

Hazard Identification and Risk Assessment in Sewage Treatment Plant

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ABSTRACT:Sewage Treatment Plant (STP) is a significant foundation to guarantee human well-being and the climate. HIRA is one piece of the occupational safety and wellbeing program at the gamble executives stage. Control Measures are taken to stay away from potential dangers incorporating Individual Useful Hardware, The executive's Improvement Program, Crisis Manual, Execution Observing, Functional Control Methodology, Material Security and Information Sheet, Wellbeing Plan, and Lawful Register. Exceptionally helpful in defeating potential dangers that are not set in stone.

KEYWORDS:Hazard identification and risk assessment, Sewage Treatment Plant

I. INTRODUCTION

Occupational health and safety are intensely affected by occupational hazards recognized and overseen in a capable gamble evaluation process. Dangers in the working environment can be physical, chemical, or psychological, it can prompt working environment occurrences and work-related injuries, which affect authoritative efficiency and benefit. Hazard identification and risk assessment (HIRA) is a technique for deciding and giving dangers in light of their likelihood, recurrence also, seriousness and assessing antagonistic outcomes, counting possible misfortune and injury. The work cycle in the business should focus on parts of natural well-being and security to help the viability of the company. The industry should distinguish hazard, evaluate the related dangers to endure ceaseless levels, risk evaluations have been made utilizing risk rules and guidelines. Recognizing potential dangers and hazard at a sewage treatment plant can control the well-being of modern space and the encompassing natural space and the individual working there as per Natural Wellbeing what's more, well-being and

Word related well-being and Security Organization arrangements. This Sewage treatment process danger risk evaluation agenda utilizes a similar examination of the "Seriousness of Results" and "Likelihood of Event" for every agenda thing to relegate a gamble rating. The gamble rating is then used to recognize higher gambling materials and general activities. This hazard appraisal agenda is intended to evaluate the Sewage treatment process Security tasks and materials utilized in relationship with the Security Agenda areas recognized previously

II. METHODOLOGY

Hazard identification and risk assessment is a process of characterizing and portraying risks by portraying their likelihood, recurrence, and seriousness also, assessing antagonistic outcomes, including possible misfortunes and injuries



Figure 1 Risk Assessment Steps

1. IDENTIFY THE HAZARDS

The initial step to making your gamble appraisal plan is figuring out what dangers your representatives and your business face including cataclysmic events flooding cyclones storms quakes fire and so forth natural perils pandemic sicknesses foodborne diseases and so on working environment mishaps slips and excursions transportation mishaps primary disappointment mechanical breakdowns and so on deliberate demonstrations work strikes exhibitions bomb dangers burglary pyromania and so on innovative risks lost web association blackout and so on compound risks asbestos cleaning liquids and so on mental risks abundance responsibility harassing and so on breaks in the production network check out your working environment and see what cycles or exercises might actually hurt your association incorporate all parts of work including telecommuters and non-routine exercises, for example, fix and upkeep you ought to likewise take a gander at accident incident reports to figure

out what perils have influenced your organization before.

2. DETERMINE WHO MIGHT BE HARMED AND HOW

As you check out your association, ponder how your representatives could be hurt by business exercises or outside factors. For each risk that you distinguish in sync, contemplate who will be hurt should the danger occur.

3. EVALUATE THE RISKS AND TAKE PRECAUTIONS

Since you have assembled a rundown of expected risks, you want to consider how likely it is that the peril will happen and how serious the results will be assuming that danger happens. This assessment will assist you with figuring out where you ought to diminish the degree of chance, and which perils you ought to focus on first.

Severity	Description
1. Extreme	The presence of the hazard will automatically result in unsafe food, Death or major injury can occur along with widespread hospitalization, there are multiple consumer or customer complaints made. There will be extensive media reporting with product recall required. Our business will suffer extensive financial loss leading to bankruptcy or cease of trade, An Insurance claim is required.

<p>2. Very High</p>	<p>The presence of the hazard will cause hospitalization of those affected. Prolonged medical treatment will be required. There may be mudhole consumer or customer complaints made. There will be extensive Reatha repointing with product recall required. Our trading partners I wholesale customers will lose toxiferines in our ability to supply safe food leading to loss of bu5iness. An insurance claim may be required.</p>
<p>3. Medium</p>	<p>The preserve of the hazard may result in a customer complaint. Consumers do not suffer any long-term effect and do not require hospitalization although acute medical treatment may occur. There is minimal longterm impact on the consumer. Affected stock may be returned to our business or financial compensator required. Consumer may use social media to communicate concerns.</p>
<p>4. Low</p>	<p>The presence of the hazard results in OD Couturier Injury sustained, there is minimal customer inconvenience and minimal firangi loss. Complairill3 main relate to serve or quality issues. There is minimal media impact.</p>
<p>5. Insignificant</p>	<p>The presence of the hazard does not and MI riot result in unsafe food. There Is no quire, illness or hospitalization if the hazard is consumed. There is no adverse finial effect on our business or that of our trading partners. There is no media impact.</p>

