EDITORIAL

Towards a Holistic Approach

The movement towards making work places healthier and safer has gained some momentum in India over the past decade. The widespread recognition and diversified outreach is yet to be established in the country. Several occupations in the organized sectors of economy have attracted a great deal of attention in relation to occupational health and safety. Many organized workers' efforts have begun to tackle these issues in bi- and tri-partite negotiations. And thousands of workers on the shop-floor of factories, mines and offices have undertaken direct actions in pursuit of improvements in occupational health and safety.

Yet, many sections in the unorganized sectors of economy (like agriculture, forestry, construction, home-based and small scale industries) have yet to notice, let alone deal with, the widespread hazards prevalent in such work places. Particularly vulnerable and specially complex issues of occupational health and safety affecting women workers and child labour have not received much attention or witnessed significant action.

There has been another chasm in this area of struggle and development. The environment movement in the country has been significantly focusing on the questions of air and water pollution and associated health hazards during the past decade. Numerous examples of citizen actions and community struggles against environmental health hazards due to effluents exist throughout the country. But bulk of these movements have remained unconnected with workers' effort for safer and healthier work places. In fact, the entire environmental
movement assembled in Rio during June 1992 noticed the absence of workers' organizations and concerns. Besides its global dimensions, similar gap exists in the country and within South Asia.

This unconnectedness has at times resulted in peculiar situations. The Bhopal gas tragedy, caused by leakage of MIC killed thousands of community residents, while leaving the workers inside the factory unharmed. The subsequent protests resulted in closure of the factory, thereby causing job loss. In many instances, like in Bombay, community protests against effluents and pollution have generated unnecessary hostility between community residents and workers. Thus the unconnectedness has also resulted in mutual apathy and hostility between 'two sides of the same coin'. This unconnectedness is also reflected in the efforts of consumer groups as they begin to demand safer and hazard-free goods and services.

PRIA's work in the field of Occupational Health and Safety has been so far supporting workers' initiatives, and those of their organizations. Yet, we have been relating with the community movements against pollution and health hazards. It is this recognition of unnecessary 'divide' and common overarching purposes between the movement for improving occupational health and safety at work places, and the movement against pollution and for improving environmental health at living places which has prompted us to build a holistic and integrated perspective in our programme.

This Bulletin, therefore, reflects this holistic and integrated approach of our Centre on Occupational and Environmental Health. We have begun to undertake programmes with such a holistic focus. The brief reference in this issue to a recent PRIA study in Rajgangpur in Orissa is an illustration of the same. We hope that this revised perspective and presentation of materials in this Bulletin will facilitate exchange of information and ideas across the two sets of movements, improve communication and overcome distance between them, and thereby contribute to a more holistic and comprehensive movement towards making working and living places safer and healthier in our country and the region.

Rajesh Tandon
Dear Friend,

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Looking forward to your continued support.

Thanking You

Sincerely

Rajesh Tandon
Executive Director
Dust-Caused Respiratory Occupational Diseases In India

* Dr. G.D. Agrawala.

In the month of May, PRIA in collaboration with Gramodaya Vishwa Vidyalaya and Sundergarh Industrial Mazdoor Union, conducted a study on the occupational and environmental health status of the population living in the vicinity of Orissa Cement Limited. The study was completed with the help of 11 doctors and 4 environmental engineers. The report will appear in the subsequent issue of the bulletin.

Dust-The Most Critical Air Pollutant in India:

While excessive emission of gaseous air-pollutants like SO$_2$, NO$_x$, CO$_2$, HC, CFC etc. in highly industrialised countries of the west have resulted in environmental problems like acid rain and ozone-layer depletion and created apprehensions of global warming and adverse climate changes, much less attention has been paid during recent years to the silent and slow, but continuous and potent killer that is in airborne dusts. Even in our own country episodes like the MIC leak at Bhopal, the oilum tank failure at Delhi and gas-leak of Ammonia, Chlorine, CO, etc. attract so much public attention that air-pollution in public mind, appears synonymous with gaseous air-pollution and gas leaks. Air-borne dusts, or Suspended Particulate Matter (SPM) are almost always ignored. Thus when the expert committees considers the discoloration and pitting of Taj Mahal marble exterior surface, they stress on SO$_2$ and other gaseous pollutants and ignore the role of the high suspended particulate matter (SPM) present, which could be seriously involved both in discoloration and pitting of marble surface. They are definitely involved in, as major contributors to, respiratory diseases in India.

With significant amounts of monitoring data now becoming available in India, it is an obvious fact that SPM is the air pollutant of greatest concern (probably the only air pollutant of real concern) in ambient air-quality in India. This would become clear from Table-1 giving range of ambient air-pollutant concentrations observed at different locations in India during 1991. While SO$_2$ and NO$_x$ concentrations at all locations were most of times well below the Indian (and even WHO) prescribed levels, the concentrations of SPM (or air-borne dust) almost always exceeded even the liberal Indian standards, what to say of the WHO limits. This was particularly true for the northern Indian plains, at least partly due to the warm, dry and windy climate, denuded vegetation and friable, dusty soils. The poor condition of roads and poor dust control practice in mining and industry are bound to play a major role also as shown by the much higher SPM values in case of Barauni, Kanpur, Nimbahera, Bokajan, Delhi, etc.

Suspended Particulate Matter, SPM, as monitored by the EPA design High Volume Sampler includes all air-borne particles of 0.5 to 100 microns particles size. All of these are not relevant from the point of view of respiratory diseases, since particles above 10 microns size are not able to enter human breath. Because of their larger weight, they do not get sucked up with the normal breathing velocities. That is why now separate limits are prescribed for the respirable dust particles finer than 10 microns size, called PM10 in western parlors. In fact even particles between 5 and 10 microns in size get retained in upper respiratory tract of humans and only those finer than 5 microns reach the lungs. Thus Mine-Safety officials normally consider only the fraction finer than 5 micron as respirable and of concern. Of this also, it is only particles in the range 1-5 microns size that are likely to get lodged, retained and accumulated in the lungs, the finest ones getting exhaled with expiration. The actual health-damage or diseases caused by these particles lodging in the lungs or in the respiratory tract shall very much depend on their nature and composition. Presence of asbestos, silica, heavy metals, fibrous materials, allergens etc. shall very much increase their disease causing potential. Tables 2A and 2B give an idea of the differences in composition of SPM in two industrial localities. Obviously it is not merely the SPM concentrations as measured by the standard High Volume Sampler that would indicate the human health-risk but the measurement of SPM along with the respirable fractions as also the nature and composition of the SPM.
‘Workers’: The Community at Maximum Risk

It is obvious that workers in mining, industry or even agriculture get exposed to much higher concentrations of dust as they work in areas where these dusts are generated. Drilling, blasting, excavating and material handling operations in mining, stone-crushing, grinding, milling, sieving, mixing and many such operations in industries and winnowing in agriculture release large amounts of dust. The workers are the ones to face the full blast and fury of the pollutants so released.

Occupational diseases attracted wide attention of medical and industrial safety personnel in western countries where industrial and labour laws and the well-accepted “torts” principle resulted in heavy compensation awards in favor of affected workers. Under pressure of such legal and compensation proceedings, intensive researches were carried out, TLV for various pollutants evolved, extensive shop-floor-environment monitoring and regular health check-ups of workers introduced and efficient and effective pollution-control and worker protection measures devised. In our own country the workers are by-and-large ignorant of the health implications of the dust, and even when they are actually suffering, of the nature or cause of their disease. They are not aware of their legal rights and are poorly organised to generate effective pressure. Professionals, including doctors and lawyers, prefer to take the easier course of keeping aloof or siding with the party that can pay better fees and pay fast. The most at fault is our legal system that does not accept the “torts” principle and is extremely reluctant to grant compensations. It is the aggregate result of these conditions that one finds only rare cases of dust-caused occupational diseases such as asbestosis, silicosis, byssinosis, pneumoconiosis, coal-miners lung disease etc. reported or recorded in India. With so little and poor monitoring of shop-floor environment or individual worker-exposure, and so-poor over-all management of dust in work-areas, as is openly seen in all mines, crushers, mills and other work areas, we still proudly claim that these dreaded occupational diseases are well under control in our country?

Monitoring of shop-floor environment or of worker-exposure is extremely rare in India. Steel Plants, large Cement Plants etc. do not practice it. This author has also had only limited opportunities of monitoring shop-floor environment. But such monitoring in wide variety of units has always and invariably yielded dust/pollutant concentrations, at many times the permissible concentrations. Obviously the staff and monitoring infrastructure of the Factory Inspectorates in different states and those of the Ministry of Labour are too miniscule to identify or indicate the severity of the situation. Periodical, notified in advance, and short-term checks, as are currently carried out by regulatory agencies, can be easily manipulated and managed. To be effective, the monitoring has to be regular, near-continuous and much more stringent. Only such intensive and extensive monitoring of work-places and of workers’ exposure shall reveal the real risk to the health of the worker.

### Table 1

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Location</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>SPM</th>
<th>Respiratory</th>
<th>Particulates (PM10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.H.O Limits</td>
<td>60</td>
<td>60</td>
<td>100</td>
<td></td>
<td>75</td>
<td>(proposed)</td>
</tr>
<tr>
<td>Indian Limits (for residential area)</td>
<td>80</td>
<td>80</td>
<td>200</td>
<td></td>
<td>12-120</td>
<td>ND</td>
</tr>
</tbody>
</table>

**Notes:**
(i) All concentrations are in microgram/m³ air.
(ii) Values based on CPCB/NEERI/Envirotech Data

### Diagnosis and Management of Respiratory Ailments of Workers in India.

As mentioned above, respiratory occupational diseases are rare to be reported or recorded in India. However this does not mean that respiratory diseases are less common amongst workers in India. Thus in the total cases reported at ESI Hospitals over India during 1989, as many as 36% were of respiratory ailments which was more than 28% of physical injuries, 26% of the entic disorders and 10% for other miscellaneous diseases. This is quite different from the situation in general Indian communities where entic diseases and vector-borne disease normally outnumber respiratory diseases or injuries. Unfortunately these respiratory ailments are diagnosed by the common names of cough, bronchitis, Asthma, TB etc. which entirely mask the occupational source/cause of the ailment. One would like to believe that this in-
adequate (and even faulty) diagnosis is more due to an easy-going approach and inadequate training in occupational diseases than any deliberate action on part of the doctors concerned.

In line with the above general approach, workers reporting with respiratory symptoms at ESI or other clinics are given general and symptomatic treatment including sulfa drugs and antibiotics which would not be prescribed if they were diagnosed as suffering from dust-caused diseases. Often the patient does get some relief, particularly from expectorant drugs and starts reporting intermittently and repeatedly for respiratory symptoms like breathlessness, chest pain, cough, expectoration etc. When things look to be prolonging and becoming aggravated, chest X-rays are taken and the capacity caused by accumulation of dust in lungs or the fibrosis generated by it is diagnosed as indicative of TB. The worker is then put on ATT or other anti-tuberculosis drugs and often admitted to a TB ward. With his greatly reduced resistance and lodged in a TB ward, he becomes a TB patient even if he initially was not. Obviously ATT cannot cure the dust caused pulmonary diseases of the worker. He continues to grow weaker until he dies of TB and/or other infections, none of which had an occupational source. So we have no asbestosis, silicosis, pneumoconiosis,byssinosis or other dust-caused respiratory occupational diseases, but we have a lot of TB incidence around our mines and industries. And TB is not an occupational disease, it is caused by poor general sanitation and is not notifiable or compensable.

To understand the realities of the situation and verify the above apprehensions, an intensive survey was carried out at Rajangpur, Di.

| On basis of their work-history the 282 subjects examined at Rajangpur can be classified as below: |
| Working at OCL Refractory for over 15 years | 96 |
| Working at OCL Refractory for 8-15 years | 36 |
| Working at OCL Refractory for below 8 years | 28 |
| Working at Orissa Spinning Mills (OSM) | 29 |
| Working at other industrial/Mining Units | 30 |
| Working at offices, shops, businesses etc. | 12 |
| Housewives | 27 |
| Students/Children | 24 |

Sundergarh near Rourkela in Orissa, which is briefly narrated below:

Preliminary Findings of the Rajangpur Health Survey.

The health survey at Rajangpur, involved intensive medical examination of 280 persons including industrial workers, housewives and general citizens by a team of 11 qualified doctors (2 faculty members and 9 students of M.D. at the Post Graduate Institute of Continuing Education in Ayurveda, Chitrakoot) along with 4 environmental scientists from Gramodaya Vishwa Vidyalya Chitrakoot, Satna, M.P. The survey was coordinated by PRIA which has been in the forefront to scientifically examine the occupational health scene in India and to campaign for worker health and well-being. Local mobilization and arrangements were made by Sundergarh Industrial Mazdoor Union (SIMU) a constituent of CITU at Rajangpur, Orissa. The survey was carried out during May 9-12, 1994 and detailed compilation and analysis shall take time. Preliminary findings are reported in brief below.

Preliminary status of prevalence of respiratory ailments is shown in Table-3. A look at the table immediately reveals the relationship of respiratory health at Rajangpur with occupation and the extremely alarming situation of OCL Refractory workers. While all categories of examinees having OCL Refractory work-history had 50-60% of the subjects free of respiratory symptoms, even in case of category C where the subjects had been with OCL for less than 8 years, the fraction of such no-respiratory -ailment examinees fell to around 30% and this fraction was only 11% for those who had been with OCLR for more than 8 years.

It appears that the respiratory tract of a person started getting adversely affected within a few years of his joining OCLR and soon he was on the road to no return. Soon after 8-10 years working with OCLR the respiratory tract had been degraded enough for the subject to be suspected of, or diagnosed as, a case of TB and be put on ATT. This author believes that all or almost all the examinees at Rajangpur showing respiratory symptoms were really at various stages of dust caused respiratory diseases-occupational health cases in case of OCLR workers and environmental health sufferers in case of others. Whether this author is correct in his belief should be clearer when detailed interpretation of this survey is completed and further confirmatory research has been done.

Observations of spirometer tests which were also conducted on examinees at Rajangpur also support the above findings. As given in the last columns of Table 3, the average PEF and average FEV1/FVC values were both highest in case of OSM workers and fell significantly in case of OCLR workers with his years of exposure to OCLR environment clearly indicating the effect of occupational exposures. That these values were low in the case of housewives and students/children categories was due to poor general health of examinees and some of them not being able to properly use the spirometer. Also after all they live in the same polluted environment.

Conclusions and Recommendations

(i) The status of respiratory occupational diseases at OCLR is really frightening. The situation at many mines, stone-crushers and other dust laden work- environments may be similar or worse.

(ii) Regular, near-continuous and stringent monitoring should be urgently enforced for work- environments where dusts are generated.

(iii) Thorough annual medical check-ups of all workers (whether regular/daily wages/ad-hoc-contract) at mines/industries be enforced.

(iv) To create specialised professionals, degree courses in M.D (Occupational Health) be started.

(v) Intensive research and training efforts be taken up for study of occupational health problems in India.
### TABLE 2A
**HEAVY METAL IN AMBIENT AIR SPM NEAR A CEMENT FACTORY**

<table>
<thead>
<tr>
<th>Metal</th>
<th>Range</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper, Cu</td>
<td>500 - 4160</td>
<td>mg/kg of SPM</td>
</tr>
<tr>
<td>Cobalt, Co</td>
<td>50 - 95</td>
<td></td>
</tr>
<tr>
<td>Nickel, Ni</td>
<td>75 - 180</td>
<td></td>
</tr>
<tr>
<td>Lead, Pb</td>
<td>230 - 430</td>
<td></td>
</tr>
<tr>
<td>Zinc, Zn</td>
<td>Above 8000</td>
<td></td>
</tr>
<tr>
<td>Chromium, Cr</td>
<td>150 - 880</td>
<td></td>
</tr>
<tr>
<td>Manganese, Mn</td>
<td>220 - 590</td>
<td></td>
</tr>
<tr>
<td>Lithium, Li</td>
<td>Below 20</td>
<td></td>
</tr>
<tr>
<td>Arsenic, As</td>
<td>Below 5</td>
<td></td>
</tr>
<tr>
<td>Cadmium, Cd</td>
<td>Below 1</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 3A
**SPIROMETER RESULTS**

<table>
<thead>
<tr>
<th>Cat.</th>
<th>Subject by Work History</th>
<th>Total No. of Subject</th>
<th>Average PEF</th>
<th>Average FEU/FVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>OCLR over 15 yrs.</td>
<td>96</td>
<td>327</td>
<td>78%</td>
</tr>
<tr>
<td>B</td>
<td>OCLR-8 to 15 yrs.</td>
<td>36</td>
<td>422</td>
<td>89%</td>
</tr>
<tr>
<td>C</td>
<td>OCLR-8yrs.</td>
<td>28</td>
<td>452</td>
<td>92%</td>
</tr>
<tr>
<td>D</td>
<td>OSM</td>
<td>29</td>
<td>536</td>
<td>93%</td>
</tr>
<tr>
<td>E</td>
<td>Other Industries</td>
<td>30</td>
<td>486</td>
<td>92%</td>
</tr>
<tr>
<td>F</td>
<td>Office/Shops</td>
<td>12</td>
<td>460</td>
<td>93%</td>
</tr>
<tr>
<td>G</td>
<td>House Wives</td>
<td>27</td>
<td>365</td>
<td>91%</td>
</tr>
<tr>
<td>H</td>
<td>Students/Children</td>
<td>24</td>
<td>303</td>
<td>88%</td>
</tr>
</tbody>
</table>

**Total No. of Subjects Examined:** 282

### TABLE 2B
**NATURE AND COMPOSITION OF AMBIENT AIR SPM NEAR AN INDUSTRIAL COMPLEX**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of Ambient Air SPM</td>
<td>36 - 650 ug/m³</td>
</tr>
<tr>
<td>Respirable (PM10) Fraction</td>
<td>10 - 30%</td>
</tr>
<tr>
<td>Volatile Fraction/Loss</td>
<td>15 - 45%</td>
</tr>
<tr>
<td>Benzene Soluble Fraction</td>
<td>8 - 34%</td>
</tr>
<tr>
<td>Lead in Ambient - air</td>
<td>0.1-2.3 ug/m³</td>
</tr>
<tr>
<td>Vanadium in Ambient - air</td>
<td>0.3-5.9 ug/m³</td>
</tr>
</tbody>
</table>

### TABLE 3B
**PERCENTS OF EXAMINEES HAVING RESPIRATORY PROBLEMS**

<table>
<thead>
<tr>
<th>Category</th>
<th>Suspected or Subject by Work History</th>
<th>Other Severe No. of Subject</th>
<th>Moderate Respiratory</th>
<th>No Respiratory FEU/FVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>31.5</td>
<td>14.5</td>
<td>42.5</td>
<td>11.5</td>
</tr>
<tr>
<td>B</td>
<td>22.5</td>
<td>11.0</td>
<td>55.5</td>
<td>11.0</td>
</tr>
<tr>
<td>C</td>
<td>7.0</td>
<td>3.5</td>
<td>58.0</td>
<td>31.5</td>
</tr>
<tr>
<td>D</td>
<td>3.5</td>
<td>3.5</td>
<td>31.0</td>
<td>62.0</td>
</tr>
<tr>
<td>E</td>
<td>6.5</td>
<td>3.5</td>
<td>33.5</td>
<td>56.5</td>
</tr>
<tr>
<td>F</td>
<td>8.0</td>
<td>—</td>
<td>50.0</td>
<td>42.0</td>
</tr>
<tr>
<td>G</td>
<td>3.75</td>
<td>3.75</td>
<td>37.5</td>
<td>55.0</td>
</tr>
<tr>
<td>H</td>
<td>4.0</td>
<td>12.5</td>
<td>25.0</td>
<td>58.5</td>
</tr>
</tbody>
</table>

*The author is eminent environmental scientist, and presently honorary teacher in Gramodaya Vishwa Vidyalaya, Chitrakoot, Satna, Madhya Pradesh*
The diagnosis of Byssinosis among textile workers

Results of a study conducted in Mumbai Textile Mill, Bombay as part of the National Campaign On Dust Related Lung Diseases

Introduction

This is the abridged version of the report prepared by Dr. V. Muridharan of OHSC, Bombay. For detail report kindly write to Pria.

This study was conducted on April 4th to 6th, 1994 by Occupational Health and Safety Centre (OHSC) and Pria in collaboration with Labour Welfare Department of Mumbai Textile Mill (Mumbai Textile Mill Kamang Kalyan Mandal).

The Mumbai textile mill manufactures spun cloth from cotton. After it was declared as a sick mill the weaving section was closed down. At present it employs 436 workers in the spinning, winding and other dusty departments, in three continuous shifts. The spinning department consists of the Blow-room, Card-room, Combing, Frame and Ring sections. It was noticed that the workers had never heard about Byssinosis. Some of them were treated for tuberculosis continuously for years. Some could work in dusty departments only after taking broncho-dilators.

A questionnaire was prepared similar to the one used by Dr. J.R. Parikh of the National Institute of Occupational Health (NIOH) Ahmedabad. Three hundred and nine workers were interviewed and 273 were tested for their lung function on the basis of the symptoms reported.

Lung function tests were carried out by Wright Ventilometer VM1, which gives digital readings of Forced Vital Capacity (FVC), Forced Expiratory Volume in the first Second (FEV1), FEV1/FVC and Peak Expired Flow Rate (PEF). The ventilometer was provided by PRIA. The researchers of this study were from the OHSC, LTM medical College (Sion), the Forum for Environmental Concern (Nirmala Niketan, Bombay), and PRIA.

Criteria for the diagnosis of Byssinosis

The criteria used for the diagnosis of Byssinosis was framed considering the one used in previous studies and is given below.

a) Symptoms of chest tightness after exposure to cotton dust
b) FEV1 less than sixty percent of the expected value. The values of expected FEV1 by western standard are higher than the Indian values. If we use the western values many more workers would be diagnosed as being affected by byssinosis. The Indian values are less than the western values and our diagnosis is more consistent with Indian reality and is conservative.
c) The percentage FEV1/FVC less than 75%.

We have used (b) and (c) in association with (a).

Results

The results of the study are presented in the form of four tables/graphs.

Graph 1 gives the age-wise breakup of the workers examined, majority being in the age groups 35-44 (47.98%) and 45-54 (31.13%).

Table gives the break-up of Byssinotic patients diagnosed in various sections of the mill and also their years of service. 30.16% of the workers in the dusty departments of spinning and winding had the disease and the overall percentage in all the departments was 25.64%. In all, 70 workers were diagnosed as suffering from the disease.

