Post-Bhopal, ILO helped several state Governments to establish Industrial Hygiene Laboratories to monitor workplace environment. ILO provided basic instruments and training to the staff. Initially there was only one lab in Ahmadabad for the whole state. Few years ago three more labs were established one each at – Rajkot, Vadodara and Surat. This article is based on the information acquired through RTI as well as other secondary sources.

Workplace Health & Safety

Safety and Health at Work is a basic human right. The International Covenant on Economic, Social and Cultural Rights addresses occupational health in article 12.2(b) and (c) and establishes that States must take steps towards the full realization of the right to health, including the improvement of all aspects of industrial hygiene and the prevention, treatment and control of occupational and other diseases. Art. 23 of the Universal Declaration of Human Rights provides for the right of everyone to "just and favorable conditions of work." The ILO recognizes both the right to a safe and healthy working environment and the protection of the worker against sickness, disease and injury arising out of his employment to be fundamental human rights. Directive Principles of the Indian Constitution provide for "just and humane conditions of work" to be provided to the workers. Art. 21 of the Constitution of India ensures right to life. India has its National Policy for safety, health and environment at work (2009).

> Noise is the most widely found pollution in workplaces cutting across type of industry. Measuring sound is comparatively easier and taking lesser time than other pollutants. Further laboratory testing is not necessary for noise measurement. All these may have contributed role. The data of the three years that we could collect indicate that noise is the single largest sample that was drawn.

Industrial Hygiene

Industrial Hygiene is an important branch of science. Industrial hygiene is the science of anticipating, recognizing, evaluating, and controlling workplace conditions that may cause workers' injury or illness. Industrial hygiene attempts to eliminate or minimize the exposure of environmental or work hazards on human or public health by engineering controls and good housekeeping and keeps the workplace environment clean, pollution-free and hygienic. Implementing good industrial hygiene standards will help improve life expectancy of the workers, reduce sick leave, and reduce occupational diseases and disability due to occupational diseases.

Governmental Efforts to Monitor Pollution Within the Workplace

Jagdish Patel

Workplace Monitoring in India

Under the existing law, it is the primary responsibility of the industry to monitor the work place environment and keep the environment free of pollution. Following Bhopal gas leak, the Factory Act was amended in 1987 to include Sec. 41F and corresponding Sch. II which listed threshold limit values (time weighted average) and ceiling limits for 120 substances.

IHL Infrastructure & Data on Occupational Diseases

In Gujarat, in 2018 numbers of sanctioned posts of Industrial Hygienists were 4, but all are vacant. Numbers of hazardous factories were 10,908 and numbers of workers employed were 426,128. No complaints were filed in the court for violation of Sec 41 F. But the report states that 3 workers were found suffering from noise-induced hearing loss.

The return filed in the year 2019 has the similar story. Numbers of sanctioned posts of Industrial hygienists was 4 but all remained vacant. Number of hazardous factories was 12,042 and number of workers employed were 630,031. No complaints were filed in the court for violation of Sec 41 F. But the report states that 10 workers employed in were found suffering from noise induced hearing loss.

In 2020, 3,59,029 workers were employed in hazardous factories in Gujarat. (Pl. note the numbers have reduced from 630,031 to 359,029!) No complaint was filed against any factory for violation of Sec. 41 F which may not mean that no factory violated the provision. It only means that state decided to be sympathetic to such violations. The State submitted that 11 workers were found suffering from noise-induced hearing loss (NIHL) and 5 workers were found suffering from silicosis in Gujarat.

In these three years, numbers of workers suffering from noise-induced hearing loss (NIHL) have increased – from 3 to 10 to 11 in 2020.

> Implementing good industrial hygiene standards will help improve life expectancy of the workers, reduce sick leave, and reduce occupational diseases and disability due to occupational diseases.

Working of Industrial Hygiene Laboratory

In April 2018 they carried out field work for 13 days which is maximum in 3 years, while in May, 2017 and July 2018 no field visits were carried out at all. Out of the three years, they seem to be more active in 2018. Though no visits were carried out in July, 2018, they carried out field visits for 85 days in a year which is more than double than 41, that were carried out in 2017. In 2019 they carried out filed visits for 56 days which is around two months in a year. *(See Table: 1)*

Table: 1

Report RTI on Ind. Hyg. Lab activities 2017-2019

Year	Days in the field to visit units	Units visited	Total no of samples	Violated samples	% of samples violated
2017	41	92	623	147	23.95%
2018	85	211	1146	86	7.5%
2019	56	172	1015	82	8.07%

