completion without hindrance leading to profit making is more important instead of practicing the safe processes. There is involvement of outsourced manpower which is inexperienced about the inherent hazards of LPG drainage. Here experience sharing between two groups was not evidenced.

#### Firemen deciding strike

Firemen were sent for standby duty for various permits issued in the plant premises. Maintenance Managers for maintenance team arranged refreshments for them at site. Since, firemen belonged to HSE department, their issue was not taken care of by the HSE Manager. (Action error) Firemen brought the issue to the attention of HSE Manager, (retrieval error) but he ignored considering it as trivial.(selection error) Firemen took the issue to Union leader, who issued notice to management highlighting Harassment of emergency force by HSE Manager. Matter took an ugly turn and the issue reached President of the company, who in turn scolded HSE Manager to assuage the feelings.

#### Analysis

It seems that work from the worker is more important but not the welfare of them. Communicating about the location and hours were not evidenced. Repetitive hiding information in a group is evidenced. A complexity due to communication gap was created intra group.

### Blame game

In a welding job in a Fertilizer plant, it was witnessed by Fireman standby. He requested welder to wear proper PPEs and tried to cordon the job area by fireproof blanket keeping it wet. He was restrained to do the same by the maintenance team and supervisor (Action error). In this work, a small fire broke out. Though fireman standby was able to extinguish it timely. An investigation, led to blame game where Operations and Maintenance department proved their ignorance (retrieval error). It was concluded in the report that due to negligence of Fireman standby the fire occurred (selection & communication error).

#### Analysis

It seems that an established process is being followed in order to save skin and go scot free. Even the expertise sharing was insisted by Fireman it was neglected by skilled group. This communication gap created a scenario where resultant effect was Fire which again was investigated incorrectly.

## **PTW failure**

Safety officer was only deputed to job site even though the job was done by Projects team in the premises of operational pipeline. Instructions on the PTW was not available (communication error) because the contractor left the job site keeping the permit in his pocket (Action error). In between, one of the project engineers enthusiastically started touching the pressure gauge of pipe spool piece which was being hydro-tested (Selection & checking error). During the process, pressure gauge blew up, creating an injury to the engineer where his eye was saved but he was hospitalized. This incident was removed from the records (retrieval error). No incident investigation was ever conducted (Action error).

#### Analysis

This is a clear case of communication gap. PTW insists recording of every hazard and precautionary steps taken. Since issuing of PTW becomes a repetitive exercise, such a scenario can occur at any place where there is no cross check. It seems that there is no respect for safety systems also because of not understanding them properly.

#### No permit taken

On the high vessel of Fertilizer plant an eagle laid the eggs. The bird was not allowing anyone to approach near. Breakdown maintenance was scheduled on one of the pipes coming out of the vessel, but no operator or technician was ready to move to the top. Top management decided to kill the eagle (action error). Security guard was instructed by security officer to climb the tower (selection error) and shoot the eagle (selection error). No permit related to work at height was taken (communication error). Also, no prior check of the gun was done (checking error). Security guard went to the top and fired at eagle. Eagle flew but returned in the mode to attack. By then the security guard, was loading the gun. Unfortunately, while inspecting, the gun was fired accidently because it had a loose spring (checking error). Security guard died immediately, it took 5 hours to bring the body of security guard down from the high tower.

## Analysis

Communication loses its effectiveness if the procedures are not communicated properly and also if there are no cross checks. Here a person was sent to a place where only skilled people are allowed and that to with the first time with a tool which not properly inspected. It seems that safety is only a lip service.

## Discussion

Aforementioned are some of the fall outs in the established PTW systems in different organizations. As per Guidelines defined and standard procedures, all the precautions were recorded on paper and the PTW format even with the adequate resources available. Yet something created a trigger among different professionals to obfuscate the system in one way or the other. PTW system generally refers Risk Assessment(RA) document and Job Hazard Analysis(JHA). RA and JHA are generally prepared by the multi-disciplinary teams. It may happen that the RA and JHA captured only soft controls but not the hard controls. There could be a possibility that JHA exercise prior to issuance of PTW became another document generation activity. So, it created a situation that JHA and RA remained parallel exercises and not interlinked. This was the reason of creating further confusion. Even though the documentation and record update was up to date, its execution remained poor.

Human errors can be identified and predicted by various methods. These methods can be used to identify and evaluate human errors in the design and manufacturing, operations, and maintenance of systems and tasks' duties. Potential errors, probability of errors, consequences of errors, and techniques to reduce and control errors are outputs of human errors identification and prediction techniques.