Workers with less than 10 years of service had a 23.52% incidence of the disease and those with more than 30 years of service had a 45% incidence. The maximum number of workers examined were from the age group 11-20 i.e. 167 workers out of which 37 of them were diagnosed as having the disease (22.15%).

Graph 2 gives the incidence of smoking amongst the affected workers. 32.15% of the affected workers were smokers, of them 20% were heavy smokers. The rest 67.14% were nonsmokers.

Graph 3 gives the incidence of cough among the workers who are affected. 41.42% had no incidence of chronic cough, 33.99% had chronic cough lasting more than three months.
Discussion

The OHSC's initiative in this study is without parallel in the 150 years of existence of the textile industry in Bombay. It is the first time that the workers are actively participating in the campaign in order to remain healthy while at work. This is in spite of the assaults on their livelihood by mill closures, selling of the mill land where they had slogged for a century, exit and other policies with the advent of the new economic liberalisation etc. The 1981 Textile strike and the ensuing closures and forced retirement schemes have compelled about 100,000 workers to lose their jobs.

It is estimated that there are, at present, around 100,000 textile workers who are employed in Bombay, out of which 15-40% of those working in the dusty sections would be having Byssinosis (based on world statistics). This is a very large number indeed.

Most of the workers gave history of symptoms on more than one day in the week and hence the eliciting of the history of Monday morning sickness in the initial stages of the disease was difficult, since they had forgotten as to how the disease developed so many years back.

Regarding the criteria used we had given importance to both the history and to the lung function tests. Dr. Kamat et al. had diagnosed the disease based only on history while Dr. Shilling also gave importance to FEV\(_1\) less than 60% of the expected values in the Ahmedabad study where the workers were compensated) FEV\(_1\)/FVC of less than 75% was used. The FEV\(_1\) values used by us was adjusted to Indian values based on Dr. Kamat's study.

Radiological investigations are not useful in the diagnosis of Byssinosis. They can be used only to diagnose associated diseases like Tuberculosis. Of the diagnosed patients of Byssinosis, there were 4 patients who had T.B. earlier for which they were treated and currently 5 patients are undergoing treatment for the same.

There may be more cases of Byssinosis (early ones) in the mills. Those workers having FEV\(_1\) in the range of 60-80% of the expected FEV\(_1\) would be checked up after 6 months.

In its final stages the disease cannot be distinguished from chronic bronchitis and emphysema due to non-occupational causes, except for history of chest tightness at the beginning of the week. The patient's history is also important since it has been seen that patients diagnosed as having non-occupational chronic respiratory disease.

The post-mortem of the lungs of the workers who have died show no specific pathology of the disease 1.

Cough as an additional symptom can be present in what Dr. Kamat et al. had called as a typical Byssinosis. Only if it is present for more than three months of the year it was considered to be due to chronic Bronchitis by Dr. Kamat et al.

Smoking associated with Byssinosis is considered only at the time of compensating the patient for the disease whence the compensation amount is reduced as per the degree of smoking.

It is obvious that the incidence of Byssinosis would be higher in the dusty sections of Spinning and winding and was confirmed in the study. The incidence of the disease in the nondusty sections of the mill, is also due to the fact that there is an overall increase in the cotton dust level in the entire factory, as was also the findings in the Kamat study.

The incidence of the disease increases with the number of years of service as was the case in the earlier study. But many workers with long years of service had to leave their jobs due to the textile strike of 1981 they were not obviously

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**TABLE**

**Workers Examined for Lung Function**

<table>
<thead>
<tr>
<th>Years of Service (YS)</th>
<th>Departments (Showing Total No of Workers)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spinning + Winding + Weaving + Other</td>
</tr>
<tr>
<td></td>
<td>Blow Card Frame Ring</td>
</tr>
<tr>
<td></td>
<td>(1) (2) (3) (4) (5) (6)</td>
</tr>
<tr>
<td></td>
<td>Total %</td>
</tr>
<tr>
<td>-----------------------</td>
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</tr>
<tr>
<td>YS</td>
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<tr>
<td>0-10</td>
<td>5  3  12  4  5  5  34  23.52%</td>
</tr>
<tr>
<td>BY</td>
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<tr>
<td></td>
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<td>YS</td>
<td>11-20</td>
</tr>
<tr>
<td></td>
<td>13 22 41 23 39 29 167 22.15%</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>BY</td>
<td>2  10 6 10 7 4 37</td>
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<td></td>
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<tr>
<td>YS</td>
<td>21-30</td>
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<tr>
<td></td>
<td>10 6 17 7 6 4 50</td>
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<tr>
<td>BY</td>
<td>4  2 2 3 1 1 12 24%</td>
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<tr>
<td>YS</td>
<td>30+</td>
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<td>5  3  6  2  3  3  22</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>BY</td>
<td>3  2  3  0  1  1  10 45%</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Workers</td>
<td>33 34 76 36 53 41 273</td>
</tr>
<tr>
<td>Byssinosis</td>
<td>11 15 14 14 9 7 70 25.64%</td>
</tr>
</tbody>
</table>

Total Workers in Dusty Section (1,2,3,4) 179
Byssinosis in Dusty section 54
Percentage of affected Workers (Dusty sections) 30.16%
covered.

Though a drug audit was out of scope of the present study, it was noticed that many workers were on broncho-dilators and they could not work without taking them.

Follow-up of the study camp
1) Medical certificates have been given to all the 70 affected workers.
2) The employer has to fill a special form (16A) and submit it to the ESIS.
3) The ESIS will then initiate

against dust-related lung diseases. Due to these efforts the ESIS, Gujarat have initiated check-ups in all the textile mills of Gujarat for Byssinosis.

Even in Bombay it is hoped that the workers would continue the campaign and extend it to all the 100,000 textile workers in Bombay who are in the job and the rest around 100,000 who are without it. Byssinosis is an incurable disease like all other dust related lung disease and hence workers would be compensated even after they have left the mill.
The Dumping Grounds: A Living Hell!

(A Study on the Working Conditions and the Occupational Health Hazards at the Dumping Sites in Bombay)

INTRODUCTION:

This study was conducted by the Forum for Environmental Concern of Nirmala Niketan College of Social Work, Bombay. Responding to the request from the Municipal Muzdoor Union, the Forum conducted a study on occupational health conditions of the workers involved in landfilling at the dumping grounds. The number of workers in these dumping sites has increased rapidly along with an increase in the strength of truck drivers, bulldozer operators, and maintenance staff.

Various dumping sites were visited by six researchers, for a sample survey in which 100 respondents were covered. Primary data was collected on the basis of an interview schedule. Information was also collected through observation and informal group discussions. Various senior officials of the Solid Waste Department were also interviewed and medical examination of all the workers was conducted at Nafr Hospital under the supervision of Dr. A.A. Mahashir. Few visits were also made to the homes of the workers to not only understand the living conditions but also to ascertain attitudes of other members of the family towards the workers. In absence of a similar study on these workers very little secondary data was consulted.

The highlight of the findings of the study is printed below. The detailed report which is prepared by Forum for Environment Concern, is available on request from PRIA.

BACKGROUND OF OCCUPATION:

World-over, the production and disposal of industrial and domestic waste has become a potential threat to the environment consequently leading to health hazard of the population and the workers who handle it. With rapid urbanisation and industrialisation and an increase in population there has been a rise in the living standards and increased migration to urban areas. The problem of collection, handling and disposing of solid waste in metropolitan cities has become a matter of International concern. Solid waste which litters roadside, open areas, floats in lakes/streams/creeks, and collects in huge ugly dumps is the most visible form of pollution.

Solid wastes generated in urban areas is derived mostly from the following sources:
- Household waste
- Commercial refuse
- Institutional refuse
- Street sweeping
- Construction debris
- Industrial waste

Garbage content

Garbage comprises of both wet and dry refuse, and unlike the western countries, it is not segregated in India. The dumping grounds of Bombay city are, Deonar, Shivaji Nagar, Chincholi (Malad), Gora and Mulund.

The waste matter can be broadly classified into the following categories:
- Garbage from residential areas
- Waste matter from roadsides & gullies
- Rotten vegetable matter, decomposed entrails and leftovers of slaughtered animals, fish, etc. from various markets.
- Leftovers from restaurants, hotels and other eating places.
- Hospital, Nursing Homes and Polyclinic garbage
- Refuse from abattoirs.
- Debris from construction sites
- Refuse from commercial centers
- Industrial waste matter including sludge/slurry from factories
- Carcasses of various animals.

The garbage, which is a mixture of both wet and dry refuse is collected by the conservancy staff of the B.M.C and emptied at the dumping grounds, where it is bulldozed and leveled.

Solid wastes, which is constantly on the increase, present a serious problem. As most of the methods used to dispose it results in some type of damage to the environment. But the production of wastes that are difficult to dispose continues unabated. Dumps provide breeding grounds for mosquitoes, insects, and rodents, as well as ruin the attractiveness of the surrounding areas. Incineration of garbage produces pollution.

Earlier, tin cans were produced in packaging industry, which were easily absorbed by soil
due to rust. Tin was however replaced by aluminum which remains in its original state for many years. Even the paper and cardboard packaging that decay or burns easily is being replaced by plastic’s, that does not decay and emit harmful gasses when burned.

On the other hand due to rapid advancement of technology and growth of population the quantity and the nature of garbage has increased tremendously in India. Most of the waste produced today is non-decayable, hence today we face a major problem in finding economically viable methods for disposing garbage.

In the case of Bombay, a large city with rapid geographic and demographic growth and a large quantity of waste, the situation is further deteriorated due to the absence of an efficient garbage disposal system. The estimated population of Bombay today is 12 million people, spread over an area of 437 kms.

The responsibility of collection, transportation and disposal of garbage in Bombay lies with the Bombay Municipal Corporation, (BMC). The quantity of refuse generated in the city was 300 tonnes per day at the turn of the century, this now stands at a staggering 5000 tonnes/day, with a per capita figure of 425 gms/day.

**Collection and Transportation of Garbage**

Public road cleaning and collection of garbage generated at temporary collection points, are done by scavengers and ‘halalkhore’. Their duties are as follows:

1. To sweep roads, house gullies, passages, open space as well as brushing of roads.
2. To collect and remove all the garbage thus generated into dustbins, sheds or take to the temporary dumping place or traveling refuse trucks.
3. To collect and remove defecations from roads, footpaths, open space, and all other public convenience.

**The duties of a ‘halalkhore’ are as follows:**

1. To maintain the cleanliness of public sanitary conveniences.
2. To clean, collect and remove the night soil from the privies to the Night Soil Depots.
3. Quick and efficient removal of garbage is a very important function of the Solid Waste Department and the methods adopted for transportation of the garbage is the most crucial factor.

**The main centers for collection of refuse are:**

- Residential premises.
- Shops.
- Street sweepings
- Commercial establishments.
- Industries
- Market, Hostels, hospitals, industries etc.
- Slum colonies.

**Transportation of Garbage**

Transportation implies, conveyance from the point of collection to the point of disposal. The transportation of refuse from the collection point to the disposal point involves the use of 800 vehicle shifts/day. The Bombay Municipal Corporation owns 250 vehicles and 20 compactors. The demand for the balance vehicles that is necessary to transport refuse, is met by hiring vehicles from contractors, appointed for this work on an annual basis. The municipal fleet consists of a closed body on conventional vehicles with tipping arrangement and also container lifting facilities. Each vehicle is manned by six motor loaders and their work is supervised by an assistant mukadam. The vehicle follow predetermined routes and collects garbage from the shed or bins.

The gang of six motor loaders are divided into three pairs, the first pair empties the refuse from the shed/bin into the basket, the second pair carries the basket to the vehicle and the third pair unloads this into the vehicle. When the vehicle is full it is ready for dispatch to the dumping grounds. The trip from the collection point to the dumping ground are generally made in a shift of seven hours. The trips however, depend on the capacity of the vehicle and the distance to be travelled.

**Disposal of Garbage**

Though there are various methods for the disposal of garbage, Bombay till date has been employing the dumping methods, where garbage is dumped in large areas, normally marshy/swampy places. This land once reclaimed is used for developmental activities like construction of buildings, gardens etc. The present system of disposal of garbage had been used by the British Government and the BMC has continued with the same methods. Previously garbage collected from each area was incinerated, but gradually as the population increased, the nature as well as the composition of garbage started changing and the quantity of work started increasing. The authorities could no longer dispose of garbage by collecting and incinerating it in small heaps. The municipality then sited vast stretches of open land located away from the city limits for dumping garbage.

One of the major reasons for locating these dumping sites away from the city limits was the fact that garbage in any form is an eyesore, affecting the scenic beauty of the surrounding areas, as well as the fact that decomposing garbage emits foul odour and toxic gasses. The garbage from Bombay city and suburbs is unloaded, bulldozed and leveled at the dumping grounds located at Deonar, Shivaji Nagar, Gorai,
Malad and Mulund. This methods has been employed for the last 100 years by the Bombay Municipality. These dumps are usually referred to as "open dumps", as refuse is left uncovered. This methods is harmful to public health, adds to pollution and last but not the least is not aesthetic. The other methods of disposal of garbage employed by the B.M.C are incineration, composting, sanitary landfilling and pyrolysis.

The working conditions at various dumping grounds:

The working conditions at six major dumping grounds, namely, Deonar, Chincholi (Malad), Gorai, Chandan (Andheri), Mulund and Shivaji Nagar are accessed in this study. It was observed that almost all of them lacked basic facilities, like first aid, electricity, drinking water and approaching roads. The largest dumping ground i.e., Deonar covering an area of 500 acres is the only one having a road. The road however is unarable, slushy and with ankle deep water. In Malad there is no electricity at night the workers have to use kerosene lamps and are therefore a prey for all creatures of the night. There is no provision of drinking water, washing facility or first aid at Malad dumping ground. Chandan dumping ground is heavily infested with snakes and other poisonous insects. Workers sit on bulldozer for safety in night.

FINDINGS

<table>
<thead>
<tr>
<th>Table No.1</th>
<th>Number of workers interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dumping Site</td>
<td>No. of Workers</td>
</tr>
<tr>
<td>Deonar</td>
<td>76 (80%)</td>
</tr>
<tr>
<td>Malad</td>
<td>06 (6.32%)</td>
</tr>
<tr>
<td>Gorai</td>
<td>07 (7.37%)</td>
</tr>
<tr>
<td>Juhu</td>
<td>02 (2.11%)</td>
</tr>
<tr>
<td>Mulund</td>
<td>01 (1.05%)</td>
</tr>
<tr>
<td>Shivaji Nagar</td>
<td>03 (3.16%)</td>
</tr>
<tr>
<td>Total</td>
<td>95</td>
</tr>
</tbody>
</table>

Profile of workers

The vast sprawling expanse of land reserved as dumping grounds which comes under the B.M.C has about 200 employees. Out of these a total of 95 workers were interviewed from all the sites.

- **State of origin**: Majority of the workers (84%), are from the state of Maharashtra itself, mainly from Ratanagiri and Sangli districts. Most of them belong to the weaker section of society and had once been marginal farmers. Giving up all their possessions they had come to the city lured by the glamour and seeking greener pastures. It was only when they came to Bombay, they found that the reality of getting a good job easily was a distant and futile dream. Most of them have been forced to accept employment in the B.M.C dumping grounds for their livelihood.

- **Age**: The majority of the workers fall into the age group of 26-45, comprising about 70% of the total number of workers. There is a steady decline in the number of employees above 45 years. As Table 2 shows, 15.79% of workers fall in between the age group of 46-55 years, while only 3.16% are above 56 years of age. Above 10.53% of the workers fall into the age group between 16-25 years.

<table>
<thead>
<tr>
<th>Table No.2</th>
<th>Age of the respondents:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>No.</td>
</tr>
<tr>
<td>16-25</td>
<td>10</td>
</tr>
<tr>
<td>26-35</td>
<td>35</td>
</tr>
<tr>
<td>36-45</td>
<td>32</td>
</tr>
<tr>
<td>46-55</td>
<td>15</td>
</tr>
<tr>
<td>56 and above</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>95</td>
</tr>
</tbody>
</table>

According to the workers, their average mortality rate is 40-45 years. The nature of their work exposes them to physical dangers, health hazards and a high rate of exposure to mental stress and tension. As one worker put it, "it takes a number of years for both our families and us to come to terms with our work, but finally, we do not come to terms but become indifferent to ourselves as well as the opinions of others. It is this indifference which helps us continue working in these places". As workers are forced to work under such inhuman conditions, their energy and resistance to diseases decreases, hence they often succumb to most ailments and are often victims of respiratory diseases.

- **Types of Earners**: In terms of earning capacity 84% of the workers are single earners, while 16% have two earning members in the family.

<table>
<thead>
<tr>
<th>Table No.3</th>
<th>Job status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Job</td>
<td>No.</td>
</tr>
<tr>
<td>Labourer</td>
<td>45 (47.37%)</td>
</tr>
<tr>
<td>Bulldozer Cleaner</td>
<td>11 (11.58%)</td>
</tr>
<tr>
<td>Bulldozer Maintenance</td>
<td>16 (16.84%)</td>
</tr>
<tr>
<td>Bulldozer Operator</td>
<td>12 (12.63%)</td>
</tr>
<tr>
<td>Raker Operator</td>
<td>01 (1.05%)</td>
</tr>
<tr>
<td>Mukadam</td>
<td>03 (3.16%)</td>
</tr>
<tr>
<td>Crane Driver</td>
<td>01 (1.05%)</td>
</tr>
<tr>
<td>Crane operator</td>
<td>01 (1.05%)</td>
</tr>
<tr>
<td>Supervisor</td>
<td>05 (5.26%)</td>
</tr>
<tr>
<td>Total</td>
<td>95</td>
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</tbody>
</table>

WORKING ENVIRONMENT

"Working in the B.M.C dumping ground is like walking into the fires of hell", says a bulldozer operator.

"Dumping ground are like Yamaraj's jaws of death, which slowly but surely crushes our lives", lamented a labourer.

Both the above quotations explain the extreme anguish and helplessness of the B.M.C employees who are forced to work here for their living. The working conditions at B.M.C are extremely inhuman and deplorable. To an onlooker the dumping grounds appear to be nothing but a vast expanse of rotting, stinking garbage with foul and obnoxious odour pervading the atmosphere around the dumping area.

Due to the nature of garbage and its consequent decomposition, various foul smelling gases are emitted. During summer due to the intense heat the gases are ignited, as a result the sur-
rounding garbage catches fire. Barrng the monsoon season it is very natural to find the dumping grounds hazy with various pungent smelling gases, smoke and choking smoke. The employees are forced to work in these terrible conditions. On the whole, the dumping grounds are places of death, decay and desolation.

- Inadequate protective equipments

Considering the disgusting and squalid conditions existing at all the dumping grounds, one would expect the B.M.C. authorities to provide better protective equipment to its employees. Sadly, the B.M.C. does not consider the well being of the dumping ground employees as vital for more efficient work output. One has to see to believe the pitiable plight of the workers at the dumping sites. The need for survival is the only major driving force that compels them to take up jobs at the dumping grounds.

The workers are not provided with adequate personal protective equipment. During the monsoon the workers are given inferior quality raincoats, gloves and gumboots. The workers say that the quality of the material is so poor that it does not last them for more than a week. They are expected to make do with these items for the whole year. Previously they used to be given better quality personal equipment. These products lasted them for an average of three years. Then with the rise in prices, the B.M.C. authorities discontinued distribution of these products to their employees, and instead provided equipment of inferior quality.

It is therefore very natural to see the workers toiling away in the dumping ground without any personal protective equipment. They have to very often walk and work in knee deep slushy garbage without any gumboots and gloves, thus exposing themselves to various diseases. To add to their woes they are forced to inhale all the foul and obnoxious toxic gases present in the dumping grounds.

The torrid heat of summer makes the conditions worse. Due to the intense heat the garbage very often catches fire and many workers receive burns injuries. The heat along with the choking dust present in the atmosphere is virtually a living hell for the workers, and yet they continue working, literally blinded with dust and smoke.

In brief they are forced to earn a living in conditions that are extremely detrimental to their health.

The workers are not provided with any proper uniforms. The conservancy staff i.e. the labourers are provided with khaki uniforms, comprising of khaki shirt and a khaki half pant. As they are not provided with gloves and gumboots, they are susceptible to various skin infections and injuries including cuts, bruises, burns and insect bites.

The bulldozer operators and cleaners wear full khaki uniforms, while the maintenance staff wear full blue uniforms. All of them are again not provided with any safety equipment, they all work with their bare hands. It is high time that the B.M.C. seriously considered providing its employees with more sensible uniforms conducive to the work they are engaged in.

- Inaccessibility

The dumping grounds are bereft of any other welfare facilities. These are situated in rather inaccessible places of Bombay suburbs with no proper transport, this makes commuting from home to work very tedious and time consuming for the workers. The workers have to make tremendous efforts to reach the dumping grounds on time for work, if they report late for duty, the Junior Officer (JO) marks them absent for half a day. This is very often considered as a half day casual leave. Sometimes, after a lot of pleading, the JO may waive the penalty. As the services of the dumping grounds are considered to be essential, an emergency service is also provided by the B.M.C. the employees holidays are curtailed as well as very few public holidays are given. Even on important festivals, the employees are often called to work. The workers are often half a day off. Making them absent for coming late results in a further reduction of their meagre leave package. The B.M.C. should understand that making an employee absent for half a day, as a penalty for coming late, would not really solve the problem. The root cause of the problem lies in the fact, that employees are forced to travel long distances from their home to their place of work. Besides the workers are employed on shift duties comprising of morning, afternoon and evening shift.

Due to the hours of work, low frequency of public transport and inaccessibility the workers spend a long time commuting from home to their place of work. Their problem is further aggravated by the fact that the dumping ground employees are transferred at regular intervals. Hence the workers have to keep changing their routes of travel, from their home to the work site. The worst affected are the bulldozer workers and cleaners, as they are rotated every three months.

- Lack of basic amenities

Taking into account the dirt and filth the workers have to work in, one would expect that the employees be provided proper bathing, washing and toilet facilities. The dumping grounds at Deonar have a large tank filled with water, to be used by the workers for washing. The other dumping grounds have no facilities, and hence the workers have to return home dirty. The workers at Deonar just about manage to have a small wash before leaving for home. The dumping grounds do not even have toilets for the workers.
Another shocking fact is that none of the dumping grounds have provisions to supply drinking water to their employees. After working for hours under the scorching heat during the summer, it is natural that the workers would like to quench their thirst. They have to go to restaurants to have their thirst quenched. Some workers carry their own supply of water for the day. Very often the workers have to walk long distances in the hot sun to the restaurant to have drinking water. They are very often humiliated by the restaurant owner, as well as the customers for their dirty countenance and obnoxious odour.

