

Risk Management Praxis In Engineering Industries.

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Abstract: Engineering industries from time-to-time is learning about risk management as much work is accomplished in mitigating the impact of the risk. None of these control procedures are absolutely new to these industries but a repetition is said to be for emphasis. Hence, the process of risk management commences with the ability to identify all possible risks and their impact because you cannot fight what you cannot see. This is followed by accepting the responsibility of confronting these risks before it reaches its peak level. This is why it becomes imperative to be acquainted, comprehend the praxis of risk management. The study seek to identify these risks, analyse an effective and effective risk control measures, utilise the opportunities hidden within these uncertainties while a same time minimise the impact of risk. It's a generally knowledge that risk management is the sole responsibility of both individual and the organisation and most of these control measures are acceptable to industries. In my opinion, such acceptable level of risk mitigation is the definition of an individual or the organisation because you or the organisation determines the level of risk to bear or accept.

Keyword: Risk, Risk management, Risk personnel, Mitigation

1. Risk Management

Risk is defined as the possible (conventionally, usually negative) impact of an event, determined by combining the likelihood of the event occurring with the impact should it occur. Risk management is the understanding, identification, appraisal, and prioritization of risks accompanied by organised technical or economical resources to minimize, monitor, and control the likelihood and/or impact of the uncertainty and maximize the opportunities hidden [1,2]. Simply, is the acknowledgement that a challenge or problem might occur at time't' (sec). Good and adequate risk appraisal, maintenance and management algorithm may to great level contribute of about 92 – 96% safety of maintenance/risk personnel, machine or equipment in use, quality of products and most importantly the operators. The intricacy of industrial machine that is to be restored to its good working condition, to be operated or possibly serviced, risk that may be associated during machine failure or in motion and intense time constrain frequently pose as a challenge to risk person, all make maintenance difficult. In the world of engineering repair, maintenance, uncertainty can be numerous. These uncertainties may directly or indirectly reduces efficiency or quality in judgements. These uncertainties can be in the form of the following; extend of damages that occurred; level of work to be carried out; cost of breakdown and the time needed in restoring these equipments to its good working state. This study is aimed at analysing the engineering in the context of the unknown; assessing the suitability of an effective risk monitory, control and the risk of negligence; utilizing opportunities of uncertainty in engineering industries and to identify, evaluate, minimise the impact of risk.

2. Scheduled Risk, Its Opportunities and Outcome

Maintenance in engineering industries has always been a non-negotiable and essentially important as a result of the rise in the cost of industrial equipments, machineries and infrastructures, that make planned risk inevitable in reducing the cost of maintenance, increase in production output. Effective risk schedule involves an aggressive and early identification of these risk triggers through collective efforts of relevant risk personnel's involved in establishing a minus-zero tolerance to risk triggers. It involves figuring out 'what' to be done about and 'how' to go about each risk before occurrence and possible 'ways' to develop a favourable scheme in increasing the efficiency of the equipments. An organised planned risk helps in updating the risk registers (maintenance and control measures); proper assessment of the effectiveness of risk plan and its control measures; adequate contingency plan for residual risks that may not be eliminated completed; it enhances good judgement in recommendatory and progressive action plan; consciousness of compliance to international standard is not left from the lists and above all 90 – 95% safety of personnel.

3. Qualitative Risk Evaluation and Control

Risk can be better evaluated based on the information that were generated by the risk identified and analysed [3] in order to make judgement on whether each risk plunges within an organisation's risk performance evaluation and treatment. One major aim in risk management is to understand, analysing and addressing risk to prevent operators from been exposed to occupational/technical risk and identify potential opportunities that may be obscure within the challenges [4]. There are several procedures in mitigating or controlling risk, some procedures may be cheaper than the other; some are more efficient and effective than the other but a combination of these control procedures or measures gives better and safer work-environment for the risk personnel than solely depending on one procedure or measures. The risk assessment procedure can best be illustrated in the Figure 1 below.

