

## *Evaluation of Risk in Waste Water Treatment Plant By HIRA Technique*

JAYASURIYA A<sup>1</sup>

SUNDARARAJU V<sup>2</sup>

<sup>1</sup> Student (Industrial Safety Engineering, KS Rangasamy college of Technology, Tamilnadu)

<sup>2</sup> Professor (Industrial Safety Engineering, KS Rangasamy college of Technology, Tamilnadu)

-----\*\*\*-----

**ABSTRACT** - Water Treatment Plant is a significant foundation to guarantee human wellbeing and the climate. In the turn of events, parts of ecological wellbeing and wellbeing are of concern. Peril ID and hazard appraisal is one piece of the word related wellbeing and wellbeing program at the danger the board stage. The motivation behind this investigation was to recognize potential dangers utilizing peril distinguishing proof strategies and hazard evaluation techniques. Hazard evaluation is finished utilizing standards of seriousness and likelihood of mishap. The outcomes got from this danger evaluation are 22 potential risks present in the water cleaning measure. Outrageous classes that exist in the danger evaluation are spillage of chlorine and mechanical flames. Chlorine and fire spillage gets the most elevated worth since its effect compromises numerous things, for example, mechanical catastrophes that could imperil human existence and the climate. Control measures embraced to keep away from potential perils are to apply the utilization of individual defensive hardware, yet the board will likewise be better overseen as per danger control risks, word related wellbeing and wellbeing projects, for example, giving work licenses, crisis reaction preparing is required, valuable in conquering potential perils that have been resolved.

**Key Words:** HIRA, Risk Analysis, Emergency Response, Occupational Safety

### **1.INTRODUCTION**

Wastewater treatment, additionally called sewage treatment, the expulsion of debasements from wastewater, or sewage, before it arrives at springs or normal waterways like streams, lakes, estuaries, and seas. Since unadulterated water isn't found in nature (i.e., outside synthetic research centers), any differentiation between clean water and contaminated water relies upon the sort and centralization of debasements found in the water just as on its expected use. In wide terms, water is supposed to be contaminated when it contains enough debasements to make it unsuitable for a specific use, like drinking, swimming, or fishing. In spite of the fact that water quality is influenced by characteristic conditions, the word contamination ordinarily suggests human action as the wellspring of pollution. Water contamination, in this way, is caused principally by the seepage of tainted wastewater into surface water or groundwater, and wastewater treatment is a significant component of water contamination control.

Modern (counting agro-mechanical) wastewaters have exceptionally fluctuated arrangements relying upon the kind of industry and materials handled. A portion of these wastewaters can be naturally solid, effectively biodegradable, to a great extent inorganic, or conceivably inhibitory. This implies TSS, BOD5 and COD qualities might be during the several thousands mg L<sup>-1</sup>.

Due to these high natural focuses, mechanical wastewaters may likewise be seriously supplements lacking. In contrast to sewage, pH esteems past the scope of 6–9 are likewise regularly experienced. Such wastewaters may likewise be related with high convergences of broke up metal salts. The stream example of mechanical wastewater streams can be altogether different from that of homegrown sewage since the previous would be affected by the idea of the tasks inside a plant as opposed to the typical exercises experienced in the homegrown setting. A critical factor affecting the stream example would be the shift idea of work at production lines.

## 2.LITERATURE SURVEY

### **HASAN ALZHRANI ET AL, IN HIS WORK ON, "System FOR HAZARD IDENTIFICATION AND RISK ASSESSMENT IN WASTEWATER TREATMENT PLANTING" 2016**

It is notable that wastewater treatment projects worldwide has gotten perhaps the main, indispensable tasks and connected to development. Since consumable water and water system for agribusiness water thought about an exceptionally low assets in the Kingdom of Saudi Arabia - desert locales - soit is important to focus harder on these tasks, which previously occurred, where billions of Saudi Riyals have been put resources into the sewage and mechanical water treatment projects. Wastewater treatment industry in Saudi Arabia has extended to incorporate a ton of units and divisions, machines and many specialists and has become a peril to staff and the zones encompassing these stations. In this examination we notice the means and techniques to be utilized and followed by laborers in managing the different dangers. We start by distinguishing the dangers at that point call attention to how to break down these

risks and ordered into a few degrees agreeing to their seriousness.

### **L.SHIVANATHAN ET AL, IN HIS WORK ON, "OCCUPATIONAL HEALTH AND CHEMICAL SAFETY AT ETP AND STP IN PROCESS INDUSTRY" 2018**

Wastewater treatment is a process used to convert wastewater into an effluent (out flowing of water to a receiving body of water) that can be returned to the water cycle with minimal impact on the environment or directly reused. Sewage treatment is the process of removing contaminants from wastewater, primarily from household sewage. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safer for the environment. In this research we first identify the hazards then analyze these hazards and classify it into several degrees according to their severity. And also we mention the steps and methods to be used and followed by workers in dealing with the various hazards.

### **FAJRUL FALAKH ET AL, IN HIS WORK ON, "HAZARD IDENTIFICATION AND RISK ASSESSMENT IN WATER TREATMENT PLANT CONSIDERING ENVIRONMENTAL HEALTH AND SAFETY PRACTICE" 2018**

Water Treatment Plant (WTP) is an important infrastructure to ensure human health and the environment. In its development, aspects of environmental safety and health are of concern. This paper case study was conducted at the Water Treatment Plant Company in Semarang, Central Java, Indonesia. Hazard identification and risk assessment is one part of the occupational safety and health program at the risk management stage. The purpose of this study was to identify potential hazards using hazard identification methods and risk assessment methods. Risk assessment is done using criteria of severity and probability of accident. The results obtained from this risk assessment are 22

potential hazards present in the water purification process. Extreme categories that exist in the risk assessment are leakage of chlorine and industrial fires. Chlorine and fire leakage gets the highest value because its impact threatens many things, such as industrial disasters that could endanger human life and the environment. Control measures undertaken to avoid potential hazards are to apply the use of personal protective equipment, but management will also be better managed in accordance with hazard control hazards, occupational safety and health programs such as issuing work permits, emergency response training is required, Very useful in overcoming potential hazards that have been determined.