The dumping grounds have no canteen facilities for their employees. The worst affected people are the early morning workers, who very often have to work without breakfast or lunch, as they leave very early in the mornings, and hence they have no time to prepare food. Some years ago the B.M.C. used to provide some nourishment to its workers by way of eggs, puri bhaji and sandwiches along with milk or tea. But these facilities were discontinued by the B.M.C. for reasons they know best. The B.M.C. can easily start a small canteen, serving some snacks and tea.

None of the dumping grounds have any electrical facilities at the site. The Deonar and Mulund dumping grounds alone have offices with electrical facilities. The night labourers are the worst hit as they operate under very low visibility conditions. In the night these labourers find it very difficult to look at what they are stepping on and they very often step on carcasses or entrails brought from the Deonar abattoir. They are prone to suffer from bruises and cuts on their legs from nails, glass pieces etc.

- **No first aid facilities**

In case of accidents or any emergency there is no first aid facility available at any of the dumping grounds. The workers have to be transported to the nearest hospital, which is a few kilometers away from the dumping grounds. If there is no transport available, as is very often the case, medical aid is further delayed. Except for Deonar, none of the other dumping grounds have any doctor or medical assistance in the vicinity.

**Occupational Hazards**

The smaller dumping grounds of Gorai, Chincholi, Mulund and Shivaji Nagar, have only one or two night labourers employed. They are extremely insecure as they fear attacks by animals, insects or gangs of anti-social elements. They are not provided with any protection. Barricading Deonar, none of the other dumping grounds have security guards posted outside. Workers have to work here with the help of small kerosene lamps, which hardly provide effective light.

All the workers face more or less similar problems and have to work in most inhuman conditions. There are however some categories of workers who have problems peculiar to their nature of work.

- **Bulldozer maintenance workers and operators**

As the name implies, bulldozer maintenance workers have to carry out repairs and maintenance of bulldozers and cranes owned by the B.M.C. All these workers are situated at the Deonar dumping grounds, as this is the largest of the dumping grounds and has the largest fleet of bulldozers and cranes. Besides this, all the tools and implements necessary to carry out maintenance work are located at Deonar. There are no garages or workshops where the workers can carry out the repairs. They use the shed of an old fertilizer factory located adjacent to the dumping grounds. This factory has a lot of fertilizer stored at the centre of the shed. This is not only very inconvenient but is very detrimental to the health of the workers, as they constantly inhale the fertilizer dust. There are indications that the factory may commence operations again, which means that the workers will have to work in the open. However they have already started carrying out a major part of their work in the open area outside the factory shed.

The spare parts and tools required for the bulldozers are extremely heavy. Constant lifting of these has resulted in the development of numerous postural or orthopaedic complaints amongst these workers. Very often they have to carry out maintenance work beneath the bulldozers, which cannot be raised to work more freely as equipment for this is not available. They are forced to crawl beneath the bulldozer and carry out the repairs by lying down horizontally on their backs. As there is inadequate ventilation and light, their work becomes more tedious and cumbersome.

In case of a breakdown at the dumping sites, the maintenance workers have to go to the grounds and carry out the repair work in knee deep muck and dirt. If the repair work cannot be carried out at the site itself, then the vehicle is towed to the Deonar garage. Most of the workers have numerous callouses and warts on their palms as they have to handle grease and heavy machinery.

The work of the bulldozer operators is to bulldoze and level the garbage by going over it a number of times. The bulldozer seats are extremely narrow and is made of steel, hence they are exposed to the deafening noise and continuous vibrations of the machine which has resulted in various health complaints such as decrease in hearing capacity and severe orthopedic ailments. These ailments include continuous backache, neck ache, wrist, ankle and knee joint pains accompanied by swelling. They are also not provided with any safety equipments.

A major problem faced by all bulldozer operators is that they are called for emergency duty mainly for demolition of slums, buildings etc., though they are not paid for these kind of duties, they are forced to carry out this task or else face the possibility of losing their jobs. This is one of the most frightening and daunting tasks for them as it poses various dangers. This includes the possibility of their getting hurt by the demolished material or assault by the slum inhabitants by way of stone throwing and lathis. They therefore move for months after carrying out the demolition work, for fear of being identified.

During the process of leveling and dozing garbage a lot of dust is churned up. They are forced to breathe this dust as well as the foul smelling and toxic gases, emitted due to the decomposition of refuse. As a result many of them suffer from chronic coughs and colds. Their worst experiences is when they have to doze decomposed carcasses. When they do this, the carcasses burst open showering them with blood and entrails. This is extremely revolting, and the workers find it very difficult to reconcile themselves to doing this job. There are no provisions to have these carcasses burnt, which include those of dogs, cats, cows, goats, horses etc. These workers often suffer from giddiness and vomiting.

- **Crane operators**

The major task of the crane operators is to
distribute garbage evenly by crane, lifting refuse from one place to another location. Here again a lot of dust is churned up by the machine while it is operative, and hence they too have to inhale a lot of gases. Cranes are used at the Deonar dumping ground only, as these workers are therefore stationed at Deonar. They may be transferred if they are asked to operate bulldozers elsewhere. The health problems faced by crane drivers are similar to those faced by bulldozer operators. They are also exposed to the tremendous noise generated by the crane while in operation. This has resulted in loss of hearing and orthopedic problems amongst the drivers, i.e., they suffer from backaches, wrist and joint pains.

**Bulldozer cleaners/crane cleaners**

The bulldozer and crane cleaners always accompany the operators in their respective vehicles, facing the same hazards as the crane drivers and bulldozer operators.

The cleaners have to ensure that the vehicles are cleaned regularly for which they are provided a hose pipe to spray water and a rake with four to five prongs. These are absolutely insufficient and inadequate for cleaning the huge vehicles. They are not provided with any suitable protective equipment i.e., good quality gloves and gumboots, which are absolutely essential because very often they are forced to use their bare hands to clean the dirt or remove limbs of dead animals etc. The workers used to feel nauseated and had to discontinue work a number of times, but now over a period of years they have got used to their working conditions and carry out their work mechanically.

During the process of dozing and leveling the garbage, all kinds of refuse gets caught in the machinery and may hinder their work. This means that the cleaner has to get off the vehicle into the rotting, foul smelling garbage and remove the dirt etc. Most cleaners wait to be promoted to the level of an operator, as that is a relatively better and dignified position. Many learn to operate the bulldozers while accompanying the operators. Once they become operators, they have hope of getting transferred to some other dump.

**Labourers**

The labourers belong to the conservancy department. The major task of the labourers is to direct the refuse to appropriate places for unloading. Amongst all the various categories of workers, their plight is the most pathetic. All the labourers come from the lowest socio-economic strata of society. Some of them literally lead a hand to mouth existence, and have virtually no savings. These labourers have no facilities, their uniforms comprise of a khaki shirt and half pants.

These people are not provided with gloves or gumboots. They have to remain in the dumping grounds continuously and work under the most grueling conditions. During the summer, labourers have to work under the scorching sun. In addition to this they are forced to inhale the toxic gases, emitted by the decaying garbage. During the monsoons the heat is erratic, sometime the weather is pleasant due to clouds, while at other times there is continuous heavy rain. The dumping grounds are filled with water and the workers are forced to walk and work in knee deepstinking and soaking wet garbage. The cess pool workers have to continuously channel out the excess water into the nearby creek. The only implements they are given for this task is a long broom and shovel.

During the summer when the garbage catches fire, the labourers have to put off the flame, risking personal injury. Most of the labourers walk either barefoot, or with ordinary rubber or plastic slippers and are very susceptible to cuts, bites and bruises, by insects, rodents and other creatures. There are many stray dogs who feast on the piles of rotting flesh, and at times they become very ferocious and attack the workers. Most of the labourers move about with sticks and stones.

The night labourers are the worst affected, since there is no electricity within the grounds, they operate under conditions of very restricted visibility. They have to direct the trucks that come in at night, and make the entries in the register. They have the additional responsibility of looking after the bulldozers. Many parts of the machinery was reported stolen earlier. These machinery parts are very expensive and the B.M.C cannot afford to keep replacing the stolen goods. However, the B.M.C authorities do not provide any security for the labourers, who are always under the constant fear of being attacked by goondas, robbers etc.

A few night shift labourers of the Chincholi dumping ground at Malad suffered from severe hallucinations. They complained of regularly seeing and talking to ghosts and spirits. Further probing revealed that they could not distinguish between human beings and ghosts. When one seriously reflects on the situation, no one can blame the poor labourers from suffering from such hallucinations. Dumping grounds are situated away from residential and also commercial areas, and there is no electricity. The only sounds the workers hear is that of occasional night traffic, howling of dogs and sounds made by other nocturnal creatures. All these factors certainly contribute to the development of fear among the workers.

**Mukadams**

The mukadams are on a higher grade than the labourers. They have to ensure that the labourers carry out their task properly and attend work regularly too. They do not have to be continuously present in the dumping grounds.
However, they also have to walk through the garbage and are exposed to the same hazards as the workers and do not enjoy very robust health.

- Supervisors

The supervisors basically carry out the administrative tasks. They take the attendance of all the dumping ground employees and register the entries of the refuse trucks. Though they do not go into the dumping grounds, they are also exposed to the perilous environment. The chowkis in all the dumping grounds, barring Deenar and Mulund are make-shift tents. Some of the Depot Attendants and Junior Overseers are very sympathetic to the plight of the workers as they can fathom and understand their hardship.

Considering the existing conditions in the dumping grounds one cannot but fully sympathize with the woes of the workers. They are forced to work under the most inhuman circumstances. Given an alternative, they would gladly give up their jobs at the dumping grounds and take up other jobs. To add to their sufferings they are ridiculed by outsiders. After working in the dumping grounds for the day their bodies and clothes smell of foul odour. As a result they are abused by their fellow commuters. Most of them feel rejected and dissatisfied with life and suffer from a low morale.

Many labourers have problems relating to their family members. Many family members find it very difficult to relate to or accept that one of their near one is working at the dumping grounds and handling garbage. The wives of some workers refuse to come near them. There are a few workers who have not disclosed the nature of their jobs to their family members for fear of losing their respect.

These people lead very dissatisfied lives as they are neither happy with their jobs nor accepted by family members. This results in many of the workers seeking solace in alcohol and tobacco. A large majority of the workers are light to moderate drinkers. Very few are heavy drinkers and some workers say “if we do not drink, we will not be able to work. Ask the B.M.C to provide us with better working conditions and facilities”.

Health

Considering the nature of the dumps and the working conditions that the workers are exposed to, it is but natural to expect serious health constraints amongst the workers. Due to the decomposition of waste materials, various toxic gases are emitted mainly carbon di-oxide, ammonia and methane. The workers are not provided with any personal protective equipment, and they have no option but to have a direct contact with decaying refuse. The atmosphere is heavy with dense smoke, dust, foul odour and germs. To make a thorough assessment on the types of occupational hazards faced by the dumping ground workers, they were convinced to undergo a complete medical examination at the Nair Hospital.

All the workers were interrogated in details for the following information - number of years of service, type of work undertaken and presence of any symptoms. A thorough clinical examination was done by a chest specialist, ophthalmologist, dermatologist and an orthopaedic surgeon whenever necessary. Each patient was subjected to routine blood count and Hb (hemoglobin) percent, chest X-rays and PFT tests (Pulmonary Function Test). They were also advised necessary treatment for their symptoms. A total of 103 patients were examined, a majority of them being in the age group of 31 to 50 years. The entire clinical examination was conducted at the Nair Hospital under the overall supervision of Dr. A.A Mahasur, Professor and Chief - Department of Chest Medicine & EPRC.

Preliminary investigations by the forum staff revealed that the workers suffered from the following ailments:

<table>
<thead>
<tr>
<th>Disease</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory</td>
<td>73</td>
</tr>
<tr>
<td>Skin</td>
<td>40</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>22</td>
</tr>
<tr>
<td>Eye</td>
<td>80</td>
</tr>
<tr>
<td>Gastro-intestinal</td>
<td>51</td>
</tr>
<tr>
<td>Other ailments</td>
<td>35</td>
</tr>
</tbody>
</table>

- Respiratory ailments:

About 25% of the workers examined are suffering from coughs while 26% are suffering from breathlessness. The prevalent acrid smoke due to the combustion of gases given out by decaying garbage leads to cough and a continuous choking sensation. As a result the workers find it very difficult to breathe freely, and hence suffer from constant breathlessness. The air is also heavy with a high density of dust which causes nose and throat irritation. Huge quantities of dust is given out during the process of garbage leveling, causing cough, throat irritation and breathlessness, almost to the point of the person choking.

Pulmonary Lung Function Tests (PFT), were carried out on 100 people. Of these 77% had normal PFT, while 23% had abnormal PFT’s. 26% had restrictive pattern, while 44% had both. Chest radiograms were taken in 103 subjects, of these 71.8% had normal X-ray’s. In 17.5% the chest radiograms showed non specific shadows like post-TB, fibrosis, hyper inflation etc. and about 10.7% had the presence of reticulohyarlular shadows.

A clinical examination revealed that 8.7% had holes, 11.7% had bronchi, while 5.8% had bronchial breath sounds. According to the report given by the Nair Hospital, none of the patients complained of aggravation of symptoms during working hours. A majority of the patients were smokers, the abnormal signs and symptoms have been attributed to smoking. However, as per the data collected by investigators 73% of the workers had complained of aggravation of symptoms during working hours. Moreover all of them had contracted ailments after joining the B.M.C dumping grounds.

- Skins

Based on the clinical examination conducted by the doctors of the respiratory department, 27.2% were found to have some or the other skin problems. Out of these, 69.9% had non specific skin lesions and the remaining 30% had skin lesions which were occupationally related. These skin lesions are mainly due to contact with garbage and mechanical equipment as well as oil and dust.

According to the data collected by the Forum, 40% suffered from skin ailments. Of these 39.4% were labourers, 15.8% were bulldozer cleaners, and 26.3% were bulldozer operators. It is clear that the majority suffering from skin diseases are those who handle garbage.

The workers claim that they contracted skin infection only after they started working on the dumping grounds. As most of them are forced to work with their bare hands, and without any protective equipment, it is but natural that they develop skin infections. The symptoms are largely itching, rash, inflammation, bruises, blisters and pigmentation.
Orthopedic ailments

Out of the 103 workers who were examined, 27.9% complained of backache, 10.7% suffered from minor symptoms of neck pain, joint pain, etc. All these ailments were related to their occupational environment. Most of the workers who had postural complaints belonged to the Solid Waste Department of the B.M.C comprising of the maintenance staff and the bulldozer operators.

The bulldozer operators suffer from constant backaches and joint pains (knees and wrist) on account of the heavy vibration of the bulldozer, while it is in operation. As the seats on the machines are not cushioned, the intensity of pain received from the constant jerks of the machine, increase. Most of these operators have said that the vibrations they receive during the day, while operating the machine, are also experienced while resting at night.

Maintenance workers suffer from severe backaches, which may lead to the slip disc problem, and also from joint pains, mainly in the knees, ankles, and wrist. This is on account of the fact that they are forced to lift very heavy equipment. Very often while lifting heavy equipment, workers have fractured their toes or fingers as a result of letting go of the machinery, due to loss of balance, weight of the item, etc. Lack of hoists at the garage increases the stress on the workers, both physically and mentally, as they have to crawl beneath the vehicles in order to carry out repair work. This exercise puts a high strain on their back.

Eye ailments

A large number of the workers complain of eye infections after joining work at dumping grounds. The presence of dust and gasses emitted from the decomposing garbage could be a primary factor for these complaints. The complaints include diminished vision, redness, burning sensation, itching, and constant irritation due to the sensation of a foreign body presence in the eyes. A common complaint is the constant watering of the eyes. As per clinical examinations, 90% suffered from problems of visual acuity. Of these 35% had ocular complaints related to their occupation. One person had a history of foreign body trauma while on duty, leading to corneal capacity and hence a refractive error. All these workers have been advised to wear glasses constantly.

Other ailments

Besides the above-mentioned illness, the workers also suffer from severe gastric ailments namely acidity, burning sensation in the stomach, giddiness and nausea. For the first few months, workers at the dumping grounds find it very difficult to digest any food. Some workers complained of constant headaches and insomnia, as a result of the nauseating environment that they work in.

Medical Benefits

The employees receive a paltry sum of Rs.30/- per month, as medical allowance. They are also entitled to free treatment at any of the B.M.C hospitals. However, most of them do not avail of this facility, due to reasons cited below:-

- They have to wait in long queues for medical attention.
- Secondly, the hospitals do not have proper treatment facilities and never have adequate stock of required medicines. This means that workers have to buy the medicines from chemists located outside the premises.
- In an emergency, they have to go for treatment to private clinics, if the hospitals are located far away from their residence or work area.
- They allege, that they are treated by student doctors at these hospitals, and the dumping ground workers have stated that they do not like being experimented upon.

Many of them have bitter experiences to relate of the treatment they have received at these hospitals, due to negligence and faulty diagnosis.

They, therefore, prefer to pay more and get treated at private clinics. Besides the paltry medical allowance they receive, they get Rs.18/- p.m. as unclean allowance, which does not meet the cost of their soap and laundry expenses for a week.

It is indeed a blot on the B.M.C and all those responsible for the deplorable, inhuman, disgusting and unhygienic conditions that the people who keep our city clean have to live and work in.

SUGGESTIONS AND RECOMMENDATIONS

- Elimination of hazardous duties
- Welfare measures
  - Housing facilities
  - Safety equipments
  - Transport facilities
  - Canteen
  - Provision of drinking water
  - Toilet, rest and bath rooms facility
  - Personal Protective equipments
- Medical facilities
  - First aid
  - Vaccination against typhoid, cholera etc.
  - Regular Health check ups
- Need of a well equipped garage
- Training inputs/ workshops on Occupational Health hazards.
- Utilisation of modern technology for garbage disposal.
- Recycling of garbage.
Does coke contain alcohol:

Mark Pendergrass in his book ‘For God, Country and Coca Cola’, claims alcohol to be an important ingredient of the coke. In the archives of company he came across a formula which was kept secret for more than a century. In 1977, when the Indian government demanded to know the contents of coke, the company withdrew from country rather than reveal it. This closely kept formula was first published in the British Sunday Times, which the Coca Cola company denied. The Sunday Times then produced coke

<table>
<thead>
<tr>
<th>ingredient</th>
<th>quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citric acid</td>
<td>1 oz.</td>
</tr>
<tr>
<td>Ext. vanilla</td>
<td>1 oz.</td>
</tr>
<tr>
<td>Flavoring</td>
<td>2 and a half oz.</td>
</tr>
<tr>
<td>F.E. coco</td>
<td>4 oz.</td>
</tr>
<tr>
<td>Lime juice</td>
<td>1 qt.</td>
</tr>
<tr>
<td>Sugar</td>
<td>30 oz.</td>
</tr>
<tr>
<td>Water</td>
<td>2 and a half gal.</td>
</tr>
<tr>
<td>Caramal sufficient</td>
<td></td>
</tr>
<tr>
<td>Mix caffeine, acid and lime juice in 1 qt. boiling water. Add vanilla and flavoring when cool.</td>
<td></td>
</tr>
</tbody>
</table>

Flavoring:

- Orange: 80
- Lemon: 120
- Nutmeg: 40
- Cinnamon: 40
- Coriander: 20
- Nutmeg: 40
- Alcohol: 1 qt.

Let stand for 40 hours.

Fetal evidence:

Electronics is Britain’s second largest manufacturing industry, employing 3,300,000 people. Scotland and the West Midlands generate the highest employment in electronics. A new study suggests this clean industry may also have one of the highest rates of miscarriages.

The recent study carried out at the University of California at Davis, looked at 950 pregnancies and found a spontaneous abortion rate of 14 percent among women working in wafer fabrication, against a background rate of 10 percent for women in the other sections of the electronic industry. While the variety of substances present in a fabrication area makes it difficult to clearly identify causal relationships, certain hazardous solvents such as glycol ethers or ‘celluloses’ are heavily implicated, particularly ethylene glycol ethers. The incidence of

Ten coal miners die for every million tonnes of coal in China:

Around 5000 coal miners died in China in the year 1993. Six serious accidents occurred in Jan. 1994, in State owned mines in which 175 workers died. Minor accidents which result in one or two deaths are most common. These are rarely reported since the mines management often fail to inform the authorities therefore the actual casualty rate can be presumed to be higher than official figures. As a result of cover ups these workers are often denied legal compensation.

Source: China’s Labour Bulletin (No.2), April 1994, p.11

Environment and health in Eastern Europe:

“Environmental pollution is clearly damaging health and priorities should be set that reflect the urgency and importance of environmental concern in Central and Eastern Europe”. The above stated portion is one of the conclusion of the report prepared by the World Bank on the Environmental Health in Eastern and Central Europe. The report points out that market reforms, industrial restructuring and environmental incentives and regulations should mention about emission which causes the serious health damage.

miscarriage rises steeply with greater exposure to the glycol ethers, reaching a rate of one miscarriage to every three pregnancies for women working in the riskiest process. Glycol ethers are also used in printing inks, varnishes and lacquers, graffiti removers, as degreasers and in photographic processes.

Source: Hazards, Vol. 43, 1993, p.3

The EC Subprint project:
The printing industry has two main jobs which expose workers and pollute the environment with hazardous organic solvents. Firstly the printing ink and secondly the process of press clean up (wash up) after printing.

The government, medical and safety professionals, trade unions and the employer associations in Denmark recognised the health hazards of these solvents ten years ago. One of the main health hazard recognised and for which the Danish government gives compensation is a solvent which induces brain damage. Two of the dominant occupations where this solvent damage occurred was among painters and printers.

In the year 1980-90 there were 596 cases of printers (average age 45 years) effected with brain damage who were identified for compensation in Denmark. In 1990 there were 5,620 skilled and unskilled printers in Denmark. If the Danish experience applies to the rest of the European Community, and there are no good reasons to suggest that it doesn’t, then around 4,000 to 8,000 printers throughout the EC will be suffering from brain damage due to this solvent. The number of cases of brain damage awarded compensation in Denmark, from the graphic trades, has dropped significantly from the 82 cases in 1990 to 48 in 1991. But it is too early to say whether this is due to reduction in the amount of solvents used in the printing industry. There are around 17 vegetable oil wash up products in the Danish market as a substitute and it is estimated that up to 30% of Danish printers use these products.

