

CHEMICAL SAFETY: ORGANIZATION OF INFRASTRUCTURES IN INDIA

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Summary

Although some measures were introduced on the Indian subcontinent in the seventies of the last century to protect the living environment, it is only in the last five decades of political independence that legislation in India oriented towards the regulation of activities related to hazardous chemicals has received any serious attention. In the wake of the Bhopal disaster, the initiative for environmental protection has gained considerable momentum. The outcome of the resulting activities so far as they are pertinent to Chemical Safety are reviewed in this paper.

Introduction

In the wake of Bhopal (1984) there has been a visible effect of sensitization of Government, industry and the public on issues related to chemical safety [1,2]. It must, however, be remembered that legislation and regulation of activities pertaining to hazardous chemicals has a longer history. Thus the Smoke Nuisance Act of Bengal, Bombay and Madras Presidencies of pre-freedom India have been in operation since the late seventies of the last century. Similarly the Explosives Act, the Factories Act and the Drug and Poisons Act have all regulated hazards of chemicals (to which humans are exposed voluntarily and involuntarily) for over sixty years now. The Insecticide Act became active in the early sixties of this century [3,4].

Although the idea of protecting the environment in addition to public health was implicit in all the above acts, it was only in the middle of the seventies that the Water Pollution Prevention and Control Act was put on the statute book. This demonstrates explicitly the commitment of the Government to protect one of the important compartments of the Environment. Following Bhopal, there has been, naturally, an upsurge of activity to review and update the existing measures for chemical safety. The Environment (Protection) Act of 1986 and the updated Factories Act of 1986 embody comprehensively all aspects of regulation of hazardous chemicals in the living and occupational environment. Currently the Ministry of Environment and Forests and the Min-

istry of Labour are engaged in enunciating the procedures, rules and guidelines for the effective implementation of these Acts.

Infrastructure for labour safety

The Factory Inspectorate system has been in operation for several decades. In the sixties, with the cooperation of ILO (the International Labour Organisation) and private foundations in India, the Directorate of Factory Inspection and Labour Institutes was updated. The Labour Institute, with the national centre at Bombay, initiated programmes of training of workers, shop assistants and workforce supervisors. Mobile vans were established to take the message of Labour safety to the door-steps of industrial establishments. Studies were conducted on ergonomics, work psychology and industrial hygiene. The emphasis remained for a long time on safety of mechanical operations since accidents in mechanical operations constituted the most significant contribution to industrial accident statistics.

Notification procedures according to the Factory Act were adopted by and annual reports were presented to parliament on accidents. Measures were taken to control and prevent accidents and to impart training in labour safety. Occupational diseases were grouped into "notifiable" diseases as per ILO guidelines. These covered pneumoconiosis, skin disorders and a few other disabilities linked to the exposure to toxic chemicals. Threshold Limit Values (TLV's) were adopted on a tentative basis for particulates and certain solvent vapours.

The provisions of the Factory Act covered most of the industries under the organized sector (both private and public) and some of the units under the unorganized sector which had a labour force of more than ten and which used electrical or steam power for operations.

Concurrently the National Safety Council (NSC) was established with representatives from Trade Unions, Management, Professional bodies and Government. NSC acted as a catalyst and promoter of industrial safety by sponsoring seminars, training workshops, conferences and prestigious national awards for both individual and institutional performance. On the module of the (Central Labour Institute) CLI, Bombay, Regional Labour Institutes were established at Calcutta, Madras and Kanpur and later at Chandigarh.

The constraints of adequate medical care of the workers and their families were attempted to be removed by the creation of Employees State Insurance Hospitals at all industrial Centres and all major cities adjacent to industrial sites. This was facilitated by the enactment of the Employees State Insurance Bill. In structure and function the ESI hospitals did not differ very much from hospitals run under the national health scheme or private hospitals, except for the provision of a "referral" system. ESI Hospitals could use a panel of specialists drawn from Medical Institutions and general practice not only for confirmation of diagnosis but also for specialist treatment.