In three years, it was on 3 March 2017 that they collected maximum number of samples from one unit. They collected 34 samples from Alembic Ltd, API-1. *(See Table: 2)*

Table: 2

MDC	04
Ethanol	06
Toluene	10
Acetone	08
IPA	04
Methanol	02
Total	34

In 3 years, they collected samples of 63 substances as well as samples of noise, heat and air velocity. Sch. II of the Factory Act lists 120 substances for which permissible limits have been prescribed. Out of 63 substances for which samples were drawn, the Act has not prescribed limits for 32 substances. Only for 31 substances the Act has prescribed limits. This indicates limitation of the legal provisions. *(See Table: 4)*

Asbestos is one of the most hazardous substances and known carcinogen but the IHL, Baroda has not collected even one sample in these 3 years.

There are several large chemical factories in public and private sector around Vadodara. Refinery of Indian Oil Corporation, Petro Chemical Complex owned by Reliance, Gujarat State owned Fertilizer factory, Alkalis & Chemicals, Guj Narmada Fertilizer Corporation,

Table: 3

Monitoring of Noise levels

Year	Total No of units from where samples drawn	No of units from where noise samples taken	% of units from where noise samples collected	Total nos. of samples drawn	No of samples of noise taken	% of noise samples drawn
2017	168	34	20.23	0623	226	36.27
2018	213	39	18.30	1102	196	17.78
2019	092	33	35.86	1015	157	15.46
Total	481	101	20.99	2740	565	20.62

Table: 3-A

Monitoring of Noise levels

Year	No of units from where noise samples taken		No of samples of noise taken	No of samples violated legal limit	% violated
	New	Repeat			
2017	34	00	226	147	65.04
2018	38	01	196	086	43.87
2019	21	12	157	082	52.22
Sub Total	88	13	565	315	55.75%
Total	101				

Table: 4

Violation of TLV for noise

Year	Nos. of units where noise measured was higher than the prescribed limit	Nos. of samples higher than prescribed limit
2017	32	149
2018	28	086
2019	28	082
Total	88	317

Table: 3-B

Repeating sampling of noise from same units

No	Unit	2017	2018	2019
1	A	86	Sample not drawn	85.1
2	B	85.2/86.8	Sample not drawn	85
3	C	Sample not drawn	88	85.1
4	D	94.3/95.9/86.2	Sample not drawn	93.1/94.1
5	E	87	Sample not drawn	85.1
6	F	Sample not drawn	88	89/90
7	G	Sample not drawn	87	89/92
8	H	Sample not drawn	89.2/102.2/86.1/85.4	86.2/87.7/85.4/89.1
9	I	85.2/85.4	91/102.4/88.5	Sample not drawn
10	J	85.2/85.4/91.3/95.4/85.4/85.8	86.3	Sample not drawn

Table: 5

No	Item	No of samples in 2017	2018	2019	Time Weight ed Average (TWA)	Max value found	
1	Acetic Acid	6	30	12	10 PPM	13 PPM	
2	Ammonia	34	78	80	25 PPM	37.4 PPM	
3	Acrylonitrile	00	02	02	2 PPM	14.5 as TVOC	
4	Bromine	00	14	00	0.1 PPM	1 PPM	
5	Chlorine	30	68	64	1 PPM	1.5 (2018)	
6	Ethylene Oxide	04	32	14	OSHA 1 PPM TWA	0.25 (17), 0.16 (19)	The National Institute for Occupational Safety and Health (NIOSH) recommends that ethylene oxide be regarded in the workplace as a potential occupational carcinogen,
7	Epichloro-hydrin	04	00	00	ACGIH 2 PPM	3.4 PPM (17),	Group B2, probable human carcinogen.
8	Hydrofloric acid (HF)	04	00	06	ACGIH 0.5 PPM	1.5 (17)	
9	Isopropyl Alcohol	22	36	38	400 PPM OSHA TWA	960 (18)	
10	LPG (Butane)	04	00	00	Butane 800 PPM	937.1 (17)	
11	Methylene Dichloride (MDC)	24	32	04	OSHA TWA 25 PPM	109 PPM 85; 89.5	May be carcinogen in humans
12	Methyl Ethyl Ketone Peroxide	04	08	02	NIOSH 0.2 PPM	3.8 (17); 5.5 & 3.6 (18); 9 PPM (2019)	
13	Mono Chloro Benzene (MCB)	00	06	2	OSHA 75 PPM	1.1 (2019)	MCB affects mainly the liver, kidneys and hematopoietic system
14	Methanol	24	84	86	200 PPM	210.5 (2017)	
15	Nitrobenzene	00	00	02	1 PPM	1.8 (19)	The International Agency for Research on Cancer (IARC) has determined that nitrobenzene is possibly carcinogenic to humans.
16	Sulphur Dioxide		34	50	2 PPM	6.5 (2019)	
17	Toluene	30	74	66	100 PPM	140 (18);	2018.

