





Prevention of Occupational Health (OH) Hazards – OH Management Practices in Petrochemical industry

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Reliance Industries Limited

- The Jamnagar Refinery is a private sector refinery owned by Reliance Industries in Jamnagar, Gujarat, India. It is world largest refinery.
- Reliance Industries Jamnagar is a petrochemical plant. It is an integrated manufacturing complex which constitutes petroleum refinery complex, an aromatics/petrochemical complex, a power generation complex, a port and terminal complex, as well as access to pipeline network.
- It is equipped to refine various types of crude oil (sour crude, sweet crude or a mixture of both) and manufactures various grades of fuel from motor gasoline to aviation turbine fuel.






Objective


- To maintain and promote the health of workers and injury management at work place.
- Occupational health should be taken as zero tolerance for health risks and target zero for occupational illness.
- To reduce all occupational hazards exposures to a level at which the risk to health is minimal.



Occupational Health Hazard


- Factors related/associated to the work of a worker that has a potential to be converted into risks which in turn can affect the health of a worker.



Classification of Workplace Health Hazards

Chemical	Physical	Ergonomic	Biological
<ul style="list-style-type: none"> Dusts Mists Gases Vapors Fumes Smoke 	<ul style="list-style-type: none"> Noise Vibration Light Heat Cold Radiation 	<ul style="list-style-type: none"> Workstation design Repetitive motion Improper lifting 	<ul style="list-style-type: none"> Bacterial Fungal Viral Insects Mold



OH Management

- Part of the overall management system that facilitates the management of the OH risks associated with the business of the organization.
- This includes the organizational structure, planning activities, responsibilities, practices, procedures processes and resources for developing, implementing, achieving, reviewing and maintaining the organization's OH policy."

Methodology

- Identification, measurement and analysis of occupational health hazards.
- Preparing and observing a systematic schedule for measurement and collection of data of various occupational health hazards.
- Recommendation to improve safe & healthy work practices to eliminate/reduce occupational health hazards.
- Employee education and training in occupational health hazards.

Methodology

- Development of data collection and storage system with a view of undertaking long term studies of occupational health hazards.
- To anticipate and minimize exposure to health stressors during the planning and design phases of a work activity.
- To prepare assessment reports that document assessment results, support assessment conclusions, and clearly communicate conclusions and recommendations for corrective action.

Workplace Exposure Assessment

Qualitative Exposure Assessment

- Walk through survey & Risk Matrix

Quantitative Exposure Assessment

- Workplace Monitoring & Personal Monitoring of physical, chemical, biological & ergonomic hazards.

After survey report is generated & hazard mapping is done.

All the reports are communicated to concern plant for implementation of control measures if required.

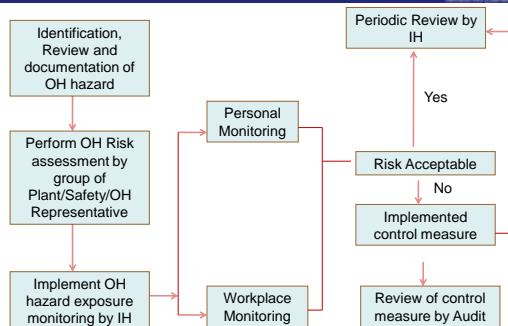
Work Place Monitoring

Parameter	Frequency
Noise	Once a year
Heat Stress	Twice a year
Illumination	Once a year
Dust	Twice a year
Noxious Substances	Once a year
Benzene	Once a month
Indoor Air Quality	Once a year

Walk through survey Form

Location	Activities	Type of Hazard	Exposure duration/shift	Eng. control	PPE Used	No. of employee exposed	Frequency	Remarks

Risk Assessment



Risk Rating

Risk score interpretation As per Kinney & Fine Method											
Exposure	Factor	Severity	Factor								
Very rarely (less than a year)	0.5	Minor (FAC)	1								
Rarely (Few times per year)	1	Major (MTC)	4								
Sometimes (1-2 times per month)	2	Serious (irreversible effect-LTC)	7								
Now and then (one per week)	3	Critical (single fatality)	15								
Frequently (daily)	6	Disaster (multiple fatality)	40								
Continuous (more than 2 times a day)	10										
For initial risk effect of PPE and control measure are not to be taken.											
Probability	Factor	RISK= Exposure X Severity X Probability	Interpretation								
Virtually impossible (>200 years)	0.2		Acceptable								
Conceivable (once in 20y)	0.5	<20	Measure req. in 6 month								
Unusual (once in 10y)	1	20-70	Immediate measures								
Unusual (once in 3y)	3	70-200									
Possible (once in 6 months)	6	>200	Do not take up the work until measures are taken								
To be expected (once a week)	10										
Sr. No.	Activity with Sub Activities	Hazard and Risk: Physical, Chemical, Ergonomical, Biological and Environmental	Initial Risk:				Actual Risk:				
			E	S	P	R		E	S	P	R
1	Sampling of Benzene	Chemical Exposure: Leading to Blood Cancer	6	15	3	270		6	15	0.2	18
E-Exposure, S-Serious, P-Probability, R-Risk Score = E x S x P											

