Hazop Study In Lpg Installation In Process Industry

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ABSTRACT
Safety plays an important role in day to day life of human beings and to an environment. It has become a vital part in every Process Industry. In Process Industry each of the processes requires a heating source; Steam though mostly used is not hot enough for certain operations so Liquefied Petroleum Gas (LPG) is used largely in process industry mostly Steel Industry. The main objective of this project is to find out the realistic hazards in the industry and eliminate them at the design stage. Finally recommendations are made to eliminate such realistic hazards. Implementation of the recommendations given in this paper work may increase the overall safety of the industry. For systematic examination of realistic hazard and to eliminate them a powerful tool called Hazard and Operability (HAZOP) study is used. The project work focuses on using the Safety measures on improvement of health and safety in the workplace and also to make an accident free environment.

KEYWORDS: HAZOP, Process Industry, LPG Installation.

INTRODUCTION

The steel industry includes the several process in-order to make the stainless steel product. The process that involved are shown in the figure (1). Where Steel Melting Shop (SMS), Hot Rolling Mill (HRM) and Cold Rolling Mill (CRM) uses more amount of LPG for the process to carried. LPG is mixture of two hazardous ingredients so called Propane & Butanewhich makes LPG as highly inflammable for analyzing the hazards and danger associated with the LPG installation and to eliminate HAZOP study tool is used. The HAZOP study is a powerful technique and it recommended for prevention of exposure and protects humans, environments and properties.

Now-a-days safety is the challenging tasks in order to assessing the system prevent the employees from the hazardous words, Industrial safety is an primarily activity which is concerned with Reducing, Controlling & Elimination of hazards from the industries.

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Literature Review:

Sandeep Yadav [1] published a paper on the title Risk Assessment (HAZOP Study) Method for taking LPG from Dispatching Unit to Road Tanker. The use of LPG gas in industry now a days it replaced fuel such as coal, wood etc. It is used in different industry for various purposes such as in CNC gas cutting machine, Furness, paint shop, canteen, etc. To make this gas available in the plant transportation and decanting process is required, there is a leakage of risk and more risk of developing electrical charge in tanker which can be cause ignition source and due to this fire can take place. This fire can turn into Boiling Liquid Expanding Vapor Explosion (BLEVE). This would have different effect according to quantity of LPG in tanker. Major accidents occur in some cases and results in heavy property damage, loss of lives, harm to environment. For avoiding these accidents it is important to seek all risk related to operation so that suitable control measure can be suggested. In order of this hazard operability (HAZOP) study (risk assessment method) plays important role. The purpose of using (HAZOP) method to identify hazard and risk associated with decanting process of LPG in order to keep process safe.

Nan Bin Mad Sahar et al. [2] published a paper on the title HAZOP Analysis Management System with Dynamic Visual Model Aid. Confirming safe operability and diminishing risk is the key component to prevent negative impact in all industries dealing with toxic, reactive, flammable and explosive. Hazard and Operability (HAZOP), aunal and systematic methodology for identifying hazards has been unquestionably successful in reducing incidents by mitigating the consequence of major accidents in the industries. Though, laborious work, time and cost are the limitation in performing and maintaining HAZOP analysis. Many research works over HAZOP automation available yet the traditional approach is still widely used by plant workers as it covers all part and aspect of a precise plant area than generalizing to fit many plant types.