PTW system was also existent in the Occidental Petroleum's Piper Alpha offshore platform and was suggested for improvement following the investigation. In the Piper Alpha oil and gas production platform explosions and fires aboard the oil and gas production platform in the North Sea claimed lives of one hundred and sixty-five (165) of the two hundred and twenty-six (226) persons on the installation and two of the crew of a rescue craft. The death toll was the highest. Similarly, on the Tuna platform in Bass strait fore broke out as the work was being carried out on a main oil line pump and associated valves. Four persons were injured. Deficiencies in the work permit system were identified as a major factor in both the piper alpha disaster and the Tuna accident.

It is important to note that workers are key elements of transformation in any organization towards safety management systems because they are continuously exposed to hazardous conditions even at an edge of an accident. Their specific engagement is an important tool to take a detour from preventing an accident to occur. It is important to infer that the safety management system will not work through written policies, plans, procedures and processes to reduce risks and hazards but through the behaviors of the engaged workers with the safety systems and its practices. In human performance theory, mission, goals, policies, processes and programs (i.e. safety management systems components) have latent organizational weaknesses that could rise to flawed defenses and error precursors within organizations (Reason, 1990, 1997). When accidents occur and investigations centers around the enquiry from workers. This inquiry focus most likely leads to the often quoted and misapplied statistic that the vast majority of all accidents are caused by unsafe acts (i.e. human behavior).

Human interface in PTW system is an area which creates a ground for mis-communication instead of effective communication. PTW system was designed to be an effective tool, but incidents do happen under the permit to work. If planning is so perfect, then why an incident happens? Defenses-in-depth are a mixed blessing. While they greatly reduce the likelihood of a bad accident, they also render the system as a whole more opaque to the people who manage and operate it (Rasmussen 1993). The complexity and tight coupling of complex, high-tech systems not only makes them opaque to the operators, but also make it almost impossible for any one individual to understand such a system in its entirety (Perrow 1984).

It becomes difficult to understand as to whether the various flaws that were observed in various cases happened due to bureaucratic instructions and worker behavior influenced due to error under stress or violation under disappointment. Nearly all errors are unintended, while most violations involve a conscious decision to depart from standard operating procedures (Reason 1990). Also it must be understood that the trend of the confused job outcome through these Jobs under permit happened in the companies which claimed to have a 'safety culture'. Uttal's (1983) definition of safety culture captures most of its essentials: 'Shared values(what is important) and beliefs(how things work) that interact with an organization's structures and control systems to produce behavioral norms(the way we do things around here)'. The literature suggests at least two ways of treating safety culture: something an organization is the beliefs, attitudes and values of its members regarding the pursuit of safety, and as something that an organization has the structures, practices, controls and policies designed to enhance safety.

In all the above cases, an important connection is safety officer who is influential in driving the culture of safety within an organization. But this condition of push-pull fails because of human element involved. Behavior of a safety professional changes in the group dynamics. Only his positive attitude can withstand the behavior and performance of group towards safety. But is he successful in pushing such a change? The answer to this is not affirmative while interviewing with them.

Taking a detour to the behavior of a driver (human) driving a vehicle (system). Even if he is instructed to wear the safety belt(training) for his personal safety, he wears it not on purpose of being safe but when he never understands the inherent issue of safety. There are two behaviors observed in the driver driving the vehicle. First, when you call him often, he never picks up phone citing the reasons that he is driving the vehicle (outcome of training). Yet this behavior changes, when he receives some phone of his selfish interest. He not only picks up phone but he chats in an environment while driving the vehicle (change behavior). Now, this change behavior can lead to an accident as this is not a safe practice (illegal and unsafe act). This becomes a safe practice, if he stops the vehicle at a point and take a call (Legal and safe act). This becomes possible, if there is an appropriate planning to control such acts by virtue of appropriate planning (Management of change). Suppose, this same driver is asked to climb down again and again (repetition) to ask the address of the destination. There is observed another change in the behavior and that is he will prefer driving the vehicle without the belt for some time (stress) till he knows the actual way to the address and drive continuously (comfort zone).

In two different industrial organizations, wherein there is a great difference about the culture, there are solutions inherent to capture the human behavior and related stresses arising out of the same. In an MNC setup, where the culture of safety is quite old in the parent organization but it is customized as per local conditions, there are areas of concern to be addressed and so is approach towards them. This fact doesn't state that such a condition helps the stoppage of failure of systems at times. There may be other reasons for the stated conditions. That can be looked into later. But these things do not get easily addressed because safety systems are evolved in due course of time. During this new process of evolution, the human interface poses a problem that is not so easy to be addressed. This leads driving safety to a problem as was discovered during the process of the interview of safety officers.