### 3.HIRA METHODOLOGY

Peril Identification and Risk Assessment (HIRA) is a cycle that comprises of various consecutive advances, for example, danger distinguishing proof, result and recurrence evaluation, hazard assessment dependent on the current controls and suggestions to lessen those dangers which are not under adequate cutoff points. Peril Identification and hazard evaluation shift enormously across enterprises, going from straightforward appraisal to complex quantitative investigations with broad documentation.

Hazard appraisal is a cycle or utilization of a philosophy for assessing hazard as characterized by likelihood and recurrence of event of a peril occasion, openness of individuals and property to the risk, and results of that openness. Various procedures exist for evaluating the danger of characteristic peril occasions, going from subjective to quantitative. An apparatus for assisting with recognizing, assess and control the danger. The device works with to evaluate each assembling venture concerning basic activities and distinguish the dangerous cycle.

Some functional advances you could take include:

- Trying A Less Risky Option
- Preventing Access to The Hazards
- Organizing Your Work to Reduce Exposure to The Hazard
- Issuing Protective Equipment

### 3. RESULT AND DISCUSSION

Hazard Assessment is performed utilizing the Risk Matrix as depicted in the writing study, the outcomes acquired from this danger appraisal are the 22 potential perils present in the water refinement measure, these discoveries depend on evaluations of workshops and preparing units at resulting water treatment plants Described exhaustively in table 4. Agreeing the current classes of outrageous danger, high danger, medium danger and generally safe then the discoveries are gathered into each hazard classification.

Outrageous classes that exist in the danger appraisal are chlorine spill and mechanical flames. Spillage of chlorine and flames get the most noteworthy worth in light of the fact that their effect compromises numerous things, for example, mechanical calamities that can hurt human existence and the climate.

Perils Chlorine can be assimilated through the skin and cause copies going from gentle to serious contingent upon the length of the contact what's more chlorine can likewise be consumed through the eye, causing copying or inconvenience, sporadic flickering, oblivious conclusion of eyelids, redness, and tearing. A lot of chlorine noticeable all around can cause serious consumes, torment, and obscured visual perception.

Subsequently laborers away should direct an all around booked examination so the presence of chlorine can be securely kept up, other than that it is additionally important to have a crisis the board control framework that alludes to spillage of chlorine and mechanical fires, Prevention endeavors from known possible risks. Expected word related perils in the water treatment industry are presented to synthetics to laborers, the likely risk of spilling chlorine gas can likewise extraordinarily influence the wellbeing and soundness of the mechanical climate. Control measures embraced to keep away from potential dangers are to apply the utilization of individual defensive gear, however the board will likewise be better overseen as per risk control perils, word related wellbeing and wellbeing projects, for example, giving work grants, crisis reaction preparing is required, Very valuable in conquering potential perils that have been resolved.

#### 4.CONCLUSION

Risk Assessment is performed using the Risk Matrix as described in the literature study, the results obtained from this risk assessment are the 22 potential hazards present in the water purification process, these findings are based on assessments of workshops and processing units at subsequent water treatment plants Described in detail in table 4. According the existing categories of extreme risk, high risk, medium risk and low risk then the findings are grouped into each risk category.

Extreme categories that exist in the risk assessment are chlorine leak and industrial fires. Leakage of chlorine and fires get the highest value because their impact threatens many things, such as industrial disasters that can harm human life and the environment.

Hazards Chlorine can be absorbed through the skin and cause burns ranging from mild to severe depending on the length of the contact In addition chlorine can also be absorbed through the eye, causing burning or discomfort, irregular blinking, unconscious closure of eyelids,

redness, and tearing. Large amounts of chlorine in the air can cause severe burns, pain, and blurred eyesight.

Therefore workers in storage must conduct a well- scheduled inspection so that the presence of chlorine can be safely maintained, besides that it is also necessary to have an emergency management control system that refers to leakage of chlorine and industrial fires, Prevention efforts from known potential hazards. Potential occupational hazards in the water treatment industry are exposed to chemicals to workers, the potential danger of leaking chlorine gas can also greatly affect the safety and health of the industrial environment. Control measures undertaken to avoid potential hazards are to apply the use of personal protective equipment, but management will also be better managed in accordance with hazard control hazards, occupational safety and health programs such as issuing work permits, emergency response training is required, Very useful in overcoming potential hazards that have been determined.

#### 5.REFERANCE

- 1.S. T. Bahn, (pp. 1-9). Gold Coast, Queensland. Griffith University. (2012)
- 2.Islam, Tanveer; Ryan, Jeffrey R. Butterworth-Heinemann is an engraving of Elsevier (2016)
- 3.R. Ramesh, M. Prabu, S. Magibalan, P. Senthilkumar, International Journal of ChemTech Research. (2017)
- 4.N. J. Earthy colored, Ithaca, NY: Cornell University, Chemical Hazard Information Program. (2016)
- 5.A. Vantarakis, S. Paparrodopoulos, P. Kokkinos, G. Vantarakis, K. Fragou, and I. Detorakis. Diary of Environmental and Public Health Volume 2016 Article ID 8467023 (2016)