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HAZARD IDENTIFICATION AND RISK ASSESSMENT IN DE- INKING PLANT

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Abstract

An accident is an unwanted event that is never scheduled or planned. Many factors contribute to accidents occurrence significant losses and even bodily injury. This may also occurs in de-inking plant which is in paper industry. HIRA is a systematic risk assessment tool that can be used to assess the risks of various hazards. It helps to identify types of Hazard in work area, to make Risk Assessments, to suggest Risk Controls to Organization, to implementing Risk Controls, to review Risk Controls in emergency management professionals prepare for the worst and/or most likely risks. Then it saves time and resources by isolating hazards that cannot occur in the designated area.

Keywords: Control Measures, De-inking, Hazard, Risk, Probability and Consequences.

1. Introduction

In this paper use a very effective analysis HIRA to identify and assess all hazards of De-Inking plant in paper industry. A hazard identification and risk assessment (HIRA) is a structured and systematic examination of a planned or existing process or operation in order to identify and evaluate problems that may represent risks to personnel or equipment, or prevent efficient operation. By using this analysis I am going to assess the hazards in the De-Inking plant. Deinking is the industrial process of removing printing ink from paper fibers of recycled paper to make deinked pulp. The key in the deinking process is the ability to detach ink from the fibers. This is achieved by a combination of mechanical action and chemical means. The most common process is froth flotation deinking. Paper is one of the main targets for recycling.

Only after the ink has been removed from the fibers, the fibers can once again be used to make a good paper. The technology advancement has given us opportunity to use waste paper in manufacturing specialty papers too, like writing and printing grades. For manufacturing writing and printing grades, efficient de-inking of the waste paper is an essential operation of the paper making process. Flotation deinking operation is found to be the most efficient process now a day. The most important factor, which will decide the growth rate of paper industry in the coming years, is the availability of suitable raw materials economically on sustained basis.

2. Hazard Identification and Risk Assessment

A core challenge faced by emergency managers is how to prevent, prepare, mitigate, respond and recover from a myriad of hazards. Several questions arise when faced with this challenge: What hazards exist in my area? How frequently do they occur? How severe can their impact be on the community, infrastructure, property, and the environment? Which hazards pose the greatest threat to the community? A Hazard Identification and Risk Assessment (HIRA) assist emergency managers in answering these questions. It is a systematic risk assessment tool that can be used to assess the risks of various hazards. There are three reasons why a HIRA is useful to the emergency management profession: It helps emergency management professionals prepare for the worst and/or most likely risks. Allow for the creation of exercises, training programs, and plans based on the most likely scenarios. Saves time and resources by isolating hazards that cannot occur in the designated area.



Figure: 1 HIRA Process

There are four steps to create and maintain a HIRA:

- A. *Hazard Identification:* In this step the hazards that could impact your community are separated from those that cannot. This requires a review of all hazards and their causes to determine whether they may be a threat to your community. This may require the consultation of the scientific community, historical records and government agencies.
- B. *Risk Assessment:* In this step the level of risk for each hazard is examined. This may involve speaking with hazard experts, researching past occurrences and possible scenarios. The likelihood of the hazard occurring and the potential impacts of the hazard on people, property, the environment, business and finance and critical infrastructure should be examined.
- C. *Risk Analysis:* The information collected in the risk assessment step will be analyzed in this step. The desired outcome of the risk analysis is the ranking of the hazards. This highlights the hazards that should be considered a current priority for your emergency management program.
- D. *Monitor and Review:* It is important to remember that a HIRA is an ongoing process and hazards and their associated risks must be monitored and reviewed.
- E. *Using the Think safe steps:* There are three steps used to manage health and safety at work:
 - Spot the Hazard (Hazard Identification)
 - Assess the Risk (Risk Assessment)
 - Make the Changes (Risk Control)

The best way to fix a hazard is to get rid of it altogether. This is not always possible, but your employer should try to make hazards less dangerous by looking at the following options (in order from most effective to least effective):