The inquisitiveness arises what makes human mindset un-safe? Even equipped with education and money, yet something in the human mindset makes him or her act in not so safe practice. It has to do with the thought process because thoughts lead to action and action leads to habits. So, habits have the root cause in the mind set. What makes human mindset in certain situations so different?

In almost all scenarios, whenever a new concept is brought forth, it is resisted by negative. It might be when we were kids whenever we demanded something that was over ruled. Just as a kid asks for an ice cream, he is denied saying that he needs more of iron through green vegetable, rather than ice cream. This practice of denial keeps on the long run. If he wants to be a painter, he is told to be an engineer. If he says no, then he is cursed as if he is fit for nothing. Repetitive attack from negativity makes a human mind in certain situations full of Naysayers. This makes an impact when equipped with knowledge a person enters the industry and has to unlearn un-safe acts and practices to learn new systems and procedures. This creates a stress like situation in the human mind. He may behave well in certain conditions but he remains under stress. During this process of his staying in the hazardous conditions, he finds ways to de-stress himself. Thus on one side he learns about Compliances but his attitude remains towards noncompliance. Naysayer remains subordinate to the actual conditions. It is like a situation, when a person who enters the company's premises, he enters with an induction wherein if he rides a vehicle, he has to wear the safety belt and follow the defined route with lots of controls and monitors. This situation is stressful for the person. The moment he comes out of the company's premises, he heaves the sigh of relief while opening his safety belt.

Let us see another case on roads in certain countries. Herein, the regulations direct people to wear safety belts while riding the four vehicles and safety helmets while riding the pillion riding(Legal). This is beside lot of awareness in the media regarding the individual safety. Yet this act is completely not understood as to what prompts the responsible citizens to be un-safe while avoiding the regulations. This behavior however changes, if there are penalties being imposed at certain section of the roads by the traffic cops(enforcement). Is it on the belligerent note or negligence towards safety? There is another situation arising when driver is driving a vehicle without wearing a safety belt (unsafe act), the car beeps continuously (Engineering control). This stops when he wears the belt (safe act). Or the vehicle goes beyond a certain speed limit (unsafe condition), it again beeps (safe condition). This makes driver to slow down the speed within the recommended speed.

Analogies are taken in reference to Human behavior on

roads to understand the potentiality of an industrial setup. This is merely an effort to make things simple and zero in the exact problem of this typical unsafe behavior in the certain scenarios.

Another point is the ownership. Behavior of driver changes when he drives the vehicle owned by him. If he drives the vehicle as an employee under a contract, he is lax in his attitude towards vehicle's safety and personnel safety. This type of behavior is also observed among employees even in company's premises. Professional working under hazardous conditions in the plant premises also falter due to their respective lax attitude. This laxity not only is observed from being inexperienced but also from being over-experienced. At times, over confidence create miseries of sorts. Ownership also changes the human behavior towards safety of self and others.

Though there is enough emphasis upon training and awareness but this is not making any headway. Even after training and awareness, there are attempt by various individuals in their respective capacities towards adventurism leading to unsafe behavior. An attempt to measure and decipher the understandability of these training and awareness is a major gap. Records are generated to the satisfaction of the safety professionals but proactive effort to understand the effectiveness of the said training is missing. Even in an industrial setup wherein there is a presence of procedures, the same remain half understood by professionals. So what is being preached is not related to the written procedures. Then what is conveyed is also not understood. So a complex web of understanding and understood leads to a gap. Accidents in major industries in oil and gas sectors have a culture of training prevalent to a large extent.

Intellectual understanding from professionals have addressed the soft controls in the various risk assessments. Prevalence of gadgets and IT systems have not addressed the effective communication part. There is an absence of feedback mechanism and confinement to the safe zone of virtual world. So, the safety has become confined to documents which remain unapproachable to the workers at field. Field systems of safety do not work upon the thought pattern of workers. This creates a wider gap in an area of effective communication. How to address this gap is a challenging work in the present work environment?

These problems are assumed to be prevalent all over the world. This gets evident from the major disasters in the companies worldwide. However, the Multinational organizations who had set patterns in safety and who customize to the respective local work conditions and culture do achieve the results faster because of the hard controls already established in their respective organizations. This seems difficult in the Indian organizations wherein systems are being evolved after learning from others and lateral professional thought processes. Major disasters in the Indian oil and gas companies dominated by the PSUs lead to this introspection. These Indian organizations have robust safety procedures and defined systems yet the incomplete loop of various elements of safety management systems has led to the disasters.