Source: Hazards 43, Summer 1993 p.7

Employers face high cost from accidents and ill health

An economic study published in Feb. 1994, by Health and Safety Executive (UK) shows that the overall cost of work related ill health and accidents, including those that do not give rise to injury but are preventable by better management of safety, amounts to 11 billion British pounds per year.

The study ‘The cost to the British economy of work accidents and work related ill health’, provides the most comprehensive estimates of the cost of accidents at work in UK. It draws upon the results of a special health and safety supplement to the Department of Employment’s 1990 labour force survey and a series of special in-depth company case studies of accident losses carried out by HSE’s Accident Prevention Advisory Board.

The findings in the study show that the annual cost to employers is between 4 billion and 9 billion, equal to between 5 and 10% of all UK industrial companies gross trading profits in 1990, or between 170 and 360 (all figures in British pound sterling) for each person employed. The cost to individual workers and their families is estimated to be almost 5 million pounds per annum after making allowances for social security payments and civil compensation.


<table>
<thead>
<tr>
<th>CHINA’S FIRE SAFETY RECORDS</th>
<th>No. of</th>
<th>Deaths</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fires</td>
<td>28,200</td>
<td>1480 (+300%)</td>
<td>51,340</td>
</tr>
<tr>
<td>Gangdong</td>
<td>905 (-7.1%)</td>
<td>185 (+33.1%)</td>
<td>1,053 (+400%)</td>
</tr>
<tr>
<td>Shenzhen</td>
<td>99 (-10%)</td>
<td>45 (+22%)</td>
<td>635 (+23.5%)</td>
</tr>
</tbody>
</table>

Figures are for the first ten months of 1993.

1993’s biggest fires
1. Kedar Toy Factory 189 dead and 500 injured.
2. Nekhon Prothom, Thailand
3. Zhili Toy Factories 84 dead and 45 injured.
4. Shenzhen, China.
5. Groufu Toy Factory 64 dead, 14 injured.

Win!
Rs. Ten Thousand
for Best Entry in
ENVIROTECH SCIENTIFIC
ARTICLE CONTEST '94
Topic:
Dust-caused
Occupational and Environmental
Health Problems in India
LAST DATE FOR RECEIPT OF ENTRIES: 31 AUGUST, 1994

For any further clarifications, contact:
Dr. Rajendra Prasad, Director
Envirotech Instruments (P) Ltd.,
A-271, Okhla Industrial Area, Phase-I, New Delhi-110 020
Tel.: 6813887 Fax: (91-11)6811833
Waste trade and India

The toxic disasters in the West have forced them to go for strict and costly environment regulations for the disposal of solid and hazardous waste. To avoid these regulations, the waste generators have found a cheaper and easier way to dispose of the waste. That is by shipping them to those countries where there are less strict regulations concerning environment and worker’s health and safety. According to an estimate of UNEP, out of the total 300 - 400 million tonnes or more of hazardous waste generated around the world in 1990, 98% came from the 24 countries which are members of Organisation for Economic Cooperation and Development (OECD).

These rich countries are running out of options, so they have decided to export these hazardous wastes to Asian countries. The Australian minister for environment has predicted that Sydney will run out of landfill space in seven years. In USA, around 2,500 landfills are closed as a result of more strict environment laws. Meanwhile the cost of waste disposal has also increased in these countries. The cost of a tonne of hazardous waste for landfill in USA has increased from $15 per tonne in 1980 to $250 in 1989. And in Germany, the cost of incinerating hazardous waste ranges between 1,200 DM per tonne (US$700) and 1,000 DM (US$6450) per tonne depending upon the type of waste.

In early 1980’s the African continent was considered to be an easy dumping ground for waste. But following Africa’s wide ban on waste import in 1991, under Bamako Convention, the toxic traders have had to look elsewhere. Out of 103 countries which have banned the import of hazardous waste, Indonesia is the only country from Asia. Most of the hazardous waste exporting countries are Australia, Canada, US, Germany and Japan. And most of it is exported to Bangladesh, Malaysia, India, Thailand, Philippines, China and Hong Kong.

- In 1972, India received, 9915 tonnes of non ferrous metals waste, including ashes and residues, copper, aluminum, zinc, and tin waste and scrap from the United Kingdom.

<table>
<thead>
<tr>
<th>AMERICAN WASTE TRADE EXPORT TO SOUTH AND SOUTH EAST ASIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target country</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>South Asia (most targeted)</td>
</tr>
<tr>
<td>Bangladesh</td>
</tr>
<tr>
<td>India</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Southeast Asian Countries</td>
</tr>
<tr>
<td>(with most active people’s campaigns against waste imports)</td>
</tr>
<tr>
<td>Indonesia</td>
</tr>
<tr>
<td>Malaysia</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Philippines</td>
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</table>

Data obtained from Port Import / Export
• In 1993, through the month of August, UK sent 328 tonnes of ashes and residues, 657 tonnes of aluminum waste and scrap, 119 tonnes of nickel waste, 234 tonnes of tin waste and scrap, 1,586 tonnes of zinc waste and scrap, and 501 tonnes of lead waste and scrap to India.

• Although Germany is the world’s largest hazardous waste exporter, recent information regarding German waste exports to South Asia are not available. However, Greenpeace Germany has found that 4,847,000 tonnes of metal waste and scrap were shipped to India in 1989.

• In 1992, 33,621 tonnes of brass waste was shipped to India from Australia.

• In 1992, Canadian waste traders shipped 106,005 tons of iron waste, 79,000 kgs of zinc waste, 392,326 kgs of ash residue containing mainly zinc, 19,275 kgs of polystyrene waste, and 23,000 kgs of other plastic waste to India.

• In addition, Canadian waste brokers shipped about a million kilograms of lead waste to India in 1992.

Total lead waste export to India in 1992 was 1,007,897. The dangers of lead are well known and have caused it to become strictly regulated waste in industrialized countries. Lead interferes with children’s mental development, causes headaches, stomach problems, memory problems, anemia, miscarriages, brain and kidney damages.

Plastic waste:

• In January, 1993 (the only month examined for US plastic waste exports) 1,198.5 tonnes of plastic waste were sent to India from US.

• Greenpeace recently uncovered a mysterious series of waste shipments from the US to India. According to US customs data, the Pepsi Cola Bottling Corporation has been exporting plastic waste from California to Madras and Bombay. In 1992, Pepsi shipped over 7,000 tons of plastic scrap to India. The most frequently used shipping lines for Pepsi waste trade are OOCL and Presidential.

The waste is described as scrap PET bottles. PET stands for Polyethylene Terephthalate, a common type of plastic used in packaging, especially for two liter soda bottles.

In many states of USA, used PET bottles are collected under a container-deposit system. Although the bottles are collected for "recycling," many are actually exported to less industrialized countries where environment and workers' health and safety laws are either less stringent or not enforced.

(This article is based on the information given by Greenpeace and Poison Alert, December 1993, No.1.)

Are asbestos water pipes safe?

According to a report in Safety Watch in USA, the Government Environmental Protection Agency (EPA), banned the manufacture of A.C. pipes with effect from August 26, 1996. It recommended the use of PVC or DI pipes. However, the Court of Appeal, 5th Circuit reversed the ban. But New York State was not affected by the reversal of the ban as it had enacted the law in July, 1991, restricting the use of A.C. pipes from January, 1992.

The reason why asbestos was banned was that even if a small fibre passes into the lung it can cause Asbestosis and even cancer. According to WHO, there is no safe level of exposure to asbestos.

In 1985, drinking water of Woodstock, New York state was found to contain 304 million fibres of asbestos per liter. The cause was a severely degraded asbestos cement water main. The report was published in Newswatch magazine and an investigation was started. As a result, seven miles (11.2 KM) of the affected Asbestos Cement pipeline was replaced with DI pipes. Prof. Dr. W. Klein of Fraunhofer Institute for Unweltchemie and Okotoxikologie, Germany, informed that Germany discontinued the use of Asbestos pipes in water supply several years ago.

It is generally said that there is no danger of ingested asbestos fibers from the use of asbestos cement pipes for drinking water, but researchers at the USEPA calculated that 1,000 cancer deaths per year might be occurring from asbestos in drinking water (Science and Total Environment 18:91, 1981). Since 1968, studies have indicated a connection between ingested asbestos and cancer of gastro-intestinal tract. (Asbestos kills, by Nancy Tait, The Silbury Fund, 1976). The second thing which is propagated is that the fibres of asbestos are 'locked in'. Scientists at Yale University, USA, found that walking about and disturbing the air in a room with an asbestos ceiling, led to 10 times the level of fibres in the air. In another case, normal air movement or vibration were enough to cause very high levels of airborne fibres in buildings containing asbestos. (Asbestos fact sheet, People's Asbestos Campaign (PAAC), London, March 1987).

Source: Safety Watch, 3-B CAMAC Street, Calcutta-700 016.

<table>
<thead>
<tr>
<th>Safety Records Of Coal Mines In India:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between 1986- 1993</td>
</tr>
<tr>
<td>Accidents:</td>
</tr>
<tr>
<td>Died:</td>
</tr>
<tr>
<td>Annual death toll:</td>
</tr>
<tr>
<td>In 1993:</td>
</tr>
<tr>
<td>Accidents:</td>
</tr>
<tr>
<td>Killed:</td>
</tr>
<tr>
<td>Injured:</td>
</tr>
<tr>
<td>Source: Tapas Ganguly Kundalib Bhelari in The Week, 5 June, 1994, p-26</td>
</tr>
</tbody>
</table>

Occupational Health Problems of MICA processing male workers:

This is a study done by Mr. P.K. Gangopadhyay, Bhatacharya S.K., S. Ahmed and M.K.Chaudhury of Regional Occupational Health Centre (E) Calcutta. (Also presented at the 43rd National Conference of IAOHheld at Ahmedabad.) Seven initial operations of mica processing industries were studied for environment assessment. The dust concentration in different processes ranged from 1.12 ± 0.15 to 2.29 ± 0.22 mppcf. 463 workers of the exposed group in different operations and 123 workers of the control group of similar socio-economic status were subjected to health evaluation. The duration of workers exposure to mica dust in the different processes varied from 9.18 ± 6.24 to 15.96 ± 9.43 years. The main complaints were cough, expectoration, breathlessness, pain in chest and low back pain. Clubbing, abnormal breath sounds including crepitations (mainly nasal) were observed in a larger proportion of the exposed group. The difference of prevalence of symptoms and signs

Continued on page 24
CIS Abstracts:

PRIA has become a Collaborating Centre of CIS this year. Our role as Collaborating Centre involves forwarding studies, documentations and other materials on Occupational Health and Safety to the CIS network and access study material and data base of CIS and its National and Collaborating Centers throughout the world. One of the major materials provided by CIS is the Abstract Bulletin. We will be publishing from time to time the selected abstracts for the benefit of our readers. These abstracts will be selected on the basis of their utility in Indian and South Asian conditions.

Recently PRIA also got an opportunity to participate in the 32nd Annual Meeting of the National Centers of CIS at International Labour Office, Geneva. By going through the published material and data bank of CIS, it was felt that the material from India is much less as compared to the work done here. Many research, academic and other institutes undertake many studies on occupational health and safety. There are also many movements and actions done by trade unions and other workers’ groups, which remain undocumented. PRIA with its limited capacity has always tried to fill this gap. We invite all the concerned individuals and institutions to send us materials which they want to be included in the CIS data bank. You can send us the original studies, books for review, reports, actions and achievements. We can thus be a link between groups in India/South Asia and the CIS network.

From this issue we are starting the process by giving a brief introduction of CIS and some of its abstracts. In case readers are interested in getting more abstracts or detailed information, they can write to us.

INTRODUCING CIS

What is CIS?

At the first World Congress on Occupational Safety and Health in 1955, which was held in Rome, it was proposed that ILO should be responsible for co-ordinating, collecting and distributing information on Occupational Safety and Health worldwide. Three years later ILO initiated consultation with some of the most active European accident prevention institutions to provide information in a user friendly language to concerned people instantly.

Once a rough inventory had been made of the organisations and facilities existing in various countries of the world, representation of nine countries met in Geneva at the joint invitation of ILO and the International Social Security Association to lay the foundations for the international service especially designed for this purpose. In May 1959, the Governing Body of ILO decided to set up the International Occupational Safety and Health Information Centre, the French acronym for which is CIS.

Realizing that it would be presumptuous to attempt such an extensive and complex task unaided, the CIS set about securing the active cooperation of national accident prevention institutions. The first National Centers were the nine European countries which had earlier given it the “go-ahead”. The CIS quickly grew and attracted other members, eventually conglomering 76 national institutions and 11 collaborating Centers all over the world. It also had the support of other International Agencies like, the World Health Organisation, the European Coal and Steel Community and the Commission of the European Communities.

The National Centers in each country collect various publications dealing with the prevention of work accidents and occupational diseases, making a preliminary selection between original information and repeated items, and selection between material of local and universal interest. This material is then forwarded to CIS in Geneva. CIS does the second screening for the final writing of the bibliographic analysis that forms the substance of the CIS abstract. These abstracts are then translated and indexed to be finally printed according to an original classification system devised by the Centre and then published in the CIS Abstracts in English and French.

What do the CIS services consist of?

The CIS serves and disseminates safety and health information by:

- Types of documents:
  - Laws, regulations and directives
  - Chemical safety information sheets
  - Training materials and methods
  - Periodical articles
  - Books, reports and proceedings
  - Safety information sheets, standards

- OSH subject categories:
  - General safety, health and conditions of work
  - Occupational medicine and epidemiology
  - Industries and occupations
  - New technologies
  - Chemical safety
  - Fires, explosions and major hazards
  - Electrical safety
  - Physical hazards
  - Mechanical hazards, transport
  - Biological hazards
  - Physiology, ergonomics
  - Stress, psychosocial factors.

The CIS is continuously diversifying its production to give better service to the user. The CIS facilitates the use of information, processed through the various facilities at its disposal as the result of development in documentation technology. The main constituent of the service is the bibliographical abstracts which were published on index cards between 1960 to 1973, and stored in computer since 1974. These abstracts are regularly published as a bulletin, which
covers all notable publications on Occupational Safety and Health throughout the world.

The originals of all documents reported are systematically filed at the Headquarters. The Centre also offers its reproduction service at the disposal of users who cannot obtain publications at the source. The reproduction service contributes to the List of Periodicals abstracted, by giving the postal addresses of all the publications mentioned. This is regularly updated and published at intervals for distribution with the regular service.

The various stages in the development of the Centre illustrate the active participation of the National Centres in the work of the International Centre: (a) by regularly sending publications such as books, brochures, research reports, annual reports of specialized agencies, dissertations, reports of conferences, seminars, round tables, handbooks, statutes, regulations, standards operating manuals, codes of practice and guides, data sheets, statistical reports, articles in periodicals, films and other audio-visual devices (including any translations they know of) which come out in their respective countries and; (b) by giving assistance in some particular activities such as the publishing of national editions or the indexing of the documentary stock prior to computer storage.

**CIS Bulletin**

CIS Bulletin is a bi-monthly publication with each issue carrying 350 abstracts on:
- news and activities
- laws, regulations and directives
- chemical information sheets
- training courses, materials and methods
- articles, books, standards and statistics
- subject and chemical indexes.

The computerized service

In 1974 the whole service was computerized, instead of the old international library-format index cards published since 1960 (some 30,000 in all). The same bulletin with a detailed index was introduced to help the user in saving time and energy from the trouble of filing the cards each time.

Under this computerized system, the feeding of information on a keyboard terminal makes it possible to store the information and to produce the magnetic tape that is used periodically for the photo-composition of successive issues of the CIS Abstracts bulletin. The computer also uses the same method to prepare the index of each number containing the cumulative annual subject-matter and author indexes. It also runs the cumulative tapes used by the external networks - the SPIDEL data base facility in France and the Swedish National Labour Protection Administration for the Scandinavian countries, to feed their own computers and thus allows users in those countries to have on-line access to the CIS data base. By making the use of telematics the CIS has improved the transmission of the information and at the same time made it more accessible to the user. This means that the health and safety specialist is in a position to call up at a moment's notice and get with an unprecedented degree of reliability, all the information which the CIS has published for the last eight years or so on the subject of his concern. He can do so directly, by himself, provided that he has the use of a display terminal, or indirectly through his National Centre; Collaborating Centre or to CIS headquarters at Geneva.

Direct access to CIS data base via display terminals

As a result of computerization the information published by the CIS has an automated data base which is directly accessible to users over conventional telecommunication networks such as the telephone, telex etc. This combination of data processing and telecommunications is known as "telematics" or "telemiformatics".

Under the 1979 agreement with the SPIDEL department of the Societe pour l'informatique, a French agency for data access, the Swedish National Labour Protection Administration, the CIS National Centre for information over the Scandinavian countries and SCANNET network provided access in conversational mode to users in Denmark, Finland, Norway and Sweden. These countries can thus have access to the CIS data base in English via a cathode-ray terminal. User who has searched the data base on his terminal can note down the reference number and then look for further information in CIS abstract bulletin.

English and French language access to CISDOC is available in most countries of the world. These vendors supply accounts and passwords:
- ORBIT Search Service
- QUESTEL Inc.
- MELDARS - at- MIC
- ESA-IRS

The contents of CISDOC:

- 8% laws and regulations
- 7% chemical safety data sheets
- 4% training materials
- 38% journal articles
- 27% books
- 16% standards

Languages of original documents:

- 52% English
- 18% French
- 13% German
- 8% Russian
- 4% Swedish
- 3% Spanish
- 2% Others

(Information is based on the Encyclopedia of Occupational Safety and Health (ILO) and other documents of CIS.)

**ABSTRACTS:**


Respiratory symptoms of chronic bronchitis and measurements of lung functions were studied in all workers currently employed in granite quarries in Singapore. Highely exposed rock drilling and crushing workers showed a greater prevalence of chronic cough and phlegm and a mean reduction of 5% in forced expiratory volume in one second (FEV1) and forced vital capacity (FVC). Similar results were obtained after excluding those with silicosis. The study indicates a demonstrable risk of occupational bronchitis and obstructive and restrictive lung
function impairment, apart from the well known risk of silicosis (61717).


The amount of Chromium found in human skin after in vitro application of cement suspension on full-thickness human skin in diffusion cells was investigated. Cement suspensions made from ordinary Portland cement or Portland cement with the chrome reduced with added ferrous sulfate were used. The cement suspension were either applied on the skin surface under occlusion for 48h or applied repeatedly every 24h for 96h. No statistically significant difference in chromium content of skin layers between skin exposed to ordinary Portland cement, skin exposed to cement with added ferrous sulfate and unexposed skin was observed. Despite the fact that a more permeable skin barrier at the alkaline pH of the cement dermis were seen when ordinary Portland cement was applied as a suspension with added sodium sulfate (20%) on the skin surface for 96h. The content of water-soluble chromium in ordinary Portland cement may vary due to the alkaline sulfate content of the cement (61547).

- **CIS 94-277** Mortality from lung cancer among copper miners. Chen R.I., Wei L., Huang H., British Journal of Industrial Medicine, June 1993, Vol.50, No.6, p.505-509. 16 ref. (in English)

A cohort mortality study of lung cancer in 7088 copper miners was made from 1 January 1969 to 31 December 1988. There was an excess of death from lung cancer. The standardized mortality ratio (SMR) was 147 (p 0.01). The SMR increased with calendar period. There was a higher risk of deaths from lung cancer in the miners employed in the 1950s. Age at the start of exposure had no effect on the risk of lung cancer. The risk of death from lung cancer increased with the duration of exposure and the time since first exposure. The SMR from lung cancer was 173 in underground miners and 193 for drilling miners (both p0.01). These data show that exposure to dust is associated with an excess of death from lung cancer in copper miners whereas exposure to radiation does not seem to carry such risk. (61672).


Summary of a survey of US fire departments conducted by the National Fire Protection Association. The 97,700 injuries sustained by firefighters in the line of duty in 1992 was decreased of 5.4% from the previous year, and the rate of 6.7 injuries per 1,000 incidents was a decrease of 5.6%. Most injuries (53.5%) occurred at the scene of the fire, the other four duty categories were, in descending order of importance, on-duty, non-fire emergency, training and responding to or returning from an incident. Tables and charts break down the figures by nature of injury, type of duty, cause of injury, size of community protected and region of the country. Data on vehicle accidents and on the number of fires are also given. Fourteen specific incidents are described to illustrate the different circumstances in which injury can occur. (61719)

- **CIS 94-348** Approved Code of Practice for the prevention of sulphur fires and explosions. Occupational Safety and Health Service, Department of Labour, P.O. Box 3705, Wellington, New Zealand, Sep 1993, 40p. 17 ref. Price NZD 10.00 ISBN 0-477-03466-7 (in English).

Content of this revised Code of Practice (see CIS 90-974): interpretation; definitions; dust explosions; hazard rating of sulfur, dust explosion prevention and protection (minimization of dust; construction of buildings; fire control, elimination of ignition sources, explosion relief venting, explosion detection and suppression; inerting); specific hazards relating to sulfur handling, liquid sulfur, fertilizers containing sulfur, personal protective equipment and training. Appendices covered: properties of sulfur, health hazards of sulfur dioxide, example of a hot work permit. (61750)


Eleven types of seats frequently used in lorries, agricultural tractors and fork-lift trucks were selected. Laboratory tests showed transmissibility coefficients of 0.34-1.28. Attemptation of the vibration input spectrum was obtained in 20 out of 24 (83%) measurements. Measurements in the field showed transmissibility coefficients of 0.60-1.45. Attemedation of the vibration spectrum was obtained in 17 out of 24 (71%) vehicle-seat combinations, which indicates that in many working situations with a daily exposure of 8h or more, suspended seats will not protect professional drivers from harmful exposure on whole-body vibration. (61663)


According to this technical note on acoustic trauma due to high-energy impulse noise, there is much inter individual variation in susceptibility to impulse-noise induced hearing loss. The new quantity Eo is proposed as a measure of the daily tolerable noise does for a given individual, and it is suggested that the number of high-energy impulse noise events per day be related to an inverse exponential scale to Eo. (61754)

**OTHERS:**
- Chemical info sheets.
- Technical info sheets-material handling.
- Ergonomic info sheets-office work.
- Medical info sheets aids/precautions.