- A. *Elimination*: Sometimes hazards - equipment, substances or work practices - can be avoided entirely. (E.g. Clean high windows from the ground with an extendable pole cleaner, rather than by climbing a ladder and risking a fall.)
- B. *Substitution*: Sometimes a less hazardous thing, substance or work practice can be used. (E.g. Use non-toxic glue instead of toxic glue.)
- C. *Isolation*: Separate the hazard from people, by marking the hazardous area, fitting screens or putting up safety barriers. (E.g. Welding screens can be used to isolate welding operations from other workers. Barriers and/or boundary lines can be used to separate areas where forklifts operate near pedestrians in the workplace.)
- D. *Safeguards*: Safeguards can be added by modifying tools or equipment, or fitting guards to machinery. These must never be removed or disabled by workers using the equipment.
- E. *Instructing workers in the safest way to do something*: This means developing and enforcing safe work procedures. Students on work experience must be given information and instruction and must follow agreed procedures to ensure their safety.
- F. *Using personal protective equipment and clothing (PPE)*: If risks remain after the options have been tried, it may be necessary to use equipment such as safety glasses, gloves, helmets and ear muffs. PPE can protect you from hazards associated with jobs such as handling chemicals or working in a noisy environment. Sometimes, it will require more than one of the risk control measures above to effectively reduce exposure to hazards.

3. De-Inking Plant

The demand of paper has been continuously increasing at a pace much faster than the availability of fibers from the natural sources. Recycling of waste paper, after its intended use, has been found to be more economical and eco friendly. Without recycling, the fiber supply from the world's natural sources shall not be sufficient to keep up with the demand. Recycling efficiency can be increased further by choosing recovered paper by grade and reusing high value papers. The reuse of the paper fibers is essentially dependent on their proper processing and de-inking.

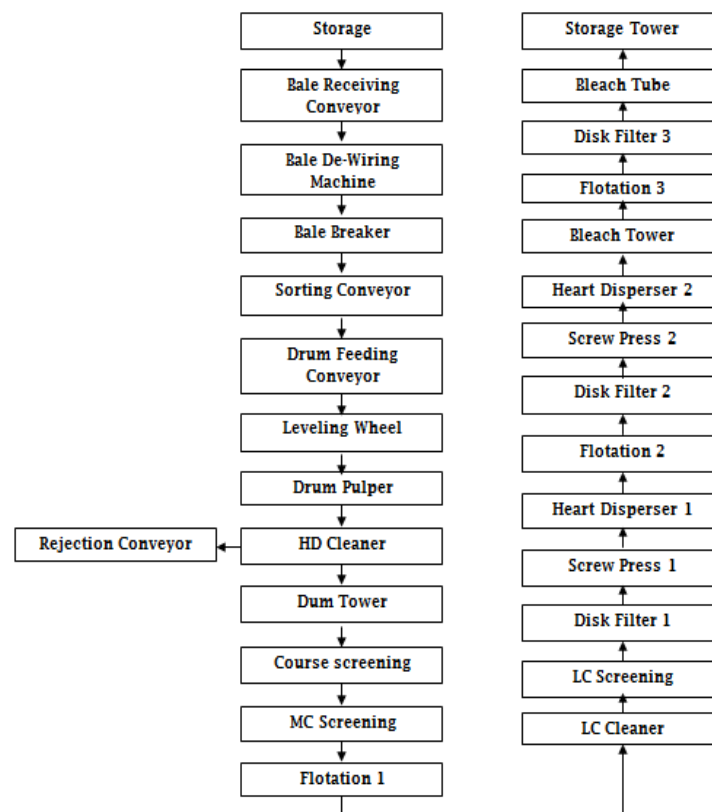


Figure: 2 De-Inking Plant Process

Some of the advantages are there in recycling: Environmental considerations, decreasing availability of conventional raw materials, Low energy requirements, Improved technology available for reuse of secondary fibers, to obtain better quality products, freedom from complete dependence on market pulp, reliable source of pulp in times of market pulp shortage, price usually favorable in comparison with that of corresponding grades of market pulp, the kinds of de-inking pulp suitable for use in printing papers usually impart special properties to the finished papers compared with papers made from wood pulp, etc.

4. Methodology

Hazard analysis is the most important step in risk analysis because, unless hazards are identified, consequence rating and probability rating reduction cannot be implemented. In the context of process safety and operational integrity programs this usually means that a process hazards analysis must be conducted. Hazard identification is the most important part of any risk analysis, removal of hazards is almost always the best way of reducing risk, and it is the only way in which risk can be reduced.

