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A Shortcut to Prevent Accidents for Traditional Industries

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Abstract

This paper points out the importance of the near miss management in prevention of accidents; its advantages, elements and implementation as a tool for HSE management through analyzing the situation of HSE risk management of the grass-roots organizations; the viewpoint that making full use of the near misses to reduce accident rate is a shortcut for the time being and the near miss management practice provided to support the point of view.

Keywords

Near Miss, Grass-Roots Organizations, HSE Risk Management

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1. Introduction

A near miss is an unplanned event that did not result in injury, illness, or damage – but had the potential to do so. Only a fortunate break in the chain of events prevented an injury, fatality or damage; in other words, a miss that was nonetheless very near. KDSB [1] defines the near miss as that potentially significant event that did not occur due to prevailing conditions, but could have resulted from a sequence of occurred events. What should be done with the near miss? "Safety Pyramid Model" states that for every fatality accident there are hundreds of near misses and minor accidents with limited impact [2]. Therefore, it has been recognized that by focusing on near misses and minor accidents it is possible to reduce the probability of having major accidents. In fact, the near misses are warnings of potential accidents to come, they may act as harbingers of doom and destruction. If taken seriously, essential lessons can be learned from analysis and many heavy accidents avoided; otherwise, dooms and destructions will be followed. Therefore, it is a shortcut to reduce accidents rate effectively by making full use of the near misses especially for organizations which are not good at modern HSE risk management techniques.

2. The Modern HSE Risk Management

The core of a HSEMS (Health, Safety and Environment Management System) is HSE risk management, which aims at accident-prevention. In general, the activity of HSE risk management can be carried out in the following three main steps [3]. The first step is the hazards identification, the hazards lying within the project or activity must be found and identified as completely as possible to avoid accidents. The second step is the evaluation of risks and effects of the hazards. All the identified hazards must be evaluated against screening criteria in order to select out those needed to be controlled and arranged by priorities order of risk. The final and third procedure is the risk control which is divided into two parts, the first part is the risk-control measures, measurements are taken in concrete term with situations. The second part is the application of those measures. During this procedure,

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participants should be trained or communicated during the project. Through being trained, they will be aware of the risks and the risk reduction measures to control the hazards, thus accidents will be prevented. The above procedures are quite scientific and reasonable, most accidents, if not all, can be prevented at least in theory. But, in fact, the result of the modern HSE risk management is not so encouraging in many grass-roots organizations of our company, because accidents happen as ever before even though the modern HSE risk management has been implemented for many years.

3. The situation of HSE Risk Management in Most Grass-Roots Organizations

Just as the above statement, through making use of HSE risk management, most accidents can be avoided or at least reduced to a low level. Unfortunately, the HSE risk management in most grass-roots organizations of our corporation under current situation does not serve the anticipated purpose. In comparison with the traditional safety management, the modern HSE risk management technique is newly emerging and not well mastered by the grass-roots organizations safety managers, the low cultural quality of the workers in grass-roots organizations makes it a bit difficult for them to apply the theory in their daily work; worsen than that, they are reluctant to do so due to their weak safety knowledge. Owing to the low safety knowledge of managers of the grass-roots organizations, they think little of safety management, let alone the newly emerging thing, the modern HSE risk management which is quite strange to them[4]. All the above reasons lead to the HSE risk management being flashy but lacking substance in many grass-roots organizations of our corporation. In fact, in order to prevent accidents from happening, the identification of hazard is quite important, only after the potential hazards lead to the accidents have been found out, will it be possible to work out the corresponding risk-reduction measures and take them to prevent accidents from happening. Therefore, before the beginning of a project or an activity, the hazards lie in the project or activity must be identified through hazard-identification activity, and the potential hazards should be found as completely as possible in order to find out the very potential hazards lead to the accidents. Unfortunately, due to the above reasons, instead of finding potential hazards as completely as possible, only a few seeming hazards which are quite limited in number are put forward to meet the requirements perfunctorily. Due to the reason that most of the potential hazards within a project or an activity are not found, the very hazards lead to accidents will thus be missed in this way. If so, it will be meaningless to continue the HSE risk management procedure with the hazards which unlikely lead to accidents. Besides, the risk evaluation technique is even harder for the grass-roots organizations to handle which make the HSE risk management even more difficult.