several thermal power plants owned by Gujarat state and National Thermal Power Corporation (NTPC) and others. In these three years IHL has not visited to collect samples from any of these units. They manufacture and handle several toxic and carcinogens. They may have their own hygiene units and may be taking care of monitoring workplace environment. But then what is the responsibility of law enforcement agency? Only exception is Vanakbori thermal power station owned by Gujarat State Electricity Corporation from where they collected 1 sample of coal dust from crushing area and 1 from bunker floor. They also collected 16 samples of noise from different areas. Out of 16, in 8 samples, the noise was beyond prescribed limit of 85 decibels (and in spite of it no case of noise induced hearing loss reported!). Another exception is Gujarat State fertilizer Corporation plant in Vadodara from where they collected 6 samples of Benzene. (Benzene is a carcinogen, no case of cancer reported in Gujarat in several years)

Monitoring of Noise

Noise is the most widely found pollution in workplaces cutting across type of industry. Measuring sound is comparatively easier and taking lesser time than other pollutants. Further laboratory testing is not necessary for noise measurement. All these may have contributed role. The data of the three years that we could collect indicate that noise is the single largest sample that was drawn. Over 3 years they visited 481 units to collect samples out of which noise sample was collected from 101 units (20.99). During this period they collected 2740 samples out of which 565 (20.62%) were that of noise *(See Table: 3)*.

Over three years 55.75% of the noise samples collected was above 85 dB. TLV TWA for noise was lowered in 2016 from 90 dB to 85 dB (See Table 3-A). In 13 Units the department collected noise samples twice. We have compared the noise levels during the two years to see if the noise levels were improved during the second visit. Out of 13, the noise levels were within the prescribed limit both the times in 3 units. Out of remaining 10 units there was improvement in 4 units while in 6 units there was no improvement or the situation worsened.

Gujarat is a hub of chemical manufacturing. Several chemicals are hazardous to health. Chemicals, when get into the workplace environment, it pollutes the air. In the 3 years of the report, 17 chemicals levels were found beyond the legally acceptable levels (Table 5) but no prosecutions were filed against the violators nor did they find any adverse impact on health of the workers in spite of higher levels

How the Higher Noise at Work Impacted Workers' Health?

Under section 89 of the Factory Act Rule 104 of the Gujarat Factory rules the manager of a factory is required to send notice of poisoning or disease in Form No. 22 to the Chief Inspector and Certifying Surgeon.

In response to our RTI Application, we were provided the copies of the Form 22. We received 92 copies of form 22 which confirms that 92 workers were found suffering from some degree of hearing loss by the Factory management.

In 2014, the DISH found 44 workers of Ratanveer Stainless Products Pvt.Ltd suffering from noise-induced deafness and when they visited the factory again in 2018, the noise level was still high, to the tune of 96.8 dB, in violation of the legal limit. Had any action been taken and the actions were effective, in 2018 they would not have reported high noise in both the samples drawn. It is clear that either no actions were taken or the actions were not effective. We believe that the high noise continued in between years – from 2014 to 2018 and that may have rendered some more workers with NIHL but we do not hear of any more cases of NIHL post-2014. This is most surprising. We also do not know the noise levels before 2014 which rendered 44 workers with NIHL. Was that level still higher than the levels in 2018? We also do not have details which are the machines that are so noisy and what is the reason for high noise. What was the level of deafness of these 44? What age group they were in? Whether they were covered under social security or not? Did they know about their rights for compensation? Did they claim? If claimed, what was the fate of the claim? Have they continued with their job with this factory and for how long and which department? These are the areas for further research.

But similarities stop here. In Philips India Ltd (Vadodara Light Factory) 4 cases of NIHL were reported in 2014 but Ind. Hyg Laboratory did not draw any samples during 2017, 2018 or 2019. We do not know why.

Now, from the available statistics we find that 92 cases of NIHL have been reported in 2014, 3 in 2018, 10 in 2019 and 11 in 2020. For 3 years – 2015, 16, and 2017 – no cases have been reported. What is the reason that 92 cases were reported in 2014? Are there any political reasons? Was there any individual enthusiastic officer who took it on his/her head and made the factories to report? Why there were no cases for next three years? What is clear, however, is the policy of the State on identifying occupational diseases seems to be very weak. ■

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