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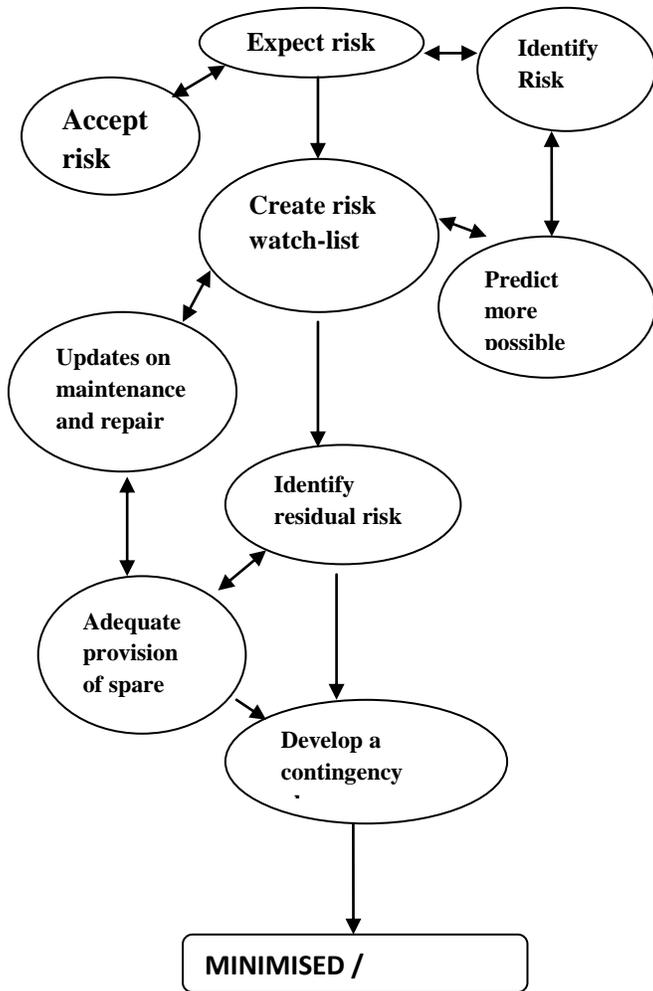


Figure 1. Risk management process chart

Risk personnel should be conscious to the fact that every part of a mechanical equipment, machineries is a potential or susceptible/triggers to injury at any time and it is of great important for risk personnel to be conscious that there are unforeseen challenges to battle with, this give rise to be expectant and heartedly accept it (attitude is everything in handling risk). From figure 1, each processes dependent on other process in ensuring better risk management. Effect risk management should include the following:

- **When (Accept risk)**

The risk or maintenance personnel should always be at alert and expectant of the probability that it'll occur. He/she should be able to predict the part of equipment that may be susceptible to risk next and make contingency plan toward mitigating it to mollify the stress of breakdown maintenance. A risk response should include the strategy and action plan to address it. Risk can be avoided (do something to eradicate it), transferable (involve a skilled, semi-skilled or unskilled personnel) and mitigated (take necessary control measures to lessen the impact or chances of occurrence)

- **How Frequent (Predict more possible risks)**

This indicate the degree or rate at which breakdown of machine occurs. It also indicates how often a machine is used in the course of production and the likelihoods of breakdown either frequently or occasionally.

- **What at Stake**

It signifies the intensity of machine breakdown (high, medium or low) that is at stake. It connote the level of work to be carried out (skilled, semi-skilled or unskilled labour), time taken for repair (days, weeks or months) and cost of repair. In the process of mitigating the effect or intensity of machine breakdown, it's of important to employ a contingency plan and adjust where necessary; monitor residual risks; creating a standard and comprehensive database of risk data; update the maintenance activities done on the industrial equipment before progressing on a new risk

- **Areas to look Forward to (Risk watch-list)**

It entails looking out for all possible risk triggers or areas of consistence occurrence of risk triggers, identify these areas, give appropriate control measures and report to the superior personnel for adequate attention. Look out for abnormal sounds from the equipment in motion, over-heating in the equipment as a result of shortage in lubricating oils, vibrations and olfaction.

- **Residual risk**

Residual risk is risk that is left after risk measures has been carried out. The level of risk that may be tolerable should be put into consideration to guarantee that the sum of residual risk is acceptable. If not, an additional risk measure may be carried out further reduce the risk. Residual risks are generally evaluated similarly the way as the initial risk is evaluated and controlled. The major difference is that there is need to take into consideration the influence of measure (and other control measures), so as its likelihood of accident is reduced drastically and decrease the impact.

- **Contingency**

Contingency plans are generally develop or pre-determined action plan from an identification of risk. It's commonly known as a plan 'B' agenda. Maintenance personnel, contractors, managers are easily and emotionally carried away with the investment profits that may results from the plan A, as a result are poor encourage to venture into plan B. The conception that there are low likelihood of risk occurring has made risk managers, contractors do handle contingency planning as activity that do not require immediate attention [5, 6]. The following are technical question that will aid you when developing a contingency plan.

- ✚ What will explicitly cause you (source) to implement it?
- ✚ What action must be taken when it occurs and when?
- ✚ Who should be responsible in handling it at that stage?
- ✚ Are the crews provided with initial and adequate training on the plan?
- ✚ How do you manage the risk?

It is imperative to ensure that the plan should be kept simple, clear as possible for better understanding and implementation.