Due to the reason that the potential hazards can not be found as completely as possible, problems can not be solved easily and rapidly. Is there any method to find the most possible potential hazards lead to accidents? The answer is affirmative; the way is the management of near miss, because most of the very hazards lead to accidents can be found out through analyzing the near misses. According to “Safety Pyramid Model”, near misses often precede loss producing events but are largely ignored because nothing (no injury, damage or loss) happened. Employees are not enlightened to report these near misses as there has been no disruption or loss in the form of injuries or property damage, besides, the near misses are by no means the things to show off. Thus, many opportunities to prevent accidents that the organization has not yet had are lost. History has shown repeatedly that most loss producing events (accidents) were preceded by the same kind of near misses, because the hazards lead to accidents are the same as those lead to the near misses. Therefore, through recognizing and reporting near miss, the hazards lead to accidents can be avoid, if the measures are worked on and put in practice, many accidents can thus be effectively prevented.

4. The Near Miss Management

The near misses is not only a shortcut for those poorly-done in risk management but also helpful for those well-done in risk management.

4.1. Application in the Poorly-Done Risk Management Grass-Roots Organizations

Just as the above statement, near misses are the kind of matter that happens without leading to any serious consequences. The hazard leading to a near miss may also lead to a catastrophe of the same kind, the only difference between a near miss and a heavy accident is its consequence (fig. 1). It can be explained in the following example. Workers in high platform should be equipped with safety belt in case of fall, but in some poorly managed work sites, workers without safety belt can still be spotted from time to time. During work, they may fall due to their gravitational potential energy. When an employee is fast enough to grasp something around him and prevent the fall, the phenomenon is called a near miss which is shocking but without serious consequences. Just because the result is slight and that it may not cause lots of attention. If everything remain unchanged, this situation is quite likely to happen again. If the accident litigant is

unfortunate, he might be dead or hurt badly, which is called a fatality accident. From this example we can clearly see that the hazard causing falls from a high place is the gravitational potential energy, but the result is quite different, i.e., one just got a shock but the other lost his life. In addition, the result is unpredictable. Therefore, in order to prevent such catastrophe from happening, we should pay attention to the near misses ever to happen. We can learn from the hazards which lead to the incident just from analysis of a near miss, then work out the corresponding measures and put them in practice.

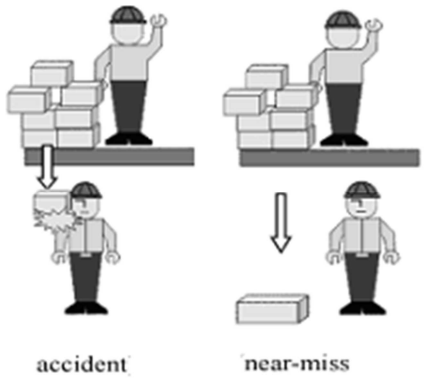

Figure 1. The Difference Between an accident and a near-miss.

Just as the above statement, the second step of the HSE risk management is the risk evaluation. After the hazards are identified, they should be evaluated against screening criteria. There are two essential factors used to assess the risk of the hazards identified from the first phase, one is the possibility of the hazard leading to an accident, and the other is the severity of the hazard leading to an accident. Because this kind of near miss has already happened, the possibility of this kind of the hazard leading to a near miss or the same kind of accident is quite high in this kind of grass-roots organizations, and is 100 percent in the very grass-roots organization. As for the severity of the hazard leading to an accident, it may be very slight, such as the near miss itself, it may also be quite serious and lead to employee deaths or great property lost or environment disaster, this is the reason why we try to prevent the near miss from happening again. From this point of view, the severity of the hazard leading to an accident should be considered as much serious. Therefore, the hazards found in the near miss have both high possibilities to cause an accident and high severity of accident once happened, i.e., the risk of the hazards is quite high. In this way, the hazards found in the near miss are all those needed to be controlled without being further evaluated. It saves the grass-roots organization from the risk evaluation work which is even poorer than hazard identification for the grass-roots organizations. Without racking brains or learning anything new, we should pay special attention to every near miss ever to happen, identify and analyze the causes then take measures to prevent it from happening again.

Compared with HSE risk management, effectiveness is another advantage to do HSE risk management by making use of the near miss. Just as stated above, due to the fact that many grass-roots organizations are not good at HSE risk management for the time being, great reduction in effectiveness of the HSE risk management leads to a result that does not serve the anticipated purpose. While through analyzing the near miss, the hazards lead to the near miss can be easily found, the corresponding measures can also be worked out, and the same kind of accidents can certainly be prevented if the corresponding measures are put into practice. Just as the above example, after the near miss (near falling-down) happen, through analyzing the hazards (gravitational potential energy) causing the near miss was found, if corresponding measures such as wearing safety-belt while working at height was taken, then the same kind of accidents (falling-down) would be prevented from happening again. In a word, near misses are smaller in scale, relatively simpler to analyze. Thus, capturing near misses not only provides an inexpensive means of learning, but also has some equally beneficial spin offs. In fact, it is quite easy and simple to prevent accidents from happening by making use of the near miss management, because no newly emerging things or new concepts are involved in the procedure compared with the modern HSE management technique. The grass-roots organizations should regard the near miss as an accident with serious consequence and learn lessons from it through analysis after it happens.