Step 1: Identifying Hazard

Step 2: Assessing the Risk

- Assess the hazard consequence rating & probability rating
- Hazard Consequence Rating Table
- Probability Rating Table

Step 3: Control the Risks

- Risk Control Hierarchy

Step 4: Review the Control Measures

Hazard can be identified by using, Self-inspection checklist, Observation & consultation, Specialists assisting with specific issues in the workplace, Knowledge sharing. After identifying the hazard risk level is calculated that is, assessing probability of occurrence: The probability of occurrence will depend on probability and frequency of exposure to a hazard.

| PRIORITISING HAZARDS AND RISKS | | | | | |
|---|------------------|-------------|--------|----------|-----------------|
| C O N S E Q U E N C E | PROBABILITY | | | | |
| | | Very Likely | Likely | Unlikely | Highly Unlikely |
| | Life Threatening | | | | |
| | Detrimental | | | | |
| | Harmful | | | | |
| Negligible | | | | | |

Table: 1 Assess Risk

| HAZARD CONSEQUENCE RATING TABLE | |
|---------------------------------|--|
| Life Threatening | Hazard may cause death or total loss of one or more bodily functions (eg. loss of: or use an arm, an eye, huge financial loss etc). |
| Detrimental | Hazard may cause severe injury, illness or permanent partial loss of one or more bodily functions (eg. noise induced hearing loss), or serious property damage, loss of production capability. |
| Harmful | Hazard may cause a reportable incident ie. an incident that results in the employee being unable to undertake their normal duties for 7 days or more, or significant property damage, high financial loss. |
| Negligible | Hazard may cause minor injury, illness or property damage, first aid treatment only or no injury, low financial loss. |

Table: 2 Hazard Consequence Table

| PROBABILITY RATING TABLE | |
|--------------------------|--|
| Very Likely | Exposure to hazard likely to occur frequently. |
| Likely | Exposure to hazard likely to occur but not frequently. |
| Unlikely | Exposure to hazard unlikely to occur. |
| Highly Unlikely | Exposure to hazard so unlikely that it can be assumed that it will not happen. |

Table: 3 Hazard Probability Table

| RISK RATING | |
|-------------|--------------|
| RISK LEVEL | COLOR CODING |
| HIGH | Red |
| MEDIUM | Orange |
| LOW | Yellow |
| CONTROLLED | Green |

Table: 4 Risk Rating Table

- Elimination*: Completely eliminate the hazard by removal from the workplace.
- Substitution*: Replace the activity, process or substance with a less hazardous one.
- Engineering*: Isolate the hazard from employees with mechanical aids.
- Administration*: Implement safe work practices, procedure and policies
- Personal Protective Equipment*: Provide suitable PPE to cover and protect an employee.

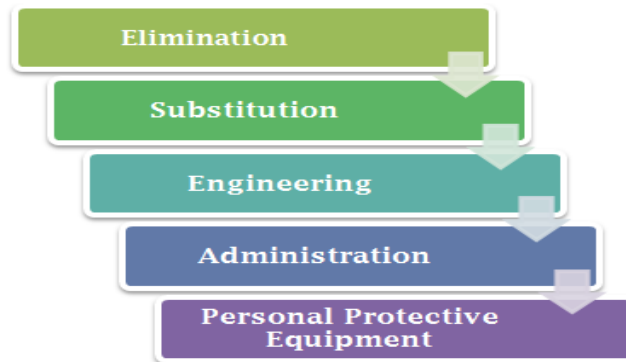


Figure: 3 The Hierarchy of Risk Control

The hierarchy of risk control is useful in determining appropriate risk control measures. The best method of controlling a risk is to eliminate the hazard-it is not always possible to do this immediately. The aim of implementing controls is to get as many controls in place so the risk is reduced to as low as possible.

5. Conclusion and Future Work

Thus by implementing HIRA study to identify the hazard and assess the hazard in the plant by plotting hazard consequence rating and probability rating of the risk level. Then according to the severity of the hazards they will be eliminated or controlled them by engineering and control measures. Here I suggest some control measures for de-inking plant, based on that they implement the control measures for de-inking plant. After the implementation I will review the process it will be considered as my future work.

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