All these INFO SHEETS are originally prepared by the Canadian Centre for Occupational Health and Safety (CCOHS) and reissued by CIS for worldwide dissemination.

- Getting to grip with Manual Handling: A short guide for employers.

A HSE (UK) publication.

- Sick Building Syndrome: Causes, effect and context. The office development boom of the last 25 yrs. has been followed by an architectural revolution geared to designing energy saving buildings at all costs. The result: the modern, often sealed, open plan, fluorescent lit, synthetically furnished, artificially ventilated offices in which individual workers have
WORKAHOLISM

Ways out of workaholism:
Lots of people who put too much effort into their job without getting anything back suffer from heart attack.


Stage 1: The worker thinks constantly about their job, including evenings and weekends. He or she gets a buzz from pressure and the extra work. Early signs of overload might be exhaustion, mild depression, and loss of concentration. There might also be some somatic problems - headaches, and stomach, heart and circulation problems.

Stage 2: the critical phase. Health problems reach the psychosomatic phase. Work takes a higher priority than all the other parts of the worker's life - the workaholic's family life becomes strained. He or she feels more and more superfluous when not working. This leads to depression, which may cause time off work. Diet is neglected, high blood pressure and ulcers may start.

Stage 3: Chronic phase. The workaholic is affected nearly all the time - the job is the only thing which keep them going. Time is planned to allow evening and weekend work; they only sleep for 3-5 hours or not at all. Colleagues not working to this timetable are treated harshly - the workaholic become very competitive. Chronic overload affects ability to concentrate. Sleep disturbance and heart attack risk at this stage.

Stage 4: Terminal phase. Burnout syndrome. Concentration, though and sensory ability permanently diminished. Affected workers may have to leave work permanently, years before retirement age. Chronic depression, attempted suicide and early death are more common in workaholics in this final phase.

Avoiding workaholism:
1. Use work and organisational measures: limit the amount of work each individual takes on; change the system of working hours, including drastic limits on overtime. Prioritise work quality, not quantity.

2. Therapy: Getting medical help is a major problem - most doctors don't know how to recognise and diagnose workaholism. Neither are they aware of the appropriate treatments. As a result a number of self-help groups have started to emerge.

HOW ENVIRONMENTAL!
TO BE ABLE TO VOLUNTARILY
DESTROY
YOUR LUNGS!

I WONDER
WHICH IS MORE IMMORAL—
CHILD LABOUR
OR BONDED LABOUR.

CHEER UP, YOUNG MAN!
WE ALL SUFFER
OCUPATIONAL DISASTERS—
I SUFFER
LOW BLOOD PRESSURE.

I USED TO LIKE FISH—
NOW THE TUNRED VEGETARIAN.
ALL THE FISH HAVE BEEN MURDERED
BY CHEMICAL POLLUTANTS
DUMPED INTO THE SEA.
PRIA

The Society for Participatory Research in Asia (PRIA) is an independent, non-profit, non-government organisation registered under the Society Registration Act 1860.

Over the last twelve years PRIA has promoted people-centered development initiatives within the perspective of participatory Research. As the cherished mission, PRIA endeavors to promote people-centered, holistic and comprehensive evolution of society characterised by Freedom, Justice, Equity and Sustainability, by

- creating opportunities of sharing, analysing and learning among formations of the Civil Society (in particular, people’s organisations and NGOs);
- engaging in independent and critical analysis of societal trends and issues, development policies and programmes; and
- enabling dialogue across diverse perspectives, sectors and institutions.

The focal aim of PRIA’s Centre for Occupational and Environmental Health is to promote and contribute towards making work and living place healthier and safer. On one hand the Centre collects information from networks, organisations and individuals through research studies, documentation and data bases and it on the other, disseminates information through Bulletin, publications, training/ workshops and information service.

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Is India a garbage dump?

In our last bulletin we had a theme article on the occupational health conditions of the dumping ground workers of Bombay Municipal Corporation. No doubt it received lots of appreciation from all the quarters of the society but it failed to attract the attention of the policy makers and implementers. The unfortunate outbreak of the plague in some parts of the country some how substantiated the recommendation of the study to practice the scientific technique for garbage disposal and the need for a proper health care system. Almost all over the country the garbage disposal system is obsolete and carelessly done; there is also a general apathy towards the health care system by the Indian government. Our expenditure on health care system is one of the least in the world. Considering the size of the population, the 6% of GDP on health care looks as a cruel joke, whereas the world average is 8.6%. For the last few years we have experienced a gradual decrease in the budget allocation for government hospitals and the flourishing of private hospitals and nursing homes. The recent experience of plague gives us an opportunity to learn and reflect on this policy. Most of the private nursing homes and hospitals refused to admitting the plague patients and the total burden was shifted over to the ill-equipped government hospitals. 400 doctors fled the Surat town after closing their shops. It is an issue of great concern for every one that on one hand we talk of globalisation, modernisation and liberalisation, while on the contrary Indian government is still not able to provide basic health and sanitation facilities to its citizens. Plague not only demonstrated the virtual collapse of the health care and sanitation system but also that of the local administration. According to UNICEF report around three lakh urban children die annually of diarrhoea, mainly in slum areas. In a country wide survey carried out by National Institute of Urban Affairs, which covered 686 urban slums, indicates the depressing scene of infant mortality of 123 per 1000 live births. The major cause of their death is diarrhoea, diphtheria, tetanus and measles, which are mainly due to poor sanitation conditions. Even at the height of plague prevalence 60 employees of India’s premier medical institute, All India Institute of Medical Sciences got affected by viral hepatitis. This outbreak of plague gives us chance to reflect on the policies affecting the common man’s life. The population in cities is increasing and the budget of municipalities are stagnant. It has now become a regular feature that after every disaster the government
announces the gesture of opening of a 'Control Room' and
does nothing to prevent it before hand. The Plague Surveil-
ance Unit, Bangalore had in fact warned as early as five
years ago about the reappearance of plague but no one
listened to it. Instead, the Maharashtra Government closed its
plague unit in 1987. The production of vaccine was also
stopped and the only one company Heffkine Institute, Bombay
had the emergency stock of 500 vaccines whereas the imme-
diate requirement was of 15,000. We must learn from this
experience. In this century alone more than 12 million
Indians have been killed by this deadly killer, which reap-
pears again and again to teach us a lesson.

We know it is a fact in our country that even if thousands
die there is no accountability. Even after a decade or we are
not able to compensate Bhopal gas disaster victims nor we
have taken any concrete step to prevent such disasters in the
future. For theoretical purposes many old laws were amend-
ed and many new ones made but this only increased the
already existing number of laws and bylaws and created
more confusion for the common man rather than generating a
will in the implementors. Similarly plague will reappear if
no action is taken now.

Thousands of workers lose their lives every year due to a
variety of diseases but it remains only in the inner pages of
the newspapers. We must remember that any occupational
health problem if not handled at the proper time can take the
shape of a major man made disaster. For the last few years
we are promoting the import of hazardous waste from the
developed world. India and Pakistan are on the top. The
technology and products which are coming are rejected and
obsolete. We have the example of asbestos and will now
witness the development of foundries. Gradually our country
is developing into the junk yard of the globe with not only
hazardous waste, rejected, outdated technology and anti-
environment consumerism from the developed countries but
also created by us due to our faulty practices.

In this issue we are highlighting the plight of women in the
unorganised sector. The hidden agenda of liberalisation is to
shun the social security responsibility of workers by employ-
ers as well as by the government. We can see its obvious
manifestation in the informal sector. In this whole segment
the worst condition is that of women and child labourers.
The family in particular and the society in general considers
women as subsidiary earners rather than full fledged wage
earner. This is the reason she can be employed at cheap
wage and sexual harassment of women at the workplace is a
globally prevalent phenomena. This theme article is only a
drop in the ocean of the overall difficulties faced by the
women when they work for earning their and their family's
daily bread and butter.

In our effort to develop this bulletin as a vehicle of exchange
of views among diverse sectors, of the society, we published
the views of an environmental scientist in the last issue. This
time it is highlighting the activities and achievements of
 Environment Management Division of Confederation of Indian
Industries. We strongly feel that the problem of occupa-
tional, environmental and consumer health can only be solved
when all the concerned parties not only openly share the
information but also have a common strategy.

Harsh Jaitli
Subscribe Now If You Have Not!!

Dear friend,

I deeply appreciate the response given by you to our first bulletin. We would be happy to follow your suggestions in the near future.

As mentioned in my earlier communication to you regarding mobilising the support for continuity and sustenance of this bulletin, through annual subscription, this letter is a reminder to you, if you have not subscribed. From next issue we will be following the subscription and exchange lists. In case you have already subscribed then kindly pass this on to those friends who have not.

So subscribe now!

Looking forward to your continued support.

Thanking you.

[Signature]

Rajesh Tandon
Executive Director
Note on Environment Management Division of Confederation of Indian Industries

Dr. K.P. Niyati

The author is head of the Environmental Management Division of the Confederation of the Indian Industries.

BACKGROUND

Industry, today has to dovetail of various environmental regulations in its functioning right from its product design, technology choice, siting and operation to ultimate waste disposal. As a result, it is required to bear an increasing burden of compliance costs. The range and magnitude of problems faced by industry are compounded further by:

- Non-integrated regulatory regime reflected in media specificities of pollution control prescriptions - air, water, hazardous wastes, environment audits, EIAs and so on.
- Non-uniform application of effluent/ emission/ disposal standards, non-availability of cost effective pollution control technologies/ monitoring instruments.
- Lack of information about waste recovery, reuse, and waste utilisation technologies/ clean process technologies; lack of skill and expertise especially on waste minimisation and pollution prevention techniques etc.

The challenge to industry, therefore, is to respond to the emerging environmental imperatives and be able to produce more of quality goods and services with less resources, in environmentally compatible manner, profitably and competitively.

The objectives and brief of EMD activities corresponding to the activities suggested in Agenda-21 are as follows :-

Environment Management Division (EMD) in CII is established to assist Indian Industry in becoming increasingly 'ECO EFFICIENT' and to discharge its environmental obligations effectively. EMD, therefore, plays a role of catalyst-cum-facilitator and provides enterprise level services to demonstrate that it makes good business sense to reduce waste and be an environmentally responsible company.

OBJECTIVES

The objectives and brief of EMD activities corresponding to the activities suggested in Agenda-21 are as follows :-

* to facilitate creation of an enabling atmosphere for environmental protection through interaction with policy makers.
* to create awareness in industries on the use of clean process technologies, waste reuse/recycling technologies etc.
* to provide education and training opportunities to help Indian Industry acquire in-house expertise for Environmental Management.
* to disseminate environmental technology information to promote use of clean technology/ waste reclamation and utilisation technologies and promote technology transfer.
* to provide professional services and to undertake specific projects to help industry evolve cost-effective and implementable solutions.

SERVICE PROFILE

EMD offers a wide range of services on different environmental aspects. The thrust is to convert environmental problems into opportunities, to improve profitability through pollution prevention, waste minimisation and waste utilisation. EMD is making special efforts to serve small scale units and pollution intensive industries.

Environmental policy

EMD interacts with the regulatory agencies with an objective to review and monitor the effectiveness of various industrial and environmental policies and suggest changes, to provide advice on policy formulations, prescriptions, interventions and support in devising legal and fiscal strategies and to make industry proactive.

Environmental management

EMD provides specialised professional services on various issues such as, waste minimisation, environment audit, air and water pollution control, resource recovery, reuse, recycling and waste utilisation, solid waste and hazardous waste management, environmental impact assessment, etc.

Information on environmental issues

The EMD acts as technology-cum-strategic broker to promote technology transfer in the areas of clean process technologies, pollution control technologies, resource recovery, reuse and recycling technologies etc., and to operate industrial waste exchange data bank.

Training and awareness building

EMD undertakes a wide range of need based training programs/ workshops on various topics including Environmental Audit, Environmental Hazard Management, etc., and organises lectures/ seminars and promotes environmental awareness through audio/ visuals and awards.

Sharing of experiences

Keeping in line with its initiatives, EMD organises visits, both domestic as well as international. The objective of these visits is to enable the industry to learn from those industries/ organisations who have successfully implemented Environment Management Scheme in a cost-effective manner and have generated wealth from waste.

International linkages

The Environmental Management Division
of CII works closely with international bodies like UNDP, BCSD, UNEP, UNIDO, WORLD BANK, ADB, etc., to help Indian Industry become globally competitive.

Some of the major activities of EMD are as follows:

PROMOTING CLEANER PRODUCTION

- **Government - Industry Partnership.**

Being an apex industry association, CII works closely with the Government especially with the Ministry of Industry, Ministry of Environment and Forests and the Ministry of Energy (Power & Non-conventional Energy Sources). President CII, is not only a member of National Environment Council which is headed by the Prime Minister but also also a member of the jury for Indira Gandhi Paryavaran Parashar. In order to help Ministry of Environment and Forests, CII is working very closely for the implementation of Montreal Protocol Provisions and is also represented on the steering and technical and financial committees in this regard. CII is also represented on various committees constituted by Ministry of Environment & Forests and Central Pollution Control Board (CPCB) which have direct bearing on Agenda -21 items, such as National Waste Management Council, Environmental Education Committee, Committee on Cleaner Production, CPCB Technical Committee on Eco-labeling.

- **Use of Economic Instruments**

Industry and the Government, both started recognizing that implementation of normative measures through environmental laws and standards alone would not serve the cause of Sustainable Development. There has to be a prudent mix of fiscal and regulatory approach if use of cleaner production technologies in Indian Industry will have to be induced. Two specific initiatives in this regard, with which CII is closely associated, are, firstly, setting up of Clean Production Technology Centers with special emphasis on requirements of Small & Medium Enterprises (SMES) and use of fiscal instruments - a study sponsored by MOEF and conducted by National Institute of Public Finance and Policy (NIPEP).

For promoting voluntary compliance of environmental regulations, one common thrust that is explicit in all environmental activities of CII is to impress upon Indian Industry that environment protection makes a sound business sense. It is exemplified by case studies from Indian enterprises who have realised concrete monetary benefits by employing resource conservation, reuse & recycling waste utilisation approaches to solve their environmental problems.

- **Internalization of Environmental Costs**

While, this has been a difficult subject, yet CII has initiated a couple of exploratory efforts. They relate to evaluating the possibility of evolving a mechanism of internalizing environmental costs in a given industry sector as a test case and exploiting the scheme of Eco-labeling launched by Government of India to induce internalization of environmental costs in industry.

- **Environmental reporting & Best Environmental Practices**

Now, due to recent developments, companies are already required to disclose energy consumption data in their annual reports, and are also reporting on energy conservation efforts in the Director's Report. Regarding other resources such as water, raw materials, auxiliaries, etc., it is learnt that MOEF has initiated an intervention for consideration of Ministry of Law. Even otherwise many enlightened industries are voluntarily bringing out corporate environmental report annually for the benefit of share holders, general public and other stake holders. This trend is increasing. In order to adopt best environmental management practices, Indian industry have also started framing their corporate environment policies or SHE (Safety, Health & Environment) Policies. Many companies, especially export oriented units now have written environment policies and the trend is picking up. The practices essentially flow out of the key elements of such policies, environmental objectives and targets.

CII has also catalyzed this process through propagating the concept of Environment Management Systems (EMS) certification on the lines similar to Total Quality Management (TQM) and ISO-9000 (Series) certification scheme. Based on CII's initiative, Bureau of Indian Standards (BIS) has already brought out a standard on Environment Management Systems which is akin to BS7750 of British Standards Institute (BSI), International Standards Organisation (ISO) is also working on an internationally accepted EMS standard. ISO standard is expected to provide further fillip to this activity. CII is not only keeping the industry informed, but is also inducing them to adopt these EMS standards.

- **Technological Co-operation for Cleaner Production**

Government is initiating the process of establishing the Cleaner Production Centre with the specific objective of promoting use of Clean Production Technologies (CPT's). UNIDO, with the help of appropriate institutions in India, is also establishing National Cleaner Production Centers (NCPCs). CII is developing its own data base and shall network with other data bases and centers within the country and internationally. CII has also published a compendium of waste minimization case studies to promote exchange of experiences in cleaner production.

- **Cleaner Production Policies**

Use of CPTs and investments on CPTs is governed by macro -economic policies in the country. CII interacts regularly with the Government on these issues. Eco-labeling scheme of the Government also supports
this case, as there is strong emphasis on cleaner manufacturing processes in the criteria for grant of Eco-labels. For SMEs there is a need of specialized motivational policies or incentives. CII is interacting with Department of Small Industries and DCSSI in this regard.

- **Business Associations, Trade Unions and Workers**

CII attaches great importance to involvement of workers and trade unions in improving enterprise level environmental performance. EMD of CII has conducted over a dozen enterprise level training programmes for workers to motivate them to work towards waste minimization and resource conservation. These programmes were conducted in local languages. CII also interacts regularly with trade unions and their apex organisation. Environment professionals and industry personnel representing CII have served as faculty/resource persons in training programmes and workshops organised by trade unions organisations and other institutions. These programmes were meant exclusively for trade union officials from all over the country.

- **Awareness & Training Activities**

EMD of CII, since its inception has conducted over 100 training programmes, workshops, clinics, seminars, etc., both to create awareness and to train industry personnel in specific areas of environmental management. Of these nearly 75 were devoted to ‘Environment Audit’ as a management tool for minimising wastes and conserving resources. The focus was on reducing consumption of input resources per unit of product output. With a view to create multiplier effect, CII in collaboration with MOEF and ADL (Arthur D. Little Consultants - USA & UK) even organised a two week long “Environment Audit” training programme exclusively for developing cadre of trainers. These trainers are being utilised by CII as resource persons in its training activities all over the country. Unique feature of CII’s training activities has been joint programmes with MOEF, CPCB, BIS, or State Pollution Control Boards in most places. This has helped industry and regulatory agencies work together towards the common goal of environmental sustainable industrial development. Seminars and workshops predominately covered newer areas such as Eco-labeling, technology transfer for sustainable development, Environmental Policies & Strategies for Small Enterprises, Emerging Environmental Technologies & Environment Management Practices, etc. CII also organises trade fairs and exhibitions both to create environmental awareness as well as to promote business in environmental technologies and services.

- **Cleaner Production - Role of International Organisations**

While, this part relates to the international organisations’ role in education, training and awareness activities concerning cleaner production, it must be recognised that CII has been proactively working with international agencies such as Business Council for Sustainable Development (BCSD), United Nations Development Programme (UNDP), United Nations Industrial Development Organisations (UNIDO), World Bank, European Economic Community (EEC), and bilateral agencies such as USAID, NORAD, CIDA, FINIDA, etc. for enabling Indian Industry to respond to the needs of Sustainable Development.

- **Networking & Information Dissemination for Cleaner Production**

CII is constantly in touch with international as well as bilateral organisations such as UNEP, UNIDO, IRC, ADB, GEF, etc. as well as other bilateral agencies such as GTZ, Germany, British Council, CIDA, USAID, etc., for information dissemination on cleaner technologies. In-fact, CII’s EMD responds to at least 15 enquiries from individual companies at home and abroad every month, who are interested in business linkages with potential both in the areas of cleaner manufacturing technologies as well as conventional end-of-pipe pollution control technologies. EMD of CII is also exploring the possibility of networking with international organisations to organise training activities relating to cleaner production. In this context CII is in touch with TNO and other Dutch agencies. Support of Global Environment Facility (GEF) would go a long way, especially in helping SMEs acquire, operate and manage Environmentally Sustainable Industrial Technologies (ESITs).

**PROMOTING RESPONSIBLE ENTERPRISESHIP**

- **Encouraging Establishments of Sustainably Managed Enterprises**

In addition to proposing, promoting and articulating the need of evolving an effective mix of regulatory, administrative, economic and market oriented measures, CII has been proactive in working with the Government on initiatives such as hundred percent depreciation for waste recovery and waste utilization technologies, streamlining of consent and other regulatory practices, modifying environmental audit prescriptions, rationalisation of standards and environment clearance procedures etc. - all to support environmental stewardship in industries for larger goal of transforming value addition organisations to sustainably managed enterprises. Information dissemination, particularly in respect of enabling technologies being crucial, CII is striving to forge links with various multilateral & bilateral programs such as ICPIC of UNEP, Trade in Environmental Technologies and Services (TEST) Project of USAID, Technology Partnership Initiative (TPI) of British Government, German Development Agency (DEG) Program, etc., for introducing environmentally sustainable industrial technologies in India.

- **Venture Capital Environmental Funds**

Venture Capital availability, crucial as it is, for trying out newer & better technologies, CII has been playing a critical role in establishment of such venture capital funds. One successful example, if it gets going, would be India Environmental Technology Venture Fund (IETVF) being pursued by British and Canadian private organisations.

- **Transnational flow of Technologies & Practices**

While this aspect concerns multinational

Continued on page 6
The diagnosis of Byssinosis among textile workers

Results of a study by PRIA conducted in the Model Mills and Sut Girmi Mill, Nagpur as a part of National Campaign on Dust Related Lung Diseases.

INTRODUCTION

PRIA in collaboration with Institute of Integrated Development, Nagpur, carried out a survey of two textile mills in Nagpur from Feb. 14 to 16, 1994. Recognising the fact that in a country like India, where majority of the workers involved in textile industry are victims of one or other occupational disease, PRIA few years back took the task of conducting series of studies at various places. The major objective behind such exercise is not only to identify cases of byssinosis, so that disability compensation can be claimed and preventive steps can be initiated, but also to educate and mobilise workers around this issue.

The total number of diagnosed workers were 307 and out of this 177 were from Model Mill and 130 from Sut Girmi Mills. Most of the workers had never heard about byssinosis. A questionnaire was prepared similar to the one used by Dr. J.R. Parikh of National Institute of Occupational Health (NIOH) and also based on experience gained from similar studies at various places. Some trained students from local Electro Homeopathy College participated in the study.

Lung Function Tests were carried out by the Wright Ventilometer VM1, which gives digital readings of Forced Vital Capacity (FVC), Forced Expiratory Volume in the first second (FEV1), FEV1/FVC and Peak Expired Flow Rate (PEF).

CRITERIA

The criteria used for the diagnosis was same as used in the studies conducted for the diagnosis of byssinosis in Bombay and Ahmedabad. Which are as follows:

- Symptoms of Chest tightness after exposure to cotton dust
- FEV1 less than sixty percent of the expected value. The values of the expected FEV1 by western standard are higher than the Indian values. If we use western values many more workers would be diagnosed as being affected by byssinosis. The Indian values are less than western values and our diagnosis is more consistent with Indian reality and is conservative.