In regard to documentation of vital statistics on mortality and morbidity,

state of the art of labour welfare in different industries and industrial safety, the CLI has been active in producing authentic reports based on field surveys of industries, working manuals in regional languages, audiovisual aid for training and has sponsored both documentaries and feature movies for being screened at community welfare centres and public movie houses. In India, as in many Developing Countries with relatively low literacy rates, the silver screen and lately the television have proved to be far more effective in notifying the people than printed documents.

The implementing agencies and activities related to the updated Factories Act 1986 are shown in Fig. 1.

After Bhopal, chemical safety has received much greater stress than before.

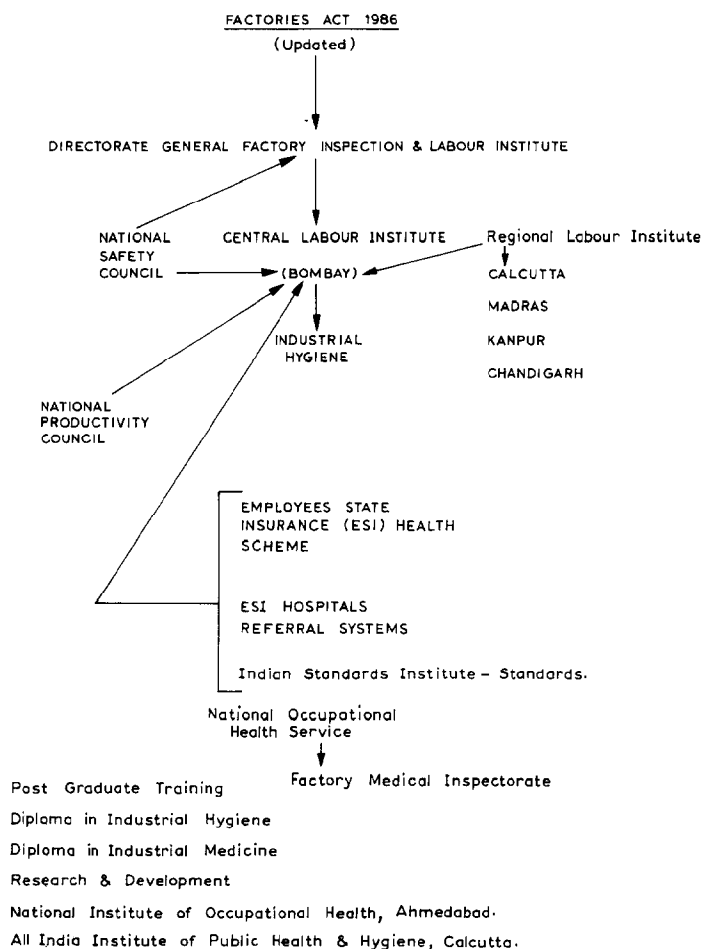


Fig. 1. A model for chemical hazard abatement infrastructure for the occupational environment to implement the Factories Act of 1986.

Thus the State Labour Department along with their counterparts in Industrial Development, Environment, Health and others activated an intensive and extensive survey of chemical industries within their territorial jurisdiction which has resulted in exceedingly valuable reports on the existing hazardous installations in almost all the industrialized and industrializing states of the country. Most significant among these are the reports from Maharashtra, Tamil Nadu, Gujrat, Andhra Pradesh, West Bengal and Uttar Pradesh [5].

Infrastructure for environmental protection

Concern for protection of the environment was articulated immediately after the participation of Mrs. Indira Gandhi, the former Prime Minister, in the Stockholm Conference on Human Environment in 1972. In the decade of 1972–1982, the section dealing with environment under the umbrella of the Department of Science and Technology was transformed into a separate Ministry of Environment/Department of Environment in all major states [6]. Water and air pollution prevention and control activities are undertaken by the Central and State Boards with their own laboratories and inspectorate systems.