Bureaucratic Indian mindset creates a further complicity. It is like Vedas un-deciphered and confined to caves. Big volume documents addressing something which has no direct relationship with the activities in field compounded with ineffective communication has led to a situation which must be understood as a whole. Perhaps the root cause is deeply psychological and sociological. Some typical ideas that we hear and activities that we do from childhood can be the contributor to this thought process:

- 1. Life is eternal (soft approach to understand life)
- 2. Everything is evanescent (this too will pass away)
- 3. Bowing to elders without consideration (a psychological cowering towards seniors)
- 4. Competitiveness to prove one's worth (Rote without learning)
- 5. Avoiding an inquisitive mind (Accept without questioning)

These all activities lead people not to question the existing conditions and actions. Whether the conditions and activities are safe? Whether they can be improved if seen from another viewpoint? If there are no such checks and balances, thought process remains devoid of ideas. Ideas infuse a challenge to the existence. Any new revolution was once an idea. So if ideas are not allowed and new thoughts processes are not promoted, then checks and balances remain driven by individual fancies and experiences. Interpretations become an art instead of science. Different patterns will emerge within the organization that will become like small whirlpools in a big ocean. Since safety is a system driven approach, no concrete structure emerges in the organization. Safety remains the most talked about subject and confined to papers in various documents.

It ultimately comes down to an effective communication. Just take it to the roads. Everyone all over the world stops at Red signal and moves at Green signal. It is learnt by observing and following. No big procedures but simple instructions only that to learnt by observations and practice. Mind grasps things easily if the things are simplified. Simplification delivers clarity and thereby understanding. Perhaps safety is too complicated for the Indian mindset because of bureaucratic approach.

Definitely systems may produce barriers for safety regulation but Enforcement is another drive. Enforcement inherent in the safety systems can drive things to some extent. This enforcement needs to be implemented globally but this is a difficult proposition as countries find to arrive at a single viewpoint on safety. Hence, mandate was given to ILO to develop Guidelines for general directions. Enforcement will be successful if it is led by setting an example. Humans adjust to a certain set pattern and develop a habit to be convenient.

There appears a strange thought process "Nothing will happen to me". This thought process get a jerk when humans learn by self experience on negative things. A father is protecting a child from the doors edge by putting his palm to protect an injury to his head. He learnt it the hard way. The there is no focus on an outcome, hence this learning remains poor till an injury inflicts the wound. This stated thought process as if nothing will happen to me is either due to laziness to adopt to change or resistance to change. There can be a spiritual connotation which stresses more on Death and pain. Cultural up-bringing by continuous focusing on negativity and denial can lead to this negative thought process. Resistance to change may happen due to rebel behavior.

An important fact is that we do are not ready to listen to unpleasant truth. Term policies in Life insurance are not popular because they do not return money and then it reminds the financial benefit only after death (unpleasant truth). There is no glamour in life, whatever are the facts which lead to one truth. Dutch Philosopher Soren Kierkegaard, Danish Christian philosopher and theologian said observed - How close men, despite all their knowledge, usually live to madness? What is truth but to live for an idea? When all is said and done, everything is based on a postulate; but not until it no longer stands on the outside, not until one lives in it, does it cease to be a postulate (Dialectic – Dispute; Journals of Søren Kierkegaard 1A75, 1835).

## References

Reason, J. (1990). Human Error. New York: Cambridge University Press.

Reason, J. (1995). Comprehensive Error Management in Aircraft Engineering: A Manager's Guide. London, Heathrow: British Airways Engineering.

Reason, J. (1997). Managing the Risks of Organizational Accidents. Aldershot: Ashgate.

Reason, J. (1998). Achieving a Safe culture: Theory and Practice. Work & Stress, Vol. 12, No. 3, pp. 293-306.

Reason, J., Parker, D., & Free, R. (1994). Bending the Rules: The Varieties, Origins and Management of Safety Violations. Leiden: Rijks Universiteit Leiden.

Barry, B. (2002). Culture and equality: An egalitarian critique of multiculturalism. Harvard University Press.

Hosseini, A. H., Jafari, M. J., Mehrabi, Y., Halwani, G. H., & Ahmadi, A. (2012). Factors influencing human errors during work permit issuance by the electric power transmission network operators. Indian Journal of Science and Technology, 5(8), 3169-3173.

Hoboubi, N., Jahangiri, M. & Keshavarzi, S. 2014. Quantitative Human Error Assessment Using Engi¬neering Approach in Permit to Work System in a Pet¬rochemical Plant. Iran Occupational Health Journal, 11, 1–9.

Jahangiri, M., Hoboubi, N., Rostamabadi, A., Keshavarzi, S., & Hosseini, A. A. (2016). Human error analysis in a permit to work system: a case study in a chemical plant. Safety and health at work, 7(1), 6-11.

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