- The percentage FEV1/FVC less than 70%.

We have used (b) and (c) in association with (a).

FINDINGS

Age wise Classification

Occupationally active group is from 31 to 40 years, as most of the workers belonged to this age group. Out of 307 workers, 140 (78.2%) were from this group. No child worker was observed by the team, but the number of workers in the group 51 and above is only 38 (12.4%).

Department wise distribution and working years

In this whole sample there were 61 (20%) workers from card room section and only 11 (3.6%) from blow room section. Most of the workers, (228) had spent more than 11 years in this job and only 14 workers have working years less than 5 years. For 294 workers (95%) this was the first job.

How dusty is your workplace

Out of 307 workers, 240 (78.1%) workers consider their job as dusty. 81 workers (26.4%) feel that even if the machine is not operational the work environment is
full of dust. The significant fact about the neglected situation in these factories is that 90% of workers denied the availability of personal protective equipments. 230 workers (75%) disclosed the fact about the absence of dust suppressing facility in both the mills.

Symptoms of Byssinosis

Out of total 307 workers, 206 (67.2%) had chest complaints. 135 workers (44%) said that they cough up in the morning and 139 (45.3%) have sputum problem. Lung Function Test was conducted on 149 workers and 21 (15%) workers had FEV1/FVC percentage less than 70%.

Conclusion and Recommendations

Although the results of radiological and haematological examination are awaited, however, on the basis of the symptoms, occupational history and lung function test, one can roughly estimate that there are 21 cases of byssinosis in this group of 307 workers.

This is an indicative study which is an exercise to attract the attention of concerned authority towards the existence of the problem. The team strongly recommends the local ESI Scheme to conduct extensive medical check up of the workers of blow room, card room and spinning section of the mills and submit its recommendations to ESI Corporation for processing it for compensation claims.

Continued page No. 4

organisations from abroad in one, it is as much relevant to Indian companies who are investing abroad. CII is, therefore, creating requisite awareness of imperatives relating to ecological appropriateness of technologies and equipments to local (foreign) environmental conditions, especially in pharmaceutical, cement and textile sectors, who are going global in today's liberalised macro-economic climate.

- **Environmental Stewardship of SMEs by large industries**
  CII, through its training and awareness activities, is reaching out to larger industries having ancillaries to provide requisite environmental expertise to their small sized enterprises supplying components and other services. Similarly, they are being urged to forward environmental concerns amongst the buyers.

- **R&D for Environmentally Sound Technologies**
  CII has intensified its thrust to build co-operate ties amongst R&D Institutions and Industry. It has been mounting highly focused national and international industry missions to strengthen Industry and R&D establishment interactions. The objective being technological and ecological advancements in different industry sectors.

- **Environmental Transparency**
  CII has been working towards transparency with regard to environmental safeguards in industry. Many industries have in fact already started involving employees and people of surrounding areas in environmental efforts and initiatives. CII hopes to intensify such efforts in the near future through its ongoing business and community linkage programs.

<table>
<thead>
<tr>
<th>City</th>
<th>Garbage generated (tonnes a day)</th>
<th>Garbage Cleared (tonnes a day)</th>
<th>Sewage generated (million litters a day)</th>
<th>Sewage collected (million litters a day)</th>
<th>Budget (in crores)</th>
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</thead>
<tbody>
<tr>
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<td>2420</td>
<td>1800</td>
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<td>800</td>
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<td>2463</td>
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<tr>
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<tr>
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<td>400</td>
<td>240</td>
<td>270</td>
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<tr>
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<td>1000</td>
<td>130</td>
<td>70</td>
<td>170</td>
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</tbody>
</table>

**Table**

**State of Municipal Governance in some of the important towns of India**

<table>
<thead>
<tr>
<th>Mills taken for study</th>
<th>No of questionnaire filled</th>
<th>L.F.T. done</th>
<th>X Ray &amp; blood inv.</th>
<th>Suspected cases of 'B'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Mill</td>
<td>177</td>
<td>87</td>
<td>42</td>
<td>7</td>
</tr>
<tr>
<td>Sut Girni</td>
<td>130</td>
<td>62</td>
<td>28</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>307</td>
<td>149</td>
<td>70</td>
<td>21</td>
</tr>
</tbody>
</table>

**Overall profile of Survey**
A Study of the Occupational Health Hazards of Women Workers

In 1990-91, PRIA conducted studies on the occupational health hazards faced by women workers in informal sector. This report is the compilation of all those studies. For a detailed report kindly write to us.

INTRODUCTION

This study is an effort towards documenting occupational health hazards of women workers in the unorganised sector. It is observed that 80% of the workers in the informal sector comprises of women. The present study is an attempt towards recording the plight of the fair sex in their endeavour to earn their daily living. The female wage earner faces a peculiar situation. On the one hand a woman runs the household, which is her expected role in the family; on the other hand, economic constraints compel her to seek employment outside the mantle of her family. In this pursuit women play a very significant role of a wage earner, but this is hardly acknowledged by her family or society at large. The financial contribution of women is perceived as merely supplementing the family income where the men play the central role. Bearing the double burden of employment and running the household, women still remain on the periphery of family and society. At home and workplace both she bears the stigma of being the weaker sex. She is not preferred in the formal sector, not because she is thought to be incompetent but because the employer does not want to provide her the basic need for being a woman; maternity leave, providing creches etc. The other negative aspect of the earning woman is the nature of her job. Women are thought to be a misfit in industry which is male dominated. Therefore, they are shifted to the unorganised sector where they mostly do arduous, monotonous work such as transplanting, threshing, bidi rolling, weaving, coir rope making, tobacco processing, assembling electronic circuits etc. However, when a better, labour saving, productive technology becomes available, the women are immediately replaced by men.

The emerging picture is rather dismal. It is seen that most of the women, about 80% are employed in agriculture and informal sector of the economy. They are less paid compared to their male counterparts (for the same job) despite such laws as Equal Remuneration Act, primarily because it is believed that they do less work compared to male workers, and also they are most vulnerable section of the workforce which can be easily exploited. They are in the job which are considered:

* unskilled such as head loaders in construction, bidi rollers, cotton pickers etc.
* seasonal in nature, casual.
* manual and more hazardous.
* not organised as a workforce.

One of the main reasons for such a situation is that the women workers in the informal sector are hardly being organised. As a result women workers of informal sector are not in a position to bargain for better working conditions and wages.

Being in the unorganised sector, the women worker are at various disadvantages. The dual responsibility of home and workplace leaves no room for her to organise a union, which can become a forum for voicing her difficulties and a remedy thereof. Consequently she not only loses her claim to various workers' benefits and compensations but in addition is constantly under threat of losing her job. Physical harassment of female workers for being a woman is not uncommon and in fact, too many. The woman falls a natural prey to such situations and has no other option because of her dire poverty. These are the various reasons why PRIA thought it worthwhile to undertake such a study.

In consultation with concerned groups and individuals following areas were identified for the study: agriculture workers in Gujarat and Tamil Nadu; women involved in Cotton plucking in the Punjab; tobacco processing activities in Gujarat; brass work in Tamil Nadu; stone quarrying in Gujarat and prawn peelers in Kerala. The study of one area - electronics in Gujarat could not be completed due to harassment of the workers by the owners. This report is a compilation of these studies. It tries to present an analysis of women workers' situation in this industry and the health risks women encounter at work.
METHODOLOGY

The basic premise of research in occupational health followed by PRIA is one of community participation and people-oriented studies. Keeping these in mind, a questionnaire was made, reviewed and administered by the workers (respondents) themselves. This approach is very meaningful in occupational health research, because the primary concern is the people under study and not research per se. Occupational health is the workers' problem so they are the best judges to study their plight resulting due to occupational hazards.

No doubt the question of using control is very important but using it in the field of occupational health has certain constraints. To get a control group in this case is difficult because people other than workers are also not free from the effects of pollutants, which are not limited to just shopfloor.

It was also realised during the course of the study that since men and women work together at the same workplace, many of the problems they face are common. Hence, to get a comprehensive picture it was decided to interview some men along with the women. Men were a part of a group discussion on certain occasions as it was necessary to include their point of view.

METHODS

The various tools such as, observations, questionnaires and group discussions were used for data collection.

OBSERVATIONS

This is a very effective tool to get a holistic view of the situation under study. For example, observation of the production process and its various stages will not only reveal the prevailing work culture but will also truly sensitize the researcher about the situation. Observation as a tool augment the results of group discussion and questionnaire method.

In occupational health, observation not only helps in getting first hand information about the work process but also about the other related factors like living and workplace conditions etc. Such observations help to study division of work at workplace and strict adherence to the assigned jobs. For example, in fertilizer company workers in nitric acid plant may not even be aware of the process in the phosphate plant. While this is very pronounced in the formal sector, it is not altogether absent in the informal sector. For example in the case of brass workers, those working on the “Bottoms” of brass vessels do so for years together and develop a skill for that. The other sections of the work process remain unknown to them and they are ignorant about the total process of brass vessel making.

Personal observations also leads to framing of better and more relevant questions. Personal observation motivates the researcher to feel the importance of his work. To know that the situation is bad is one thing but to actually witness it is another. To know that high level noise is detrimental to the hearing capacity and to actually experience it in the brass industry where continuous hammering goes on are two different things. Knowledge is good but experience is insightful. Since we are engaged in action research, observation as a tool helps develop better strategies for the improvement of workplace status because this leads to better involvement in planning.

Questionnaire

The questionnaire was reviewed and administered by the workers. This technique enables one to gather quantifiable information.

Group Discussion

While through the questionnaire one gets quantifiable data, group discussion is a technique to glean qualitative data. The advantage of this technique is that the researcher gets to know those aspects of a study which have been missed out in the questionnaire. Also, contradictory statements given by workers get checked. As a very effective technique, it gives a holistic view of the situation. Group discussion has another dimension, that of educating the study group. Through this technique the study group gets educated. If there is a threadbare discussion, various relevant issues dormant in the minds of the respondents get exposed. By posing questions the researcher in a way educates the respondents.

THE FINDINGS

The major findings of the research are detailed as follows.

Socioeconomic Profile

- Monthly family income

Almost hundred percent of women in agricultural work in Tamil Nadu, fifty percent in Gujarat and the Punjab are below the level of a monthly family income of
Rs.400. The average family size is five. The monthly per capita income is therefore Rs.80, which is a little above the poverty line figure of Rs.50. In Gujarat among the quarry workers, there were more than three children in each household. Among the tobacco processors and growers, 54.8% women had more than three children.

- **Living conditions**

Living conditions of women in the informal sector are one of abject poverty, as these women come from the weakest section of the society. Their living environment is polluted with traffic fumes, sewerage, contaminated waste water. The scene gets more morbid as kitchen fumes from firewood, cowdung and coal add to the misery of the women’s living conditions.

Because of low level of income most women use traditional fuel which is more hazardous than LPG. Adding to their poor work place environment is the kitchen pollution which enhances their chances of getting lung diseases.

- **Malnutrition**

Malnutrition is rampant among women workers in the informal sector. This heavily cuts down their work efficiency. Poverty is not the only cause for this. The other reason is the presence of acute gender bias within the family, which means the women in the family get the leftovers and often go hungry. About 60% women in the country are anemic and a large proportion of it is from the informal sector. Malnutrition leads to other health problems such as complicated childbirth and maternal death. Over and above, all these factors have a cumulative effect on the vulnerability of women workers to occupational diseases.

- **Level of education**

Most of the women in the research study fall below the poverty line. Illiteracy is very high among these workers which makes their case very weak. Being illiterate they fail to realize the significance of the scheme concerning them. Consequently the women lack the confidence which stems from their lack of education. Their illiteracy stands in the way of their relation with their employers. Related to poverty and illiteracy is malnourishment which makes them more vulnerable to occupational diseases.

Amongst agricultural workers in Tamil Nadu 85% of women are illiterate, 88% of quarry workers in Gujarat had no formal education and about 77% of women in 3 villages of Khera district are illiterate.

**ATTITUDE TOWARDS HEALTH**

There seems to prevail a rather pessimistic attitude regarding general health among women workers. This seems to be accentuated in the occupational health sector. A sense of resignation seems to dominate the attitude towards occupational and environmental health, particularly in the informal sector. In the formal sector the risk of contracting occupational diseases remains confined to only the work place, but in the informal sector the chances of having occupational diseases multiply because many times the work area can not be separated from the residential area.

**ACCESS TO HEALTH CARE**

There are many health care schemes but they are not very useful to women. Besides, this neglect is more apparent with regard to occupational health and women. In some places these women rely heavily on self medication, such as those in brass ware industry used toxic soil on their wounds, thus jeopardizing their health. Three cases of deaths due to tetanus have been reported after such treatment. These women neither have access to nor are aware of the medical care system run by the government.

But in some places inspire of the high cost of treatment by the private practitioners, women think it worthwhile because it is more efficacious than the government controlled medicare system. The sheer callousness of the health functionaries at government run centers deter the beneficiaries to avail of it.

Women of all occupations use private hospitals more than the government facilities, with the exception of those in
other occupations (vendors and manual labourers). Among the tobacco processors 30% of the women reported using private hospitals as opposed to 19% who used government facilities. The corresponding figures for women involved in tobacco cultivation were 25% and 22%, 19% and 13% for those in cultivating other crops and 24% and 22% for those who did household work. Chart 1 & table 1 is an illustration of the number of women (18.2%) who received help for medical care from the employers.

HEALTH AND SAFETY CONDITIONS

Accidents: The perception of women regarding accidents at work places is not in line with our common thinking. In fact the threshold for considering an injury as an accident is rather high. For instance, scratch, cut or crushing under stone, till there is a fracture is not considered to be serious and worthy of calling it an accident. This is the reason why women workers do not take leave on such injuries. Fear of losing their wages is the other reason. In the brass vessel industry in Tamil Nadu, out of 151 workers who handled acid, 66 workers suffered due to acid burns. But they do not consider small cuts and bruises as serious. They either neglect such wounds or apply something on it thus putting themselves at a risk of contracting tetanus.

Agricultural workers in Tamil Nadu reported minor injuries due to scythes, weed pickers and even axes. At the mining site women help in filling the baskets with the stones which are then loaded on to the trucks. The manual transportation activity is done by women only. Chart 2 and Table 2 show very clearly the number of women affected by ailments directly linked to occupational demands of working in the stone mines. Out of a total of 109 women included in the study, only 26 (23.8%) women did not suffer from any illness. All others had some or other complaint.

PROBLEMS DUE TO INCORRECT POSTURE AND LIFTING WEIGHTS

Ergonomic factors such as faulty postures during work can cause several health problems such as back ache or shoulder pain. Cotton pickers in the Punjab face an acute problem in this respect. In order to pluck cotton they have to bend back and forth and at the same time lift weights. The cotton bag is tied to the neck and in an attempt to make more money, which is paid on piece rate, they carry weight up to 10 to 12 kilograms. This leads to shoulder pain. Women in stone quarries in Gujarat lift weight in the range of 35 to 50 kilograms. This head loading gives rise to back pain. Most women complain of these problems but many of them do not associate this with the nature of their work. This is because their usual household chores is also strenuous and they attribute their orthopedic problems to this factor. Thus the cause of their backache and shoulder pain etc. is multiple. Women from other areas are also reported to have complained of their problems. Interestingly in Kheda district (Gujarat) 26 women busy with only their household chore complained of body ache and backache. Some of them also complained of tiredness, listlessness and weakness (57%).

CULTIVATION

Women involved in cultivation of rice and millet or growing tobacco reported back pain (67%) and body ache (70%). 21% of them reported dizziness and 6% complained of swollen feet with pain. Fever with shivers were the other complaints. Chart 3 and table 3 and 4 illustrate the extent of suffering due to various ailments as a result of activities related to cultivation of crops and tobacco farming. Planting of seedlings can be the cause of multiple health problems. For instance, standing in ankle deep water for hours and stooping to plant the seedlings may give rise to backache and skin diseases.
HOUSEHOLD WORK

Table 5 illustrates the morbidity pattern of women who were confined to only household work and working women who also did household work. Women who did both suffered more because the body and back ache got aggravated due to their household work. Their ailment which started at the work place did not find due attention at home but doubly increased due to additional work.

In the case of women who did both (407) the most common ailment reported was “general weakness” (57%), bodyache(26%) and backache(22%). By “general weakness” women explained that they felt tired, restless and weak. Again these symptoms together with dizziness (reported by 10%) could be at least partly due to anemia. 24% of women involved in household work and outdoor occupation reported problems with their feet. There was pain and itching between the toes, which has been attributed to “athlete foot”. Workers reported this during work at home and this could be so because the condition persists actually due to their work outside the home. This is borne out by the fact that none of the 26 women who did only household work reported of this problem. Household work such as washing clothes and dishes and cleaning and swabbing all of which involve use of water might actually escalate the problem. Chart 4 & table 5 illustrate the common illnesses due to household work. The table shows an age and occupation wise distribution of common ailments suffered for undertaking household work by women. The table depicts that some ailments are more common among certain age groups. The age group 26-35 years shows highest frequency i.e. 42.86% of backache followed by 46.43% of headache frequency. 36-55 years age group shows a higher figure i.e. 50% of vomiting frequency. A very high figure 91.84% is shown by 36-45 years age group in respect of skin problem of feet. The age group 0-18 years and women above 55 years are the healthiest in case of all diseases. The most vulnerable age group for all diseases is 26-45 years.

NIOH study suggests that the occupational health problems reported by women are temporary in nature and subsiding when they cease to work. This is not supported by the present findings which reveal that the problem persisted even after they stopped work. It is felt that detailed ergonomic studies and training of proper ways of lifting weights is needed.

Lifting heavy weights and carrying heavy head loads by women lead to various gynaecological consequences such as menstrual disorders, uterine prolapse, miscarriages and backaches causing serious long term repercussions. Accidents and injuries to themselves and to the children are also other serious health problems the women have to face. (ILO, 1983 page 1290).

HEALTH RISKS OF WORKING WITH HAZARDOUS MATERIAL

Tobacco processing and its related health problems deserve special attention; for a lot of women working in this sector complain of multiple ailments. Dizziness accounted for the majority (75%) of the ailments of the women working in the tobacco processing. This may be attributed to high rate of anemia among these women. Nevertheless dry tobacco has a particular effect on these women. Chart 5 and table 6 illustrate the prevalence of illnesses these women suffer from. Table 6 illustrates the highest figure of 43.75% of frequency of headache in 26-35 years age group followed by 37.04% of asthma frequency, 35.38% of backache and 34.38% of general weakness in the same age group. In all these diseases the next higher frequency is shown by 36-45 years age group. The lowest frequency figures are shown by 0-18 years age group followed by women above 55 years. The most vulnerable age group is 26-45 years. NIOH reported similar findings. NIOH study found high levels of tobacco dust in the “khalis” which is borne out by the present study.

Malaria is endemic in Kheda district of Gujarat, so much so that a Malaria Research Centre has been set up in Nadiad town by The Indian Council of Medical Research.

WORKERS IN TOBACCO FARMING

Chart 3 and table 4 reveal the morbidity pattern among workers in tobacco farming. This table reveals that the age group 26-35 years is the most vulnerable. The frequency range in all diseases is from 34.2% of headache to 42.35% of skin problem of feet. In a study by NIOH similar symptoms of headache, giddiness and vomiting among tobacco workers were found. They also found respiratory complaints and gastrointestinal tract disturbances. The NIOH study group called it “green symptom”, possibly because they were found in workers involved in cultivation of the crop. But this study as well as that of NIOH reveals that these symptoms are also found
among the Khali workers. This indicates that it is nicotine in tobacco, whether green or brown, that seems to trigger these symptoms. Thus "green symptoms" could be more appropriately labeled as "symptoms of nicotine toxicity". Studies on smoking and its health hazards suggest that this can be carcinogenic. Similar association may be drawn for long term effect of exposure to tobacco, green or brown on health leading to cancer. A longitudinal study may be suggested in this case.

These workers reported body ache (52%) and backache (57%) as their major problems. However dizziness and vomiting were also reported by 24% and 9% of women respectively. Similar to the case of tobacco processing workers 10% reported headache. In addition 21% of the women reported painful and swollen feet and itching, particularly between the toes, 24% of the workers reported shivers followed by fever.

**RESPIRATORY PROBLEMS**

Stone crushing is a very hazardous occupation because the dust emanating from stone crushing is in the air which the workers breathe. Dust particles more than 5 microns get filtered in the respiratory tract and those less than that get lodged in the lungs. There is a possibility of the presence of silica dust which gives rise to a lung disease called silicosis.

The lack of evidence of these health problems at stone quarries in the Inspectorate of Factories is due to the evasive nature of the owners. Whenever there is an inspection the quarries are shut down and the workers sent to the mines. This results in non reporting of occupational diseases at stone quarries. But this does not condone the prevalence of dust related lung diseases (DRLD) among the women workers. In stone quarries 5% women reported respiratory problems and another 26% women complained of chest pain.

**NOISE**

The noise level at brass industry is very high (100 to 110 decibels). The workers complain of ear pain, headache and mental tensions. It is necessary to measure the noise level in the working conditions. The limit of noise internationally is 85 decibels. The scale of noise is logarithmic. It means that an actual increase of only 3 decibels is a 100% increase in the noise level.

Studies have revealed that noise affects the physiological balance of sleep which means that exposure to noise may lead to sleeplessness. The WHO Task Group on Environmental Health Criteria for Noise has recommended a level of less than 35 dB(A) Leq to preserve the restorative process of sleep. Noise annoyance is the other consequence of this hazard. Noise can accelerate the latent neurosis in man and thus make it a psychological hazard.

Noise may result in fatigue which may be caused from having to talk loudly, a matter too difficult to assess objectively. It has been claimed that many noisy occupations cause "nervous irritability and strain", but the reaction varies greatly in different individuals.

**PROBLEMS RELATED TO LONG HOURS OF WORK**

Long hours of work at a stretch without a break may amplify the hazardous condition at work place. An ailment triggered by either ergonomic factors or exposure to dust etc. get accentuated due to long hours of work.

All the women reported working in the field for 8-10 hours a day. The postural problems of women in beedi making, agarbatti, papad, paper bag making, lace making and household work get much worse as the women work for 8 to 14 hours daily. The chemicals, fumes, gases and dust that women in mines, in slates pencil making, in electronics, in fish processing etc. inhale worsen their health problems
and culminate in serious morbidity or even death due to the long period of exposure each day. Continuous actions like bending, crouching, banging, lifting also aggravate health problems.