After the Bhopal disaster in 1984, the administrative responsibility for co-ordinating activities related to hazards control was assigned to the Ministry of Environment. This step was taken following the recommendation of an Inter Ministerial and Inter Agency working group convened by the Ministry of Environment on the basis of a policy paper prepared by the Scientific Commission for Continuing Studies on the Effects of Bhopal Gas Leakage on Life Systems. The report of this working group, edited by the Chairman of the Scientific Commission, took note of the fragmentation of responsibility through the multiplicity of agencies involved in hazards control and recommended the creation of a Central Agency for Hazards Control.

The Ministry is engaged currently in strengthening the links with the existing agencies in the Ministries of Industry, Labour, Agriculture, Health, Transport and Defence. The implementing agency for hazard control will be a state body or committee with inputs from all the concerned agencies and State Board for Prevention and Control of Pollution to coordinate the activities. The Emergency Response System will operate at the District level with the Chief Executive of the District (Commissioner/Collector) as the head with the collaboration of industry, local bodies and the representatives of public interest. The mechanisms proposed for implementing the Environment (Protection) Act 1986 and related activities are shown in Fig. 2.

The proposals which are receiving active attention currently are [7,8]:

(1) The establishment of a Safety Audit System for the chemical industry with a charter similar to the charter given to Chartered Accountants for finance control. The Safety Audit System will need the generation of expertise

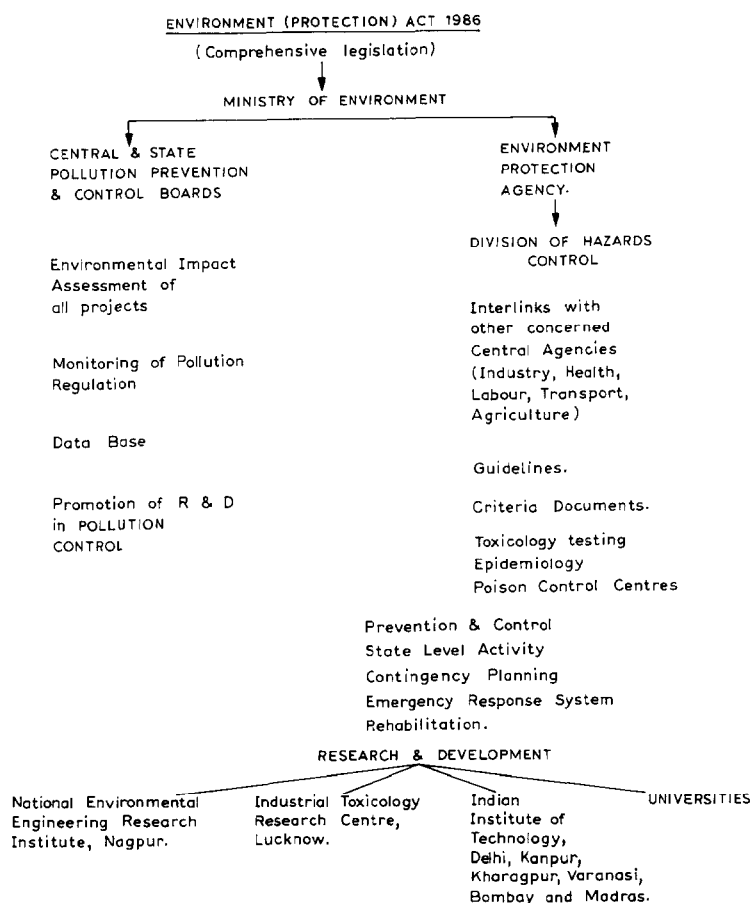


Fig. 2. A model for chemical hazards control infrastructure for the living environment to implement the Environment (Protection) Act of 1986.

in the multi-disciplinary area of safety evaluation of chemicals including hazard identification, risk assessment and management;

(2) Prioritization of hazardous chemicals, preparation of data sheets and generation of toxicity data both by experimental studies and by environmental epidemiology programmes;

(3) Setting up Regional Poison Control Centres by updating existing Intensive Care Units in hospitals dealing with chemical poisoning cases, and

(4) Implementing a data bank on hazardous chemicals and chemical accidents.