4.2. Application in the Well-Done Risk Management Grass-Roots Organizations

In addition, even those who do well in HSE risk management can also take the near miss as an opportunity to improve their HSE management. Although the label of 'human error' is commonly applied to a near miss, a faulty process, system invariably permits or compounds the harm should be the focus of improvement. The hazards that caused the near miss are subjected to root cause analysis to identify the defect in the system that resulted in the error and factors that may either amplify or ameliorate the result. Through the root-causes found by analyzing the near misses, the HSE management can be improved in this way, not only the near miss itself and the same kind accidents can be prevented from happening again but nearly the same kind of accidents can be prevented. If so, the HSE performance will be thus improved. Besides, one of the primary workplace problems near miss incident reporting attempts to solve directly or indirectly is to try to create an open culture whereby everyone shares and contributes in a responsible manner. Near miss reporting has been shown to

increase employee relationships and encourage teamwork in creating a safer work environment [5], it provides immense opportunity for "employee participation," a basic requirement for a successful HSE management. This embodies principles of behavior shift, responsibility sharing, awareness, and incentives.

5. The Practice of Near Miss Management

The near miss management is now accepted by our companies little by little after they come to know its benefits. In fact, the near miss management has already been quite popular at abroad.

5.1. Practice in China

In the past, the near miss management was not popular in China. For the near miss is by no way a proud matter, its consequence is small enough to be unnoticed, in a way that whenever a near miss happen, it would be covered quickly in case it may be revealed, let alone be shared actively with others. But through the near miss management practice, many organizations found it quite useful tool in accident prevention, and they have begun to share the near misses within their own enterprises in order to make full use of it. In fact, to prevent accidents through near miss management is not only effective but also quite easy and feasible; therefore, it is especially useful for those who are not good at modern HSE risk management technique. One of the enterprises of our CNPC (China National Petroleum Corporation) even put forward such a new concept as a gift from the GOD. It is said to be a sign of warning from the GOD when a near miss happens in a grass-roots organization or when it frequently happen within an enterprise. If the manager is wise enough to accept the signal and take the near misses seriously, the heavy accidents caused by this kind of hazards can be thus avoided. Otherwise dooms and destructions will be followed in the end. As for why its called a gift, the reason is that the consequence of a near miss is quite slight, in terms of human lives and property damage, near misses are cheaper, zero-cost learning tools for safety than actual injury or property loss, besides, it can act as a harbinger to warn people to prevent the coming of doom and destruction. Could it be called as a gift? In order to prevent the near miss from happening again, they institute teamwork training, feedback on performance and a commitment to continued data collection and analysis. In order to do so, they set up the platform to share the near misses happen within the enterprise and encourage employees to report the near misses happen in their daily work. With the resource, they take measures to prevent the same kind of thing from happening again; they try to find out the root-causes of the near miss and to wipe out the fountainhead by improving the HSE management. Now the enterprise has made great progress in HSE management and accident rate has been lower than ever since then.

5.2. Practice at Abroad

In fact, as the useful accident resource, the near miss has been made use for quite a long time in Europe, US and many other countries. In the United States, the Aviation Safety Reporting System (ASRS) has been collecting confidential voluntary reports of near misses from pilots, flight attendants, air traffic controllers since 1976. The ASRS identifies deficiencies and provides data for planning improvements to stakeholders without regulatory action. Some familiar safety rules, such as turning off electronic devices that can interfere with navigation equipment, are a result of this program. Due to near miss observations and other technological improvements, the rate of fatal accidents has dropped about 65 percent, to one fatal accident in about 4.5 million departures, from one in nearly 2 million in 1997[6]. In addition, the near miss Registry is a risk free, anonymous reporting tool for near misses in Internal Medicine of US. This tool collects information about both near miss medical errors and the barriers that kept these errors from reaching patients. In the United Kingdom, an aviation near miss report is known as an "airprox", by the Civil Aviation Authority. Since reporting began, aircraft near misses continue to decline [7]. CIRAS (the Confidential Incident Reporting and Analysis System) is a confidential reporting system modeled upon ASRS for use in the Scottish rail industry at the beginning, and it has been spread throughout the whole UK rail industry afterwards [8].

6. Conclusion

The near misses are warnings of potential things to come, they may act as harbingers of doom and destruction. It is a shortcut to reduce accident rate effectively by making full use of the near misses especially for those who do not know well how to manage HSE risk with the modern HSE management technique. Furthermore, a near miss can also be taken as an opportunity to improve HSE management based on a condition or an incident with potential for more serious consequence. In this sense, it can be used to improve HSE management universally.

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