- **Possible way out**

The major and possible solution to these afore-mention factors is before it occurs. Over 60 – 80% of accidents that occurs in the field can be attributed to either improper maintenance of industrial equipments or use of equipments. It can be better controlled administratively by training and re-training of risk personnel. Risk personnel should engage intensively on periodic maintenance (it's a time-based

maintenance which consist of inspection, servicing/lubricating and cleaning of equipments) with the sole aim to disclose areas in need for repair, change, tighten, lubricated before breakdown occurs. It is of great important to also note that Corrective maintenance of industrial equipment should be a 'NO' option, if possible the last but unthinkable option.

4. Stages of Measures for Risk Management

Stages in risk management are a system used in major safety industries to minimize or eliminate it from the grass-root. It is a generally accepted system and promoted by most safety industries. This concept is encouraged, taught and promoted to managers, safety crews as standard practice in field of profession. Several illustrations have been useful to portray these stages. Figure 2 shows a brief summary of stages of measures in risk management.

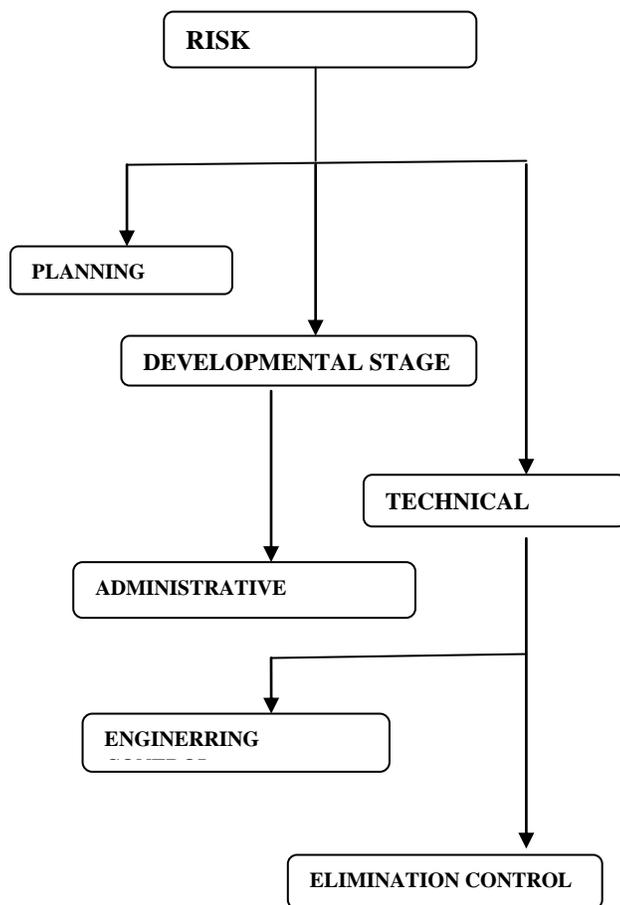


Figure 2. Stages in Risk Management Chart

4.1 Drawing Stage

The drawing stage in risk management commences the very moment a project (purchase, repairs) has been officially approved and possibly funded. It will interest to note that risk in any engineering industries is better minimised or possibly eliminated from the drawing stage. Take for an instance when purchasing industrial equipment, such equipment should exhibits the following characteristics features:

- ✦ It should conform to national or international safety standards

- ✦ Safety should be prioritized when purchasing an equipment and not the cost
- ✦ Proper and adequate technical manual and personal protective equipment (PPE) accessories should be provided along side with the equipment in question
- ✦ Operators should be properly trained before operating on the equipment

4.2 Developmental Stage

At this stage in risk management, the administrative arms controls and direct in risk mitigation. They are will power, policies makers, guideline that governs the all-encompassing condition for any organisation. In risk analysing, monitoring and control, professionalism and standard work ethic are important assets of any industry. They are saddled with the following responsibilities in risk management;

- ✦ Training and re-training of personnel
- ✦ Adequate orientation in operation and proper use of industrial equipment
- ✦ Ensuring an organised job rotation (working in a limited hours in a prone hazardous area)
- ✦ Ensuring a better working environment and
- ✦ Contingency reserves

4.3 Technical Stage

The third and most effective means of risk management is the technical stage. It is sub-divided into two parts namely; Engineering and Elimination control.

4.3.1 Engineering Control

In this stage, risk are not eliminated but rather isolate personnel from risk, however they reduce future risk implications [7, 8]. This implies changing a piece of equipment (proper machine guards) or work processes to impair the exposure to hazard. It involves an anticipation, recognition, assessment and control measures at the infant-stage such as ensuring a proper use of the Personal Protective Equipment (PPE) such as safety wears protective guards on the equipments.

4.3.2 Elimination Stage

In this stage, risk are identified, analysed, minimised and eliminated. The major difference with this stage from engineering stage is on its capacity to not only isolate personnel from risk but also to eliminate such risk. All these stages are generally acceptable in mitigating risk in order to achieve the acceptable level of risk management. In my opinion, such acceptable level of risk mitigation is the definition of an individual or the organisation because you or the organisation determines the level of risk to bear or accept.

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