E: Exposure, S: Severity, P: Probability, R: Risk Score = E x S x P

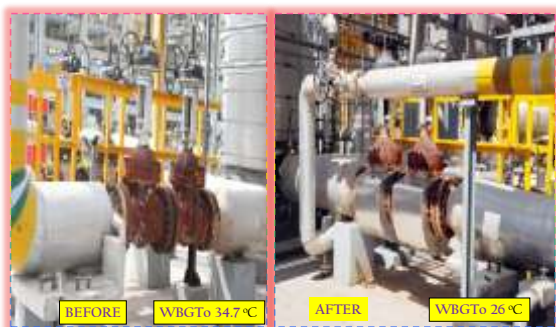
Study Conducted at following Plants

Sr. No.	Plant (SEZ)	Plant (DTA)
1	Aromatic	Aromatic
2	CFP	Coker
3	Coker	CPP
4	CPP	Crude
5	Crude	Hydrogen
6	Hydrogen	Laboratory
7	Laboratory	Sulphur
8	Sulphur	PP
9	PP	Utility
10	Utility	FCC
11	Alkylation	RTF
12	FCC	KHT CNHT
13	RTF	RRTF
14	VGO	MTF
15	Fire	Marine
16	Solid	Horticulture

OH Hazards - Summary

OH Hazards - Summary											
No	Unit	Exhaust	Chemical	Dust	Noise	Heat Stress	Repetitive	Slips	Trips	Falls	Others
1	Aromatics	2	4	4	4			2	2		
2	Coker	6	6	6	6					1	1
3	FCO	2	3	3	4			3	4	4	
4	Crude	6	6	2	2	1	1	1	1	4	4
5	CPP	4	4	4	4			2	2	2	2
6	PP	3	3	2	2	2	3	2	2		1
7	RTF	2	2	4	4						
8	Utilities	2	2	4	4						2
9	MTF	2	2	0	2			1	1		
10	KHT CNHT					3	3				
11	Marine	4	4					1	1	2	2
12	WTS-SUL	3	3	2	2			2	4	1	1
13	RRTF	3	4	3	4						
14	CLab		4	5	2	2					
15	Horticulture	3	3					1	1		
16	FLab	1	1	1	1			2	3		1
17	FCP	1	1	1	1			1	1		1
18	Alkylation	2	2	1	1						
19	CPP	1	1	1	1			1	1		
20	PP	3	3	2	2	2	3				
21	Coker	1	2	2	3			1	2	2	1
22	VGO	4	1	1	1						
23	Crude	4	4	1	1					5	5
24	FCC	6	6	1	1	2	2	3	4		
25	Sulphur					6	6			2	2
26	MTF	6	6	1	1			1	2	1	1
27	SUL	6	6	2	2			1	1	1	1
28	Aromatics	6	6	2	2			0	1	1	1
29	Fire	2	3	1	1	1	1			0	1
30	RTF	3	0	0	1			1	1	1	1
31	Utilities	10	14	6	6	0	1	1	2	1	1
32	FCP	5	8	1	1						
Total		100	117	83	88	26	29	23	30	27	28

REDUCTION IN HEAT STRESS



Noise Reduction

Concerns:

- High noise generated from Vent at the vessels was a concern; it was generating sound up to 89 dBA near the nitrogen trains

Solution:

- We procured the Vent silencer for all three Nitrogen train and after fixation of vent silencer, Noise level has reduced to 85 dBA



Before



After

Improvement in ergonomics



Reduction of Dust Exposure

Exposure to dust during Unloading of Clay treaters, Chloride treaters and Parex Chamber adsorbent

Before



After



Use of Vacuum Machine

Improvement in lighting during sphere maintenance and inspection activities



Constraint:
Poor Illumination

Efforts:

- ✓ Consultation with Electrical equipment supplier
- ✓ Review of available options through research
- ✓ Finalization of Fibre Optics lighting
- ✓ Purchase & in use

Achieved:
Illumination level with Fibre Optic lamps – **100 Lux**



Baseline Survey:
Illumination level with 24 volts lamps – **25 lux**

Occupational Health Mgmt.

- OH management standard
- Occupational Health Hazard Monitoring by Industrial Hygiene Cell
- Medical Monitoring - PME, PEM & Six monthly PME
- Biological monitoring
- OHS Sub Committee – Promote occupational health activities
- Workplace Health Audit
- Emergency Management Plan
- Occupational Health related Training
- Change Agent for Safety Health & Environment (CASHe)

Monthly OH Training Plan

MONTH	THEME / TOPICS
March/April	Planning
May	De addiction, Life style modification
June	Physical Hazards, Health Score & OH module
July	Occupational Health week celebration
August	PPE awareness & Basic First Aid
September	Keeping Heart Healthy & Nutrition, OH module completion.
October	IAQ & Chemical Hazards
Nov/Dec	Stress Management, DM Awareness & AIDS awareness
Jan/Feb	Ergonomics.

Discussion

- The OH surveillance at RIL is a continuous process
- The structured plan of OH management program at all plants of RIL is the key parameter for effective management of OH hazards exposure at workplace.
- The findings of this surveillance indicate the need for OH management program which involves a team headed by OH physician along with plant person, safety officer and industrial hygienist.

Conclusion

Plan, do check and act with a smile and resolve on a risk basis with the aim of continual improvement within each OH program element as well as the entire OH program.

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Thank You

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