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Overall Safety Review in Refinery by Checklist Method

Prince Kushwah, R.M. Chokse and Praveen Patel
Department of Fire Technology and Safety Engineering,
IES-IPS Academy, Indore, (MP), India

(Corresponding author: Prince Kushwah)
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ABSTRACT: This paper analysis is to provide the proper checklists format for finding the hazard associated in different process which is being carried out in the Oil refinery and to give the recommendation to minimize their effect in order to make the working environment safe. This checklist tells about the various hazards in the refinery in different department, and safety measures existing in the department and the Safety Measures required in the department.

Keywords: Checklist, Oil refinery, Safety Measures,

I. INTRODUCTION

Oil refinery comes on 9th position of the schedule I under section 2(cb) of The Factories Act 1948. Refining is a process to split crude oil into its many parts (or fractions) which are then reprocessed into useful products. The products of refinery can be hazardous not only in their final state but as they are being processed and refined. These hazard can be fire & explosion hazard, chemical hazard, electrical hazard etc. So a great concern is needed to minimize the occurrence of these hazards and for this purpose it is very necessary to find out the hazard present in the working area. In our project we are performing the safety review of the refinery by using checklist method. In this project we find out the Hazard in different Dept. of Refinery and make the Checklist of Hazard identified and safety measure existing in the department and the Safety Measures required in the department.

Checklists are the predefined list of guidelines, task, questions, statutory safety provisions & rules against which Processes, tasks, components etc are compared. Checklist are detailed procedural guide (useful when procedures are too complex or lengthy to Memorize). Checklist helps in improving safety and also prompt the Workforce to work safely. Checklists are very useful when carefully developed, timely updated, and properly used.

It clarifies the criteria for what should be consider when inspecting or reviewing the particular area and it helps evaluator not to forget important criteria. It helps in doing step-by-step checking while performing safety inspection or safety reviews The Checklist Method also uses a set of prepared questions to stimulate discussion and thinking, often in the form of a What-If discussion. The questions are developed by experts who have conducted many hazards analyses and who have extensive experience to do with the design, operation and maintenance of process facilities.

II. SCOPE

This analysis is aimed to determine the hazards in refinery. Furthermore; this research helps the management for adopting best practices to minimize the hazard at workplace.

III. PROPOSED MONITORING METHOD

The focus in this study is on safety review of refinery by Checklist method in order to identify strengths and weaknesses, critically examining and identifying the main areas for improvement. Before making the checklists, the following details are to be collected from various departments.

A sample is as under:-

Comparison of Checklist method with other hazard analysis methodologies.

Criterion	Explanation	Checklist	FMEA	HAZOP	Event tree analysis	Fault tree analysis
Team approach	Does method rely on team approach or is it done by an individual?	Team	Team	Team	individual	Individual
Documentation	To what extent are drawings, procedures and records needed for an effective analysis?	minimal	extensive	extensive	extensive	Extensive
Time required	How much time is needed approximately to perform analysis?	Minimal (a day)	Moderate (week)	Extensive (week or more)	Extensive (week or more)	Extensive (week or more)
Team Leader Expertise	How much training is required for proper analysis?	Minimal training	Moderate training	Moderate training	Extensive training	Extensive Training
Quantitative or Qualitative	Can the result be quantitative or only qualitative	Qualitative	Qualitative	Qualitative	Quantitative/ qualitative	Quantitative/ qualitative
Hazards considered	How wide the variety of hazard can be evaluated?	Could be very wide	Physical hazard	Physical hazard	Could be very wide	Could be very wide
Process specific	Is the methodology is for specific type of process and industry?	No	Electrical/ mechanical	No	No	No
Single versus Multiple failures	Does the method tell us about hazard due to single failure or hazard due to multiple failures in combination?	Single	Single	Single	Multiple	Multiple

A. Name of the Department	Delayed cooker unit(DCU)
B. Name of the Equipment used in the Department	Crane, valve key, pumps
C. Hazard while using Equipment or Machine	1. In Crane two blocking (or) over weight can occur while working 2. Slip of valve key while opening and closing of valve. 3. Entanglement of cloth (or) body part while working on machine. 4. Electrical hazard while can occur while working on electrical motor (or)pump.
D. Name of hazardous material used in the department	H_2S gas, Cooker gas, Coke, Naptha, LPG
E. Hazard Involved While using these material	1. While taking sample for laboratory testing, when valve is opened chemical comes out with large pressure and can cause hazard to eye and other body parts. 2. Sample should be taken in opposite direction of wind otherwise it can fall on the worker and can cause injury to worker. 3. There is a hazard of generation of static electricity if chemical are not kept in proper vessels. 3. H_2s gas is very dangerous gas, exposure to higher concentrations can result in respiratory arrest, coma or unconsciousness. Exposure for more than 30 minutes at concentrations of greater than 600ppm will cause death.
F. Safety Precaution or Safety Measures existing in the artment	1. Multi-gas detector are present for detection of gas leakage. 2. Proper PPE'S are provided to worker while handling hazardous chemicals. 3. Proper safety Permit system are available before starting of work. 4. Proper vessels are prescribed for taking chemical sample.
G. Safety Precaution or Safety Measures Required in the artment	1. In DCU Block When coal is cutted by pressurized water, smoke of steam cloud spread everywhere and worker sitting inside the cabin also get affected because cabin is not air tight and also for emergency only one breathing apparatus is present. 2. In DCU Block at 19 meter on monkey ladder handrill are not present. 3. In many places Staircases are broken. 4. Due to Steam generation, water is present on the floor there is a Risk of slip or fall.

IV. CONCLUSION

This checklist will give detailed information. About the hazard identified in the different department of the refinery, name of the equipment used in the department, hazard while Using these equipment or machines, name of the hazardous material used in the refinery, hazard while using these equipment, safety precaution or safety measure existing in the department and the safety precaution or safety measure required in the department. This checklist is very useful for safety inspection, safety audit and safety review.

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