PROBLEMS DUE TO THE REPETITIOUSNESS OF MOVEMENTS
Repeated and monotonous nature of work such as load lifting cause threat to the health of women in terms of uterine prolapse, back ache. The workers at electronic industry do the monotonous work of fitting in the circuits. This results in a condition called tenosynovitis. Also the monotony of the repetitive work dulls and fatigue the mind which may result in accidents in work place.

PROBLEMS RELATED TO TECHNOLOGY
Technological advances has its own negative repercussions. Introduction of machine has reduced the need of manual labour and has therefore robbed the workers of their jobs. This compels the women worker to seek more strenuous jobs with serious health hazards. In slate pencil industry the advent of machines has resulted in dusty respirable air which is dangerous.

PROBLEMS RELATED TO MENTAL HEALTH
Women workers in unorganized informal sector face problems other than health hazards. Sexual oppression, rape, forced prostitution, sexual harassment and wife beating are to name a few. Constant tension and anxiety due to these result in continuous stress on the women. In the present study of women workers in stone crushing it is reported that women are beaten up at the work site with no resistance from others.

REPRODUCTIVE HEALTH
The women in the Punjab spoke about repeated miscarriages. This may be related to heavy work up to the last stages of pregnancy. They reported of heavy bleeding during menstruation and pain in abdomen. Some women complain of white discharge. Table 7 details the gynaecological problems faced by these workers.

These problems are plenty and they add to their occupational diseases. A list of statistics is given to illustrate this point. Among the tobacco processing workers pain in the abdomen was the most commonly reported problem (43%) followed by white discharge (41%), burning sensation in the vagina (34%) and itching in the vaginal region (24%). Majority of these women said that it persisted for over five years. On examining the data in the other occupations it was found that the same pattern of gynaecological problems emerged. Thus, among those who do household work as well as those who work outside the home, pain in abdomen (47%) was followed by white discharge (46%), burning sensations (34%) and itching in the vaginal area (20%). Most of the workers reported these problems as persisting for 0 to 5 years.

Although we did not conduct pelvic examination or laboratory tests of vaginal smears or cervical secretions we discussed these problems at length with the workers and gynecologists. The latter felt that the symptoms reported by the women were most likely that of vaginal infections like Candida and Trichomonas. In addition, they felt that there were likely to be several cases of women with cervical erosion and even of pelvic inflammatory diseases.

On examining the pregnancy outcome of women it was found that women in the occupation of tobacco farming and household work showed 65% live births and 28% of children who subsequently died. For all the other occupations the pattern of pregnancy outcome is the same. This means that out of every three pregnancies only two children survived.

The reason for miscarriage was reported to be "rathwa" and bleeding. Rathwa is a generic name for a bad obstetric history.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Did you receive any help from owner?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>No.</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Women working in stone mines: Main Occupational illness suffered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type of Illness</td>
</tr>
<tr>
<td></td>
<td>Asthma</td>
</tr>
<tr>
<td></td>
<td>Chest Pain</td>
</tr>
<tr>
<td></td>
<td>Stomach Problem</td>
</tr>
<tr>
<td></td>
<td>Vomiting &amp; Dizziness</td>
</tr>
<tr>
<td></td>
<td>Backache</td>
</tr>
<tr>
<td></td>
<td>Headache</td>
</tr>
<tr>
<td></td>
<td>Bodyache</td>
</tr>
<tr>
<td></td>
<td>Other Illnesses</td>
</tr>
<tr>
<td></td>
<td>No Illness</td>
</tr>
<tr>
<td></td>
<td>Total</td>
</tr>
</tbody>
</table>
It may be assumed that the nature of occupation of mothers and infant mortality rate have an indirect association. But the present research does not corroborate this. Nevertheless, the mortality rate is the highest among the 0 to 1 year age group among all the occupations.

In addition to this, questions were asked about the causes of death of children below 15 years of age. For children of mothers in all the occupations, fever, measles, whooping coughs (pertussis), "rathwa" and diarrhoea were the major causes of death. Around 14% to 18% of the mothers did not report the cause of death and about 16% to 27% attributed the cause to tetanus, malaria, tuberculosis, diphtheria and accidents. "Rathwa" in the eyes of the mothers was an important cause of death. There is no single disease or illness in allopathic medicine that corresponds to this. On inquiry it seemed that this is a condition that results in wasting away of the child from general weakness to death.

The causes of death in all the occupations follow a similar pattern. Measles in all the cases is the major cause of death followed by "rathwa", fever and diarrhoea. For example, among children of mothers who do household work 18% have died of measles, 17% of "rathwa", 15% of fever and of diarrhoea. The corresponding figures for children of mothers who are engaged in tobacco crop cultivation are 19%(measles), 15%(rathwa"), 14.6%(fever) and 14%(diarrhoea).

Measles is one of the six preventable diseases covered under the government's immunization programme. Despite the fact that the measles vaccine is 90% efficient, many of the workers' children are dying of this preventable disease. Similarly with a deeper understanding of "rathwa" and its causes, prevention of this as well as diarrhoeal diseases could be taken up. In the case of "fever", women described a variety of symptoms accompanying this which suggested several possible diseases like malaria, pneumonia and other acute respiratory infections, tuberculosis and meningitis.

**CONCLUSIONS**

These findings point out very strongly at the need for further research and dissemination of information amongst the women. From the foregoing discussions the following major issues transpire.

1. Most of the workers are living in conditions of abject poverty, working for long hours for the best years of

![COMMON ILLNESS SUFFERED (CHART-V)](chart-v)

### TABLE 3

<table>
<thead>
<tr>
<th>Symptom</th>
<th>0-18</th>
<th>19-25</th>
<th>26-35</th>
<th>36-45</th>
<th>46-55</th>
<th>above 55</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backache</td>
<td>2</td>
<td>34</td>
<td>62</td>
<td>52</td>
<td>28</td>
<td>12</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td>1.05%</td>
<td>17.89%</td>
<td>32.63%</td>
<td>27.37%</td>
<td>14.74%</td>
<td>6.32%</td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>6.67%</td>
<td>46.67%</td>
<td>33.33%</td>
<td>13.33%</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Body ache</td>
<td>2</td>
<td>29</td>
<td>80</td>
<td>57</td>
<td>23</td>
<td>8</td>
<td>199</td>
</tr>
<tr>
<td></td>
<td>1.01%</td>
<td>14.57%</td>
<td>40.20%</td>
<td>28.64%</td>
<td>11.56%</td>
<td>4.02%</td>
<td></td>
</tr>
<tr>
<td>Dizziness</td>
<td>1</td>
<td>7</td>
<td>28</td>
<td>21</td>
<td>6</td>
<td>3</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>1.52%</td>
<td>10.61%</td>
<td>42.42%</td>
<td>31.82%</td>
<td>9.09%</td>
<td>4.55%</td>
<td></td>
</tr>
<tr>
<td>Vomiting</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>20.00%</td>
<td>20.00%</td>
<td>20.00%</td>
<td>20.00%</td>
<td>20.00%</td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>6.25%</td>
<td>25.00%</td>
<td>25.00%</td>
<td>18.75%</td>
<td>6.25%</td>
<td>18.75%</td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Weakness</td>
<td>0</td>
<td>1</td>
<td>20</td>
<td>17</td>
<td>4</td>
<td>4</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>16.67%</td>
<td>33.33%</td>
<td>22.22%</td>
<td>16.67%</td>
<td>11.11%</td>
<td></td>
</tr>
<tr>
<td>Skin problem</td>
<td>0</td>
<td>1</td>
<td>20</td>
<td>17</td>
<td>4</td>
<td>4</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>2.17%</td>
<td>43.48%</td>
<td>36.96%</td>
<td>8.70%</td>
<td>8.70%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>80</td>
<td>208</td>
<td>160</td>
<td>68</td>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 4
Agewise, common illness suffered by women in Tobacco Farming

<table>
<thead>
<tr>
<th>Age Group/ Symptoms</th>
<th>0-18</th>
<th>19-25</th>
<th>26-35</th>
<th>36-45</th>
<th>46-55</th>
<th>above 55</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backache</td>
<td>3.54%</td>
<td>13.27%</td>
<td>34.96%</td>
<td>28.32%</td>
<td>11.95%</td>
<td>7.96%</td>
<td>226</td>
</tr>
<tr>
<td>Asthma</td>
<td>0.00%</td>
<td>10.71%</td>
<td>35.37%</td>
<td>28.59%</td>
<td>17.86%</td>
<td>7.14%</td>
<td>28</td>
</tr>
<tr>
<td>Bodyache</td>
<td>4.07%</td>
<td>13.01%</td>
<td>35.37%</td>
<td>27.24%</td>
<td>12.20%</td>
<td>8.13%</td>
<td>246</td>
</tr>
<tr>
<td>Dizziness</td>
<td>3.16%</td>
<td>12.63%</td>
<td>36.84%</td>
<td>26.32%</td>
<td>12.63%</td>
<td>8.42%</td>
<td>95</td>
</tr>
<tr>
<td>Vomiting</td>
<td>2.86%</td>
<td>14.29%</td>
<td>34.29%</td>
<td>25.71%</td>
<td>11.43%</td>
<td>11.43%</td>
<td>35</td>
</tr>
<tr>
<td>Headache</td>
<td>0.00%</td>
<td>15.79%</td>
<td>34.21%</td>
<td>26.32%</td>
<td>13.16%</td>
<td>10.53%</td>
<td>38</td>
</tr>
<tr>
<td>Genera</td>
<td>0.00%</td>
<td>21.74%</td>
<td>34.78%</td>
<td>21.74%</td>
<td>8.70%</td>
<td>13.04%</td>
<td>23</td>
</tr>
<tr>
<td>Weakness</td>
<td>1.18%</td>
<td>12.94%</td>
<td>42.35%</td>
<td>30.59%</td>
<td>11.76%</td>
<td>1.18%</td>
<td>85</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>104</td>
<td>280</td>
<td>214</td>
<td>95</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

5. Most of the women reported occupational disease such as backache, bodyache, general weakness (possibly anemia), dizziness, vomiting, headache, respiratory problems and gynaecological disorders.

6. Gynaecological problems which these women suffered were pain in the abdomen, white discharge (leucorrhea) and burning and itching in the vaginal region. Although clinical examinations and smears were not undertaken, it seems that vaginal infections, cervicitis and even pelvic inflammatory diseases may be the cause of the problems reported.

7. Reproductive history of the women revealed poor pregnancy outcome in a substantial number of women. About a third of all the pregnancies resulted in miscarriages, still births and infant mortality. Maximum mortality rate was among 0 to 5 years age group The

their working lives at sub-minimum wages.

2. Despite the existence of protective labour legislation whose proper implementation is supposed to be monitored by the Factories Inspectorate, women toil under very difficult and exploitative working conditions. Apart from non-payment of minimum wages they are often denied of basic welfare benefits which are due to them.

3. Employment, particularly agricultural employment is not available all the year round. Also there is no security of work for local women and they are at the mercy of their employers. The situation is aggravated by the migration of labour from other areas.

4. Most of the women are involved in multiple occupations which vary according to the seasons. They are paid salaries well below the stipulated minimum wage rate.

TABLE 5
Agewise, common illness suffered by women in Household work

<table>
<thead>
<tr>
<th>Age Group/ Symptoms</th>
<th>0-18</th>
<th>19-25</th>
<th>26-35</th>
<th>36-45</th>
<th>46-55</th>
<th>above 55</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backache</td>
<td>1</td>
<td>17</td>
<td>39</td>
<td>20</td>
<td>9</td>
<td>5</td>
<td>91</td>
</tr>
<tr>
<td>Asthma</td>
<td>1.10%</td>
<td>18.68%</td>
<td>42.86%</td>
<td>21.98%</td>
<td>9.89%</td>
<td>5.49%</td>
<td>37</td>
</tr>
<tr>
<td>Bodyache</td>
<td>0.00%</td>
<td>5.41%</td>
<td>29.73%</td>
<td>29.73%</td>
<td>24.32%</td>
<td>10.81%</td>
<td>107</td>
</tr>
<tr>
<td>Dizziness</td>
<td>3.80%</td>
<td>17.76%</td>
<td>35.51%</td>
<td>25.23%</td>
<td>14.95%</td>
<td>3.74%</td>
<td>.42</td>
</tr>
<tr>
<td>Vomiting</td>
<td>0.00%</td>
<td>16.67%</td>
<td>40.48%</td>
<td>30.95%</td>
<td>7.14%</td>
<td>4.76%</td>
<td>2</td>
</tr>
<tr>
<td>Headache</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>50.00%</td>
<td>50.00%</td>
<td>0.00%</td>
<td>2</td>
</tr>
<tr>
<td>Weakness</td>
<td>0.00%</td>
<td>17.86%</td>
<td>46.43%</td>
<td>28.57%</td>
<td>3.57%</td>
<td>3.57%</td>
<td>28</td>
</tr>
<tr>
<td>Skin Problem</td>
<td>0.00%</td>
<td>2.04%</td>
<td>2.04%</td>
<td>91.84%</td>
<td>2.04%</td>
<td>2.04%</td>
<td>98</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>83</td>
<td>209</td>
<td>232</td>
<td>70</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 6

**Age wise, common illness suffered by women in Tobacco processing**

<table>
<thead>
<tr>
<th>Age Group/ Symptoms</th>
<th>0-18</th>
<th>19-25</th>
<th>26-35</th>
<th>36-45</th>
<th>46-55</th>
<th>above 55</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backache</td>
<td>1</td>
<td>4</td>
<td>23</td>
<td>16</td>
<td>14</td>
<td>7</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>1.54%</td>
<td>6.15%</td>
<td>35.38%</td>
<td>24.62%</td>
<td>21.54%</td>
<td>10.77%</td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td>0</td>
<td>1</td>
<td>10</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>3.70%</td>
<td>37.04%</td>
<td>25.93%</td>
<td>18.52%</td>
<td>14.81%</td>
<td></td>
</tr>
<tr>
<td>Bodyache</td>
<td>2</td>
<td>5</td>
<td>29</td>
<td>25</td>
<td>19</td>
<td>11</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>2.20%</td>
<td>5.49%</td>
<td>31.87%</td>
<td>27.47%</td>
<td>20.88%</td>
<td>12.09%</td>
<td></td>
</tr>
<tr>
<td>Dizziness</td>
<td>3</td>
<td>8</td>
<td>27</td>
<td>34</td>
<td>23</td>
<td>17</td>
<td>122</td>
</tr>
<tr>
<td></td>
<td>2.46%</td>
<td>6.56%</td>
<td>30.33%</td>
<td>27.87%</td>
<td>18.85%</td>
<td>13.93%</td>
<td></td>
</tr>
<tr>
<td>Vomiting</td>
<td>2</td>
<td>8</td>
<td>30</td>
<td>31</td>
<td>20</td>
<td>16</td>
<td>107</td>
</tr>
<tr>
<td></td>
<td>1.87%</td>
<td>7.48%</td>
<td>28.04%</td>
<td>28.97%</td>
<td>18.69%</td>
<td>14.95%</td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>6.25%</td>
<td>43.75%</td>
<td>18.75%</td>
<td>31.75%</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>0</td>
<td>2</td>
<td>11</td>
<td>10</td>
<td>8</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>Weakness</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>6.25%</td>
<td>34.38%</td>
<td>31.25%</td>
<td>25.00%</td>
<td>3.13%</td>
<td></td>
</tr>
<tr>
<td>Skin Problem of feet</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>7.69%</td>
<td>7.69%</td>
<td>15.38%</td>
<td>30.77%</td>
<td>38.46%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>30</td>
<td>148</td>
<td>128</td>
<td>98</td>
<td>61</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 7

**Gynaecological problem**

<table>
<thead>
<tr>
<th>Type of illness</th>
<th>Women</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irregular periods</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Heavy periods</td>
<td>25</td>
<td>23</td>
</tr>
<tr>
<td>White Discharge</td>
<td>32</td>
<td>30</td>
</tr>
<tr>
<td>Itching near Vagina</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Burning Sensation</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>near Vagina</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain in the Abdomen</td>
<td>48</td>
<td>44</td>
</tr>
<tr>
<td>Other problem</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>(not specific)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following three paragraphs summarise the principles of ethics on which is based the international Code of Ethics for Occupational Health Professionals prepared by the International Commission on Occupational Health (ICOH).

Occupational health practice must be performed according to the highest professional standards and ethical principles. Occupational health professionals must serve the health and social well-being of the workers, individually and collectively. They also contribute to environmental and community health.

The obligation of occupational health professionals include protecting the life and health of the worker, respecting human dignity and promoting the highest ethical principles in occupational health policies and programmes. Integrity in professional conduct, impartiality and the protection of the confidentiality of health data and of the privacy of workers are part of these obligations.

Occupational health professional are experts who must enjoy full professional independence in the execution of their functions. They must acquire and maintain the competence necessary for their duties and require conditions which allow them to carry out their tasks according to good practice and professional ethics.

The majority of the women workers had children between the age of 1 to 5.

8. The main causes of infant and child mortality were measles, "rathwa", fever and diarrhoea as reported by the mothers.

9. The most reported causes for miscarriage were bleeding and "rathwa" (most likely a term for bad obstetric history.)

10. Despite considerable health care infrastructure, the health status of the workers and their families is very poor. Dissatisfaction with the quality of government health services and the time taken to obtain them make them resort to the private doctors inspite of the high cost of treatment.

**RECOMMENDATIONS**

1. There is a necessity of developing an health insurance scheme, specially for women in the informal sector with special emphasis on occupational health. As there are no formal employers or records in many instances a scheme which does not involve the employers is needed. This can be done by having general surcharge on employers in the informal sector so that women under a particular employer need not be dependent on him for keeping records or paying dues.

2. It is necessary that legislations guarantee employment, a right to organise and also inspection of workplaces.
FLAME RETARDANTS - BENEFITS AND RISKS

Fire related injuries and deaths are the most important area which had always been the concern of safety professional. Around 250 fire-related deaths occur annually in England and Wales. The number of people who die from textile-related burns in the USA is approximately 500 per year. Information on domestic burning injuries is poor from developing countries, but rates are probably high. Fire retardants are mainly used to curtail the incidents of fire not only at workplace but also at public place.

- Non durable retardants

The earliest attempts to give textile flame retardants properties consisted of solutions of water-soluble salts applied to curtains in public buildings. These so-called non durable flame retardants are still used today in situations where products are not subject to rain, washing or perspiration. They find a particular use in internal insulation materials such as chipboard, in decorative paper and even in forest fire control products. One of the earliest products intended for outdoor use was flame proof tent canvas, produced by treatment with chlorinated paraffins and an insoluble metal oxide, generally antimony oxide, together with a binder resin.

The second half of the twentieth century has seen a move away from cellulose-based textile and towards man-made fibres, particularly where flame resistance is important. For instance, in 1971 cotton supplied 78% of the fibres used in USA to produce children’s sleepwear, where as two years later it provided less than 10%. This development has significant impact on the type of chemicals used as flame retardants.

- Durable retardants

During the last few decades there has been an enormous increase in the production of polymeric materials. Flame retardants need to be incorporated into these materials when they are used, for instance, in clothing, carpets, paint, electric circuit boards, cars and aircrafts, in order to retard the spread of fire. The most commonly used polymeric backbones are polyolefins, polyvinyl chloride, polyesters, acrylics and polyamides.

Flame retardants were originally considered to be non-toxic. However, a number of them have now been found to produce toxic effects. Certain have similar chemical structure to persistent organic pollutants or pesticides and could conceivably have a serious impact on the environment or human health.

A further problem is that certain flame retardants (e.g. aromatic polybrominated compounds) give rise to extremely toxic combustion products. Flame retardants provide a classical example of the way our society has to balance benefits and the risks.


TOYOTA DEVELOPS NEW SAFETY SYSTEM

Toyota Motor Corporation has developed a new safety system to be employed in Advanced Safety Vehicles (ASV). The ASV, advocated by the Ministry of Transport, is being developed by various automobile manufacturers with the aim of putting it into practical operation at the beginning of the 21st century. Toyota’s latest development includes key technologies for an “alarm system to prevent drivers from dozing off while driving”, “a headlight directional-control system”, an “automatic braking system”, an “information communication system using light” and a “drive recorder”. The headlight directional control system automatically switches headlight beams when it senses oncoming or preceding vehicles, and also increases the brightness of headlights in travelling direction in advance at curves. The automatic braking system predicts the possible danger of collision with an obstacle ahead and alerts the driver by alarms and warning displays. If no advance action is taken, the system will stop the vehicle by operating an electronically controlled throttle brake.


EC Taxes in Belgium

A system of “ecotaxing” - the first of its kind in the world - is gradually being introduced in Belgium. The basic aim is to shift demand away from products thought

Labour statistics in Japan:

Some significant findings of the survey carried out by Ministry of Labour, Japan, on health conditions of the workers in 1992, are as follows:

- About 16,000 workers employed at 12,000 workplaces employing 10 or more workers were covered in this survey.
- Busy work schedule and expenses are two major problems in regular medical examinations.
- One third of workplaces carry out cancer examination.
- Health promotion activities are carried out in less than half of the workplaces surveyed.
- Sports and recreational activities are preferred for mental health care measures.
- Smaller workplaces are less active in adopting anti-smoking measures.
- Complete implementation of regular medical examination is considered the most important task in about 60% of the workplaces.
- Some 70% of workers complain of mental fatigue due to work.
- Human relationships are ranked as top cause of anxiety, anguish or stress due to work.
- Workers overcoming mental stress or fatigue by turning to sleep and alcohol.
- Some 80% of workers take care of themselves in their daily lives.

A Newsletter from Japan Industrial Safety and Health Association. No.11, July 1994.
environmentally burdensome towards alternatives considered more acceptable. The measures originated with the two environmental parties inside the governing coalition, and the ecotaxes are by no means noncontroversial. They are being phased out gently. The first ecotax has just been levied on "disposable" razors - a choice that has provoked a few remarks about bearded environmentalists, but otherwise seems to have gained public acceptance.


**CHINESE PESTICIDES DEATHS NUMBER 10,000**

More than 10,000 Chinese farmers have died in the last year as a result of pesticide poisoning from sub-standard chemicals, according to the Agriculture Ministry. It claimed that many of the fatalities resulted from lethal cocktails of homemade chemicals, applied in liberal doses by farmers who fail to take even basic safety precautions. Over 30% of pesticides used on the 'grain basket' regions of Shandong, Jiangsu, Hebei and Henan were unlicensed, the Ministry said.


**MESOTHELIOMA DEATH LINKED TO TALC**

The late Otsuka Shintaro was awarded insurance benefit by Sakai labour standard inspection office on 24 April 1992, after his Local Workers' Health Centre (KOSH) helped him apply for Workmen's Accident Compensation. He had worked at a rubber products manufacturer in Osaka producing rubber soled socks, raincoats and rain boots for 30 years from 1942. In the factory talc (Talcum powder) was used to prevent rubber sheets sticking to each other in the production process. Otsuka had worked without a dust mask. As soon as his doctor diagnosed malignant mesothelioma he went through Otsuka's job history to identify where he inhaled asbestos. Fortunately, he knew talcum powder contained asbestos.


**WORKERS SEE THE UGLY SIDE OF THE BEAUTY BUSINESS**

Women who work full time in beauty salons and spend a lot of time perming, colouring and bleaching hair have a much higher risk of miscarriage than other women, according to the first study to examine the occupational risks of salon work. Researchers at the University of North Carolina also found that women who work full time in salons where nail sculpturing is done have a much higher risk of miscarriage than other women.

Although the findings published in February in the Journal of Epidemiology, must be corroborated by other independent research, occupational medicine specialists say the study "raises a yellow flag" and should encourage the more than half a million Americans who work in hair and nail salons to take extra precautions at work.


**PSYCHOLOGICAL TERROR AS LEADERSHIP FAILS**

Psychological terror at work-bullying, teasing, mobbing, there are several terms is most conspicuous at workplaces that are characterised by competition, unequal treatment of workers and various cliques. Places like this became clearly recognizable in the results of research, published under the title "mobbing at workplaces", which was carried out by the Department of Psychology of the Finnish Institute of Occupational Health.

One in ten of those who attended state employees' occupational health care centers had been the victim of some degree of mobbing. The most common forms had been slander, backbiting, negative criticism and being sent to Coventry. This kind of psychological terrorism was often found to be behind psychosomatic symptoms or even applications for early retirement.

The solution in many cases suggested that changes are required in work organisation. Problems with leadership and group dynamic phenomena, such as the scapegoat phenomenon, are breeding grounds for psychological terror.

Work Health and Safety, Institute of Occupational Health, Finland, 1992

**CANCER AND MAGNETIC FIELDS AT THE WORKPLACE**

In November 1992, a Swedish switching station worker's brain tumor was classified as an occupational injury. He had worked as an electrician at the steel firm SSAB for 22 years. He had been periodically exposed to strong magnetic fields.

This was the first case of occupational injury in Sweden in which a connection between work in a magnetic field and cancer had been established. According to the Swedish Trade Union Confederation, (LO) several unions are now dealing with similar cases. Train drivers suffering from cancer, tumor and leukemia and also similar cases among the population living near power transmission lines have also been reported in the media. Scientific authorities are increasingly expressing their concern.

"LO takes these warnings very seriously as an estimated 120,000 employees in LO unions have occupations in which they are exposed to strong magnetic fields daily", notes a detailed LO guide to the topic. "Many more work in occupations in which they are exposed to weaker magnetic fields daily."

AIR POLLUTION TELLING ON DELHI'S HEALTH

Delhi has the dubious distinction of being the most polluted city in the country. It is the fourth most polluted metropolis in the world. The number of vehicles in Delhi is more than the combined total of all the three other metropolitan cities of Calcutta, Bombay and Bangalore. There are a number of small and medium scale industries within the limits of the city. As a result of all this the level of pollution continues to rise here resulting in increasing the cases of heart, lung eye, ear and nose trouble and headaches according to medical experts. If the level of pollution is not brought down immediately, these diseases some of which are fatal will also rise and the citizens will have to wear pollution protection masks whether at home or outside.

Dr. D.K. Anand, a lung specialist, who runs a charitable clinic in South Delhi said that in the last three years there has been a substantial increase in the number of patients to his clinic suffering from various diseases that could be traced back to air pollution. He further added that most of these patients either worked in areas with heavy traffic or had to visit such areas on their jobs. Quoting a W.H.O. study, he said, though other forms of pollution including water and noise were posing problems for Delhites, it was the air pollution that was posing maximum danger.

Sulphur di-oxide, dust particles, lead in petrol, carbon mono-oxide, nitrogen di-oxide and ozone were all adversely affecting public health according to the WHO report. Carbon monoxide was taking place of oxygen in human blood and was causing health problems. It was also retarding the working of other organs. Of the 2200 tonnes of the poisonous gases that were belched into the atmosphere in 1992 more than 65% came from motor vehicles and about 15% from industries. There are more than 22 lakh vehicles on the city roads with about 21 vehicles being added every hour. Two thermal power stations also throw out 10 tonnes of poisonous gases and ash particles into the atmosphere every hour. Apart from this there are hundreds of industries that contribute to the pollutants in the air.

At least 2400 residents of Delhi will live longer if the average annual suspended particulate matter (SPM) level of 300mg per cubic meter of air is reduced by a third, says the World Bank’s latest report on India titled “Recent Economic Developments and Prospects”. Such a reduction will not just lower the respirable particulates but Delhi’s mortality rate too by about 3.75 per cent.

Quoting the 1993 World Development Report estimates of the full loss of healthy life due to environmental causes the India country report says these account for almost 30 per cent India’s DALY (disability-adjustment life year) losses. The corresponding figure for China is about 25 per cent. The average for the developing world is 10 per cent. Respiratory infections and diarrhoeal diseases account for 10 per cent of India’s DAILY losses. According high priority to these environmental problems would yield substantial health benefits at relatively low incremental costs. WB lauds the imaginative, incentive-based participatory approaches begun by India to conserve natural resources.

The increasing population and the rising traffic in the city has contributed to noise pollution that has touched more than 80 decibels much above the level fit for humans. The most noisy areas in the city are the Red Fort, the Safdarjung crossing, Karol Bagh, Shaktapur, Ashram, Kingsway Camp, Tilak Nagar and Shahadra. According to the environment secretary, Delhi, Mr. D.S. Negi the level is almost eight times more than the safe limit for the humans.

The National Herald (New Delhi) 10, July, 94 & The Times of India (New Delhi) 24, June, 94

Pollution Wrecking Havoc in Coal Belt

Environmental pollution is wrecking havoc in the coal belt of Dhanbad (Bihar) with more than 100,000 people suffering from respiratory diseases and tuberculosis, reports UNI. In a report presented at the 14th annual conference of doctors in TISCO coalfields revealed that about 50,000 people are suffering from these diseases in Jharia township where the problem of environmental pollution is acute. More than 20,000 patients are undergoing treatment in all the Central hospitals of Bhata Cooking Coal Limited. Air pollution is cited as the main reason for the spreading of lung diseases.

Environmental imbalance and air pollution is increasing due to emission of carbon monoxide from opencast and underground coal mines. More than 100 coke kilns are in operation in the entire Dhanbad district which has aggravated the problem of air pollution. Water pollution is also
increasing alarmingly due to imperfect coal cleansing equipment. Coal particles and dust are being discharged in the river Damodar whose water is supplied for drinking purposes. According to Pollution Control Board sources, the water of Damodar river is unfit for consumption even for animals. The number of fatalities among TB patients is increasing in the absence of proper treatment in the tribal dominated Tundi block and its adjoining areas. A cell which was established to control TB in the mining areas, is yet to start functioning due to non-availability of funds. The General Manager of TISCO collieries Mr. K.B. Trehan said that coal production through open mines would be doubled in the future which could turn the pollution scenario grim. Mr. Trehan said necessary steps were required to maintain environmental balance.

The Statesman (New Delhi) 9, July, 94

POLLUTION PLAYS HAVOC WITH KIDS IN BRASSWARE INDUSTRY

A large number of children in the brassware city of Moradabad have been the victim of a mysterious disease with a common symptom of high temperature, which the doctors there attributed to excessive pollution of the air. There is an alarmingly rising incidence of deaths of children below the age of five, in this densely populated and fast growing city. It was generally preceded by acute pulmonary troubles in many cases, particularly among those working in brassware factories.

The uncertain electric power supply by the UP Electricity Board compels the brassware industries to use local power generators run by diesel oil, which unfortunately emits thick cloud of smoke. This smoke causes irritation in the eyes, besides lung problems both to workers as well as residents. Since the brassware industry employs children and teen-agers as helping or independent hands, they fall prey to a number of diseases.

The Hindustan Times (New Delhi) 22, July, 94

12 MINERS DIE IN AN ACCIDENT IN RAJASTHAN.

In an accident in the mine of Hindustan Zinc Limited in Udaipur, 12 workers lost their life. The workers were buried in the depth of about 150 meters from the zero level of the mines. Sudden power failure came as a blessing in disguise for over 300 mine labourers who miraculously escaped. Around 15 of their colleagues were buried alive. At the time of the accident 350 labourers were working in the mine. With the collapse of the barricade put up to plug the column, filled with slurry, water gushed into the main shaft.

The speed of the water and slurry was such that it had taken away one labourer, who was working near the barricade. Within few minutes the mine was filled up to the level of 50 meters. At that time 13 labourers were working at the bottom of 578 meter deep mine. Special pumps were brought to empty the mine but even after three days of the incident they were able to pump out only 5 meters of water from the mine. This slurry is expected to harden in few days after its filling. But in this case it was found the slurry, which gushed in the mine after breaking the barricade, contained water.

The Hindustan Times (New Delhi) 31, Aug, 94

THE NICKEL DILEMMA

A Research Study by Dr. S.N. Tandon, Professor and Madhuri Raju, Researcher at Chemistry Department, University of Roorkee. (Detailed Report is under publication in Enology, the Indian Journal).

Nickel is one of the several elements required in microquantities by human beings to keep the body systems function normally. In the human body, it plays many vital functions like metabolism of membrane proteins, nucleic acid and enzymes. It is also deemed essential for pigmentation of skin and hair. Nickel upto the levels of 0.05 - 0.08 ppm is regarded as essential in human diet.

The WHO maximum possible limit (WHO MPL) for nickel intake in food stuffs is 0.2 ppm. Excess nickel intake, however, may result in nickel toxicity that particularly affects heart, lungs & kidney. Various disorders associated with excess of nickel in human body includes acute pneumonitis, dermatitis, asthma, central nervous system disorders and cancer of the nasal lung cavity and lungs. Premature graying of hair has also been linked.

As far as presence of nickel in the environment is concerned, it is present in low concentrations in drinking water as contaminant. It is important, however, that the major intake of nickel to human body is through food, with water making only a minor contribution, if any. The various food stuffs containing nickel are rice and rice products, legumes, oats, most vegetables and drinks like tea, cider, and coffee. Lower concentration of nickel are present in red meats, cottonseed, corn meal, apples, unsaturated oils, milk and milk products. Cigarettes are also known to contain nickel in trace amounts.

In September 1992, a nickel content controversy hit the chocolate industry. It all started when the Environmental Research Laboratories (ERL), Lucknow, alleged that Indian chocolates have nickel content two to four times higher than that of foreign brands and their consumptions could be harmful to health. This projected the need to constantly monitor the nickel content of chocolates.

In a recent study, Professor S.N. Tandon and Madhuri Raju both at Department of Chemistry, University of Roorkee, analysed few Indian chocolates namely Cadbury's, Nestle, Amul and Campeo brands for Nickel content. Nickel values in different makes of chocolate generally ranged between 1-2 ppm. These concentrations are similar to those reported in chocolates of foreign.
make (The Economic Times supplement 14th October, 1992). The nickel content of both Indian and foreign chocolates is definitely higher than WHO MPL of 0.2 ppm.

Dr. Tandon and Madhuri Raja in their in-depth study found that hydrogenated vegetable oil (HVO) used could be the possible source of nickel in chocolates. They observed that, although, two of well-known brands of HVO have nickel content of the order of tenth of a ppm, lesser known brands have astonishingly high nickel one having 200 times the WHO permissible limit. This can not be accidental, they say, think of the homosapiens, who are frying their delicacies in this vegetable oil. The practice of repeated frying the food stuff to serve hot can be more detrimental. Who surveys? Who analyzes? Who enforces the food and drug laws? These are simply findings to ascertain the source of nickel in chocolates.

STATUS OF MINE WORKERS IN RAJASTHAN

Mining is one of the major occupations of the people in Rajasthan. The Government of Rajasthan has basically two major sources of income i.e. Mining and the sales tax on the liquor. mining, however, is very important as it is directly related to the earning for life and thus the ultimate survival of the workers in Rajasthan.

An estimated 18 lakh people work as miners in Rajasthan, although the figures according to government records are 6 lakhs. Recent survey of miners in Rajasthan project a grim picture that need immediate attention. Mine workers are exposed to all the vulnerable dust in mines, unhygienic conditions and all the more in the case of as accidents no first aid facilities are available for them.

Survey shows that among 18 lakh mine workers in Rajasthan, an estimated fifteen percent are child labourers of the age group of 10-12 years, while thirty percent are women workers. These labourers are paid a meagre amount as wages per day. Wages are caste biased and even the meagre amount is sometimes not paid by contractors despite the full day of hard work by the mine workers. This had made the life of mine workers miserable. Workers are not provided any personal protective equipments, not even shoes in hot Rajasthan summers. Woman workers face regular harassments from contractors or mine owners. Disparity among the workers on the basis of caste is all the more disgusting. It could even be stated that wages to workers are based on their castes rather the work they perform.

Accidents in mines are common to which the miners are never paid any compensation. Even records of these accidents are not maintained. An estimated twenty percent mines in Rajasthan today are operating non-scientifically with large number as illegal ones which result as havoc for workers in mines. Workers are exposed to respiratory dust and thus dust related lung diseases. These dust related lung diseases are day by day becoming merciless killer for workers. Diseases like silicosis, asbestosis, tuberculosis, cancer, pneumoconiosis are prevalent. A broad based health survey of mine workers and their miserable condition, thus need immediate attention.

A survey on the health status of sandstone mine workers in city of Jodhpur in Rajasthan showed the plight of the mine workers which called for immediate attention. Survey revealed that more than fifty percent workers in mines come to work from distant places and cover 20-50 km one way to reach the mines. 98% of workers work in mines because they do not have any other choice or alternative employment. 71.6% have complaints of respiratory problems although the incidence of silicosis is estimated to be 16%. Further, accidents are frequent as most of the work is done manually with the help of heavy hammers, chisels and other primitive tools. Regarding the medical treatment nearly 90% of workers said that they have to bear the cost of treatment themselves. It was also found that majority of the blindness was due to accidents in mines.

A round table conference was organised by the local groups in Sept. 1994, at Jaipur, in which representatives of NGO's, State government and other concerned group participated. The issues were dealt with a clear perspective and concrete facts but the state government washed off its hand by passing the responsibility to the Central government. So a need was also felt to consult other groups active in other parts of country and then take up the issue with the central government. The detailed report of this round table conference is under preparation.

For detailed report write to Gramin Vigyan Vikas Samiti, Jodhpur.

EDITOR'S MAIL
We have received many letters with appreciation and suggestions on the bulletin. Some of them are as follows:

- Thanks for Bulletin. I have read the same with great interest. I assure you all necessary assistance for the success of your new endeavor.
  Kamal Nath, Minister Environment & Forest, Delhi, India.
- Thanks for sending me your July 1994 issue of the above Bulletin. I must congratulate you for bringing out such an excellent issue. Your research report on Dumping ground workers is excellent. I would also like to urge you to kindly take necessary follow-up action for alleviating the health of the workers.
  Dr. S.H. Clerk, Advisor, Health and safety (Hon.), Consumer Education and Research Centre, Ahmedabad.
- Many thanks for your kind dispatch of new periodical. I go through the periodical and as a trade union worker it is much useful for us.
  Mr. T.I. Lulu, Kerala.
- We appreciate the effort done by PRIA. I would like to give two suggestions, first, if the content table appears on the first page and secondly, more illustrations are added.
  Com. Banamali Dhupal, SIMU, Raigangpur, Orissa.
fibre and dust produced by finishing work, 94% used protective gloves, 22 workers all employed in the GRP industry had contracted occupational skin disorders, 6 had allergic and 12 irritant contact dermatitis, 4 worker had an accidental injury caused by a peroxide catalyst, fire, hot air and constant mechanical friction. Allergic dermatoses were due to the natural rubber latex C4 cases in protective gloves, phenol formaldehyde resin (1 case) and cobalt naphtenate (1 case) Irritant hand dermatoses (5 cases) were caused by the combined hazardous effects of polyester or vinylester resins, organic resins, organic solvents glass fibre and dust. Other cases of irritant dermatoses (7 cases) were due to dust, promoted by mechanical friction of clothes. Skin disorders in GRP industry were common (26%) but symptoms were mild. (61546)

- **CIS 94-215 Effects of occupational air pollutants on various histological types of lung cancer: A population based case-control study.** Becher H., Jedrzychowski W., Wahrendorf J., Basa-Ciepialek Z., Flak E., Gomola K., British Journal of Industrial Medicine. Feb. 1993. Vol.50, No.2, P.136-142. 27ref. (In English) A population based case control study was performed in Cracow (Poland) to determine the effect of occupational air pollutants on various histological type of lung cancer. The case group included 343 subjects with squamous cell carcinomas, 151 with small cell carcinomas, 106 with adenocarcinomas and 27 with other histological types.

Long term( 20 yrs) exposure to mineral dust and metal dust was a sufficient risk factor for small cell and squamous cell carcinomas. The highest relative risk (RR=2.45, 95% CI= 1.43-4.19) due to occupational exposures was for squamous cell carcinoma and exposure to mineral dust for more than 20 years. RR for small cell carcinomas (2.29) and adenocarcinomas (2.04) and exposure to mineral dust was smaller. No specific agent could be identified as particularly important for a specific histological type. (61726)

- **CIS 94-223 Mortality from stomach cancer in Ontario miners.** Kusiak R.A., Ritchie A.C., Springer J., Muller J., Britsh Journal of Industrial Medicine, Feb 1993. Vol.50, No.2, p.117-126. 28ref. (In English) A rather surprising excess mortality from stomach cancer was observed in gold miners in Ontario (Canada) in a retrospective cohort study of all miners in the province having attended compulsory chest clinics since 1928 (104 cases, SMR=152, 95% CI=125-185). Detailed exposure records and statistical analysis suggest that the probable causative agent is chromium coated dust in gold miners, rather than, for example, ardenic or mineral fibres. (61724)

- **CIS 94-866 Carcinogenic effects of wood dust: Review and Discussion.** Nylander L.A., Dement J.M., American Journal Of Industrial Medicine, Nov.1993. Vol.24, No.5,p,619-645ref.(In English) The strongest association of exposure of wood dust and development of nasal cancer is observed in occupations where workers are exposed to hard wood dust and where chemical additives are not used. The epidemiological data available are not sufficient to make a definitive assessment between the wood dust exposure and increased risk for cancer other than nasal cancer. The toxicity, mutagenicity and carcinogenicity of wood dust have not been thoroughly studied. Data are insufficient or lacking on 1. Wood dust exposure levels in ambient air and workers breathing zone, and wood dust deposition in the nasal cavity, 2. hard vs. soft wood dusts, 3. particle size and shape, 4. chemical composition of wood dust and the extent of contamination with chemical additives, and 5. interaction between inhaled wood dust, chronic irritation and tobacco smoking (62260)

- **CIS 94-872 Silicosis and lung cancer in U.S. metal miners.** Amandus, H., Costello J., Archives of Environmental Health, Mar-Apr.1991. Vol.46, No.2, p.82-89. 31ref. (In English) The association between silicosis and lung cancer mortality was estimated in 9,912(369 silicotics and 9,543 nonsilicotics) white male metal miners. These miners were examined by the US Public Health Service during 1959-1961 and were followed through 1975. The ores that were mined consisted of copper, lead-zinc, iron, mercury, lead silver, gold and gold silver, tungsten and molybdenum. The standardized mortality ratio (SMR US white male rates) for lung cancer was 1.73 (95% CI=0.94-
In silicotics and 11.18 (95% cl:0.98-1.42) in nonsilicotics). When lung cancer mortality between silicotics and nonsilicotics was compared the age adjusted rate ratio (95% cl) was 1.56 (0.98-2.68), and the age and smoking adjusted rate ratio was 1.96 (0.98-3.67). Corresponding figures for miners who were employed in mines with low levels of radon exposures were 1.90 (0.98-3.67) and 2.59 (1.44-4.68), respectively. These findings indicate that lung cancer mortality risk was increased in silicotics, and this probably did not result from chance or bias. However, confounding from radon exposure could not be ruled out. (62214)

- **CIS 94-877** Aplastic anemia and pesticides: An etiologic association? Fleming L.E., Timmeny, W., Journal of Occupational Medicine, Nov. 1993 Vol.35, No.11, p.1106-1116 ref. (In English) The majority of cases of aplastic anemia, a rarely previously lethal disease, are of unknown etiology. Nevertheless, for the past three decades, case reports and case series of aplastic anemia have suggested an etiologic association between aplastic anemia and pesticide exposure. A review of the medical literature provides for the support of this possible association. Two hundred and eighty cases of aplastic anemia associated with pesticide exposure were reported in the literature. The majority of cases were young (mean age 34yrs, median 28) with a short latency (mean 5 months) and with a history of occupational exposure to pesticides. The pesticide exposures reported were organochlorines and organophosphates, both commonly used types of pesticides throughout the world. Therapeutic and methodological issues as well as future directions of research into this etiological association are discussed. (62273)

- **CIS 94-878** Correlation between radiological and pathological diagnosis of silicosis: An autopsy population based study. HnizdoE., MurrayJ., Sluis-CremerG.K., ThomasR.G., American Journal Of Industrial Medicine, Oct,1993, Vol.24., No.4, p.427-445. Illus.14 ref. (In English) The radiological findings for the profusion of rounded opacities were compared with pathological findings for parenchymal silicosis in 557 gold miners who had an average 2.7 years between the radiological and pathological examination. Three readers read the radiographs and ILO category 1/1 or more was defined as a possible diagnosis of silicosis. The sensitivity values were 0.393, 0.371, and 0.236 and the specificity values were 0.987, 0.965, and 0.978 for three readers, respectively. The sensitivity of the reader improved with increasing degree of autopsy silicosis but a large proportion of those with a moderate and marked degree of silicosis were not diagnosed radiologically. The diagnostic sensitivity of the radiological test could be improved by using category 0/1 as a cut off point for workers exposed to a high averaged concentration of respirable silica dust. The diagnostic