Chemical hazards regulated by other agencies

Besides the above two major efforts for institutionalizing regulation of hazardous activities, the Department of Atomic Energy, the Department of Space, and the Department of Defence Research have active units working on chemical hazards within the purview of their respective structures and functions. Pesticides are regulated by a separate agency under the Ministry of Agriculture for implementing the provisions of the Insecticide Act. (See Fig. 3.) Hazardous

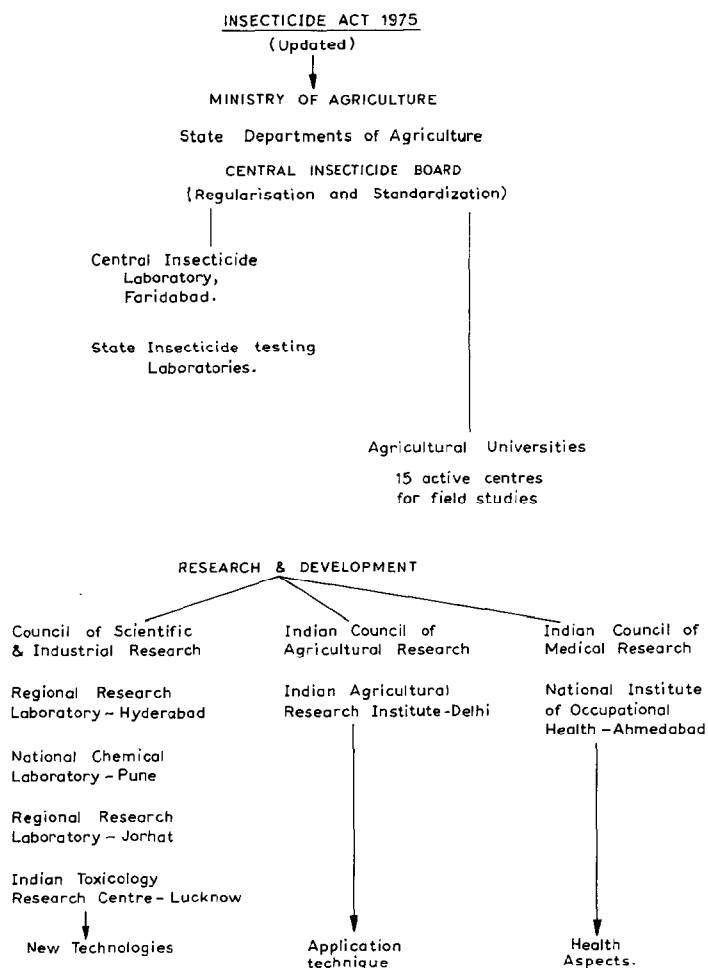


Fig. 3. A model for chemical hazards control infrastructure for the Agricultural Sector to implement the Insecticide Act of 1975.

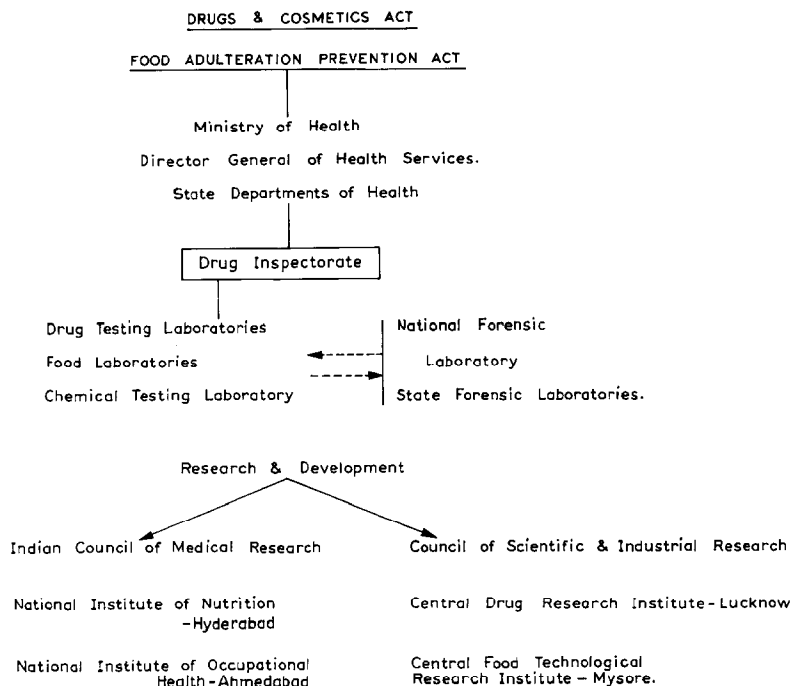


Fig. 4. A model for chemical hazards control in the Health Sector to implement the Drugs and Cosmetics, and Food Adulteration Prevention Act.