Likelihood Rating	Assessment	Evaluation Criteria
1	Almost Certain	High likely, this event is expected to occur
2	Likely	Strong possibility that an event will occur and there is sufficient historical incidence to support it
3	Possible	Event may occur at some point, typically there is a history to support it
4	Unlikely	Not expected but there's a slight possibility that it may occur
5	Rare	Highly unlikely, but may occur in unique circumstances

HSE RISK MATRIX							
		SEVERITY	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
CONSEQUENCES	People		Slight injury	Minor injury	Major injury / health-effects	Single fatality / Permanent total disability	Multiple fatalities / Permanent total disability
	Environment		Slight impact	Minor impact	Modest impact	Major impact	Massive impact
	Asset		Slight Damage	Minor Damage	Local Damage	Major Damage	Extensive Damage
	Reputation		Slight impact	Limited impact	Considerable impact	Major National impact	Major International impact
LIKELIHOOD	E Almost Certain	Incident has occurred several times in company	E1	E2	E3	E4	E5
	D Likely	Incident has occurred more than once per year in company	D1	D2	D3	D4	D5
	C Possible	Incident has occurred in company or more than once in industry world wide	C1	C2	C3	C4	C5
	B Unlikely	Incident has occurred in industry world wide	B1	B2	B3	B4	B5
	A Somewhat likely to happen	Never heard of in industry world wide but could occur	A1	A2	A3	A4	A5

4. RECORD YOUR FINDINGS

Assuming you have in excess of five representatives in your office, you are legally necessary to record your gamble evaluation process. Your arrangement ought to incorporate the risks

you've found, the individuals they influence, and how you intend to alleviate them. The record or the gamble evaluation plan ought to show that you:

- Conducted a proper check of your workspace

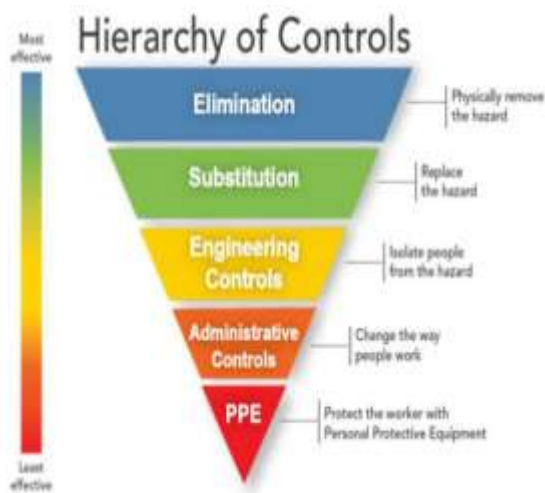
- Determined who would be affected
- Controlled and dealt with obvious hazards
- Initiated precautions to keep risks low
- Kept your staff involved in the process

5. REVIEW ASSESSMENT AND UPDATE IF NECESSARY

Work environment is continuously changing, so the dangers to your association change also. As new hardware, cycles, and individuals are presented, each brings the gamble of another danger. Consistently survey and update your gamble evaluation interaction to keep steady over these new Hazard.

III. HIERAARCHY OF CONTROL

While assessing the dangers related to explicit perils, the consequences of this assessment ought to direct the specialist in the determination of hazards in the executive's methods including disposal, replacement, designing controls, authoritative controls, and individual defensive gear. This is known as the Ordered progression of Controls.



1. ELIMINATION AND SUBSTITUTION

The most favoured technique for controlling gamble is to dispose of the danger out and out. As a rule, disposal isn't plausible and whenever the situation allows, replacement is the best way to deal with risk relief. Whenever the situation allows, substitute less dangerous specialists instead of their more perilous partners. This additionally applies to conditions and exercises. Models incorporate subbing toluene for benzene, non-toxic paints for toxic ones

2. ENGINEERING CONTROLS

Designing controls comprise of various strategies for limiting risks, including process control, nook and segregation, and ventilation.

- Process controls include significantly having an impact on the way that a task movement is performed to lessen risk. Instances of this incorporate utilizing wet strategies while penetrating or crushing or utilizing temperature controls to limit fume age.
- Nook and confinement are focused on at keeping the synthetic in and the specialist out, or the other way around. Glove boxes are a genuine illustration of nook and seclusion. Interlock frameworks for lasers and apparatus are other genuine instances of secluding processes.
- The most well-known technique for ventilation in research labs is restricted exhaust frameworks. Seethe hoods, swims, and other ventilation frameworks are talked about finally in the Lab Hardware and Designing Controls part of this site.

3. ADMINISTRATIVE CONTROLS

Administrative controls will be controls which adjust how work is performed. They might comprise of arrangements, preparing, standard working techniques/rules, individual cleanliness rehearses, work planning, and so forth. These controls are intended to limit the openness to the peril and ought to possibly be utilized when the openness can't be totally alleviated through end/replacement or designing controls.

4. PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE ought to constantly be utilized as a last line of safeguard and is a satisfactory control strategy while designing or regulatory controls can't give adequate security. PPE may likewise be utilized on a brief premise while designing controls are being created. See the independent PPE part of this site for more data.

IV RESULT

Hazard Identification and Risk Assessment (HIRA) of the different risks happening in this present circumstance were analyzed and the cycle was distinguished and assessed. Legitimate preparation is given to stay away from the event of such dangers. Material legitimate prerequisites were explored and framed exhaustively. In this paper, I investigated risk recognizable proof and hazard evaluation methods to survey all dangers and laid out needs with the goal that the most perilous circumstances can be resolved first and significant issues can be thought of.

No	Workshop or Treatment unit	Hazard Hazardous Situation	Potential Risk	Consequence	Risk Assessment Matrix		
					L	S	Risk Value
1	Flow Meter Chamber	Possible entrance and entering the flow meter chamber	Chlorine inhalation by operator working inside the chamber	Lost-time accident up to fatality due to chlorine inhalation	3	2	6 (medium Risk)
2	Demolition in Chemical Building	Work at height (8m) for demolishing walls and floors	Falling from a height of approximate 8 meter to the ground	Permanent injury up to fatality	2	4	8 (High Risk)
3	Control Room	Electrical Hazard	Electric short circuit	fractures, Fatality, Disaster	3	5	15 (Extreme Risk)
4	Process of Treatment	Cleaning accumulation sludge in channel raw water inlet of accerator 1,2 at once a month	harmful atmosphere, difficulty of entry/exit access	Fatality accident more than 1 person	2	5	10 (High Risk)
5	Process treatment of	Cleaning once a month sludge extraction	All confined space risks, including fall, electrical shock	Fatality accident	2	4	8 (High Risk)
6	Process treatment of	Working at height for routine operating main drain valve, noise, smell	Falling, slippery	Fatality accident	1	4	4 (Medium Risk)
7	Process treatment of	Working/cleaning over compartment	Falling, drowning	Fatality accident	1	4	4 (Medium Risk)
8	Water treatment line	Working at height around sand filter	Drowning, Falling	Concussion, fracture	3	2	6 (Medium Risk)
9	Backwash pump room	Rotating part, noise, slippery at backwash pump	Injury at arm or hand in Projection of loose bolt, noise, fall	Arm amputation, fracture, hearing disorders, concussion	3	3	9 (High Risk)
10	Gear box of the turbine	Exposed rotating parts	Injury at arm or hand in Projection of loose bolt	Arm amputation, shut down machine, fracture	2	3	6 (Medium Risk)
11	Chlorine Facilities	Crash inside the site	Personnel crashed by chlorine	Fatality accident	3	4	12 (High Risk)

			vehicle				
12	Chlorine Facilities	Chlorine Leakage	Inhalation of chlorine gas	Fatality accident, Disaster	3	5	12 (Extreme Risk)
13	Chlorine Facilities	Falling container when loading/unloading	Impacted by falling heavy objects (weight: +1.8 ton, height: 1.5 m)	Fracture/irreversible harm	2	2	4 (Medium Risk)
14	Purchasing	Wrong/miss specification when purchased devices, equipments, tools or materials and services	Use of improper devices, equipments, tools, materials	Stop production, fatality	5	1	5 (Medium Risk)
15	Filter gallery	Working at height	Falling at a height (6 M)	Fatality accident	2	4	8 (High Risk)

REFERENCE

- [1]. L.P. Davies (2002) Risk assessment in the storage industry Accident Journal of Loss and Prevention Analysis 68, 25–29.
- [2]. Australian Government, (2008), Risk assessment and management, Leading Practice Sustainable Development Program for the Mining Industry, Department of Resources Energy and Tourism, Commonwealth of Australia.
- [3]. Duijm, N. J., (2001), Hazard analysis of technologies for disposing explosive waste, Journal of Hazardous Materials, A90, pp. 123–135.
- [4]. Dziubinski, M., Fraczak, M. and Markowski, A. S., (2006), Journal of Loss Prevention in the Process Industries, Vol. 19, pp 399-408.
- [5]. Hazard Identification, Risk Assessment and Control Procedure, 2008, University of western Sydney,
- [6]. Nor, Z. Md., Kecojevic, V., Komljenovic, D., Groves, W., (2008), Risk assessment for loader- and dozer-related fatal incidents in U.S. WH, International Journal of Injury Control and Safety Promotion, Vol. 15, pp. 65–75.
- [7]. Khan, F. I. and Abbasi, S. A., (2001), Risk analysis of a typical oil industry using ORA procedure, Journal of Loss Prevention in the Industries, Vol. 14, pp. 43-59.