P. SUBBARAJ. [3] published a paper on the title Fuzzy Based Fault Detection And Diagnosis In Pneumatic Actuator In Cement Industry. Fault detection and analysis is an important task with increasing consideration in the academic and industrial fields, due to economical and safety related matters. The early finding of fault can help reduce or avoid system shutdown, breakdown and even disaster involving human fatalities and material damage. In fault identification, the differences between system outputs and model outputs are known as residuals, and are used to detect and diagnose faults. Computational cleverness techniques are being examined as an extension to the outdated fault identification and diagnosis methods. This paper suggests a fuzzy basedd manner for fault detection and analysis based on fuzzy classification approach. The real time statistics for pneumatic actuator has been obtained from a cement industry in normal and abnormal operating conditions. In this paper the proposed fuzzy architecture is able to detect the thirteen numbers of probable faults in pneumatic actuator for chiller water spray arrangement in cement industry, successfully when compared with Hazard and Operability (HAZOP) study.
Scope Of The Project:
The scope of the project includes reducing the accidents and incidents at process industry where very high hazard are present and to reduce the risk. The HAZOP is used to improve the operation and maintenance procedures, which will ultimately ensure safe and reliable operation of the LPG Installation.

Problem Identification:
Since LPG is used for many processes to carry on as mentioned above and which has high vapor pressure where Liquid LPG emanating from leaks will evaporate rapidly to form combustible mixture and the combustion range of LPG is 1.9-9.5% cause explosion by contact with ignition source and oxygen so it’s highly inflammable.

Problem may occur in the LPG Installation and pipe lines are:
• No Flow in LPG pipe line.
• Low Flow in pipe line.
• Increase in pressure in pipe line.
• High Flow in LPG pipe line.
• Other than storage tank cracked.

Methodology:
The concept of ‘HAZOP’ is to review the plant in a series of meetings, during which a multidisciplinary team methodically go through a brainstorming session on the plant design, following the structure provided by the guidewords and the leadership of the HAZOP expert.

They should focus on specific points of the design called study nodes one at a time. At each of these study nodes, a number of questions are formulated around a number of guidewords to explore all conceivable ways in which the operation could deviate from the design intention. The deviations with causes and consequences that are conceivable and hazardous are then noted for safeguards or remedial action.

A.HAZOP Study Procedure:
The HAZOP study procedure includes the following steps:
• Divide the system into sections (i.e., reactor, storage) as intentions with the help of P&I diagram. The intention is defined as how the plant is expected to operate without any deviations from the design condition. This can be given in number of forms and can either be descriptive or diagrammatic.
• Choose a study node (i.e., line, vessel, pump, operating, and instruction) which all the process parameters are investigated for any possible deviations from the design intent.
• Select a process parameter
• Apply a guide-word in simple words that are used to qualify or quantify the intention in order to guide and stimulate a brainstorming process for deviation to predict from the design intent.
• Determine cause(s). The causes can be a hardware failure, human error, an unanticipated process slag, external disruptions etc. Once a deviation has been identified to have a credible cause, and then it can be treated as a meaningful deviation.
• Evaluate consequences/problems these are the results due to the deviations (i.e., say release of toxic or any flammable material).
• Recommend action: What? When? Who?
• Record information to correct the mistakes and to further improve.
• Repeat procedure until the desired and proper systematic study is done.

B. Collection of Nodes:
The collection of node is said to be the heart of the study as shown in Table (1), Where all the possible parameters are taken into consideration and investigated till the possible deviation as achieved

<table>
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<tr>
<th>Table 1: Collection of Intentions &amp; Nodes</th>
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<td>INTENTION 1 : LPG UNLOADING AND STORING IN SPHERE</td>
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**Conclusion:**

The HAZOP study can be done at any stage of a plant i.e. the design stage or the pre-commissioning stage or in the running stage. By conducting this study all the realistic hazards can be eliminated in the process industries. HAZOP is a Systematic approach thorough examination of the assessed equipment with an aim to identify the dangerous statuses (scenarios), which allows the Possibility to evaluate the consequence of a failure of personnel, finding of such situations, for the mistake of personnel would have a significant consequences. The HAZOP Increase of the efficiency of the operation equipment, finding of situation that may lead towards disturbing of the operation, unplanned breaks, damage of equipment, loss of processed raw material, improvement towards the operational regulation. So the safe operating condition on the LPG Installation area is maintained with the help of HAZOP study.

**REFERENCES**