Chemicals used as drug and pharmaceuticals or as ingredients of cosmetics/ personal products are regulated by the Drug and Cosmetic Act. (See Fig. 4.)

International and bilateral collaboration

Illustrative of the efforts made by India to enter into international and bilateral arrangements for hazard control, the following deserve mention:

- a. A Memorandum of Understanding has been signed between the International Programme on Chemical Safety (cosponsored by the United Nations Environment Programme/World Health Organization/International Labour Organization) and the Ministry of Environment, Government of India.
- b. The Environmental Information System (ENVIS), set up by the Ministry of Environment, acts as the national correspondent for the International Registry of Potentially Toxic Chemicals, Geneva, which is a constituent wing of the United Nations Environment Programme.
- c. The Directorate of Factory Inspection and Labour Safety is linked to the Central Information System, International Labour Organization, Geneva.

- d. Council of Scientific & Industrial Research, Ministry of Scientific Research, TNO bilateral agreement with The Netherlands on Risk Analysis.
- e. Collaboration with the European Community of Nations on hazardous chemicals by the Ministry of Industries, Government of India.
- f. Possible Collaboration with the Health and Safety Executive U.K. on Hazards Control based on U.K. legislation.

Role of industry

It is only after Bhopal that the Chemical industry has begun to exhibit visible concern with safety of the public in relation to its activities. The Indian Chemical Manufacturers' Association has cosponsored seminars and participated with Government agencies in exercises related to tightening the measures for chemical safety [6]. Under the Hazards Control Programme and the revised Factories Act, chemical industries have to take full responsibility for contingency planning envisaging both the control and prevention of hazards within their installations and emergency response systems. When accidents occur, safety audit reports will have to be submitted to the Government from the stage of application of license for setting up the industry to the installation and operation stage and then periodically. Preparation of such audit reports and their evaluation requires high-level expertise which has to be generated urgently.

Conclusions

The legislation and regulation of activities pertaining to hazardous chemicals in the Indian subcontinent has a long history. The idea of protecting the environment and public health was implicit in many acts in vogue from the seventies of the last century. Legislation enacted in the seventies of this century led to the setting up of the Central and State Boards of Prevention & Control of Pollution.

Following the Bhopal disaster, initiatives have been intensified to review and update existing measures for the control of hazardous activities and their adverse impact on the environment and public health. The Environment (Protection) Act of 1986 and the Factories Act of 1986 embody comprehensive measures for protecting the living and occupational environment. The Ministry of Environment & Forests and the Ministry of Labour Welfare are engaged presently in preparing the guidelines, planning and organizing the infrastructure needed for implementing various measures both at the Central and State levels.

Other agencies involved in measures related to chemical safety are the Ministry of Health, Ministry of Agriculture, Ministry of Industries (Department of Chemicals and Petrochemicals), Department of Atomic Energy, Depart-

ment of Space, Department of Defence Research & Development, and the Indian Standards Institution. The needs have been articulated for bringing about effective orchestration of the measures adopted by these diverse agencies.

The Government of India has sought the help of International agencies such as WHO, UNEP, ILO in planning and implementing measures for hazards control and has entered into bilateral agreements with several industrialized countries for technical cooperation in generating the requisite expertise.

From the organized sector of Industry, the Indian Chemical Manufacturers Association has extended its cooperation and support to the Government in updating the measures for hazards prevention and control. The proposed safety audit system in the chemical industry is expected to remove most of deficiencies in the existing control systems and ensure better safety within and outside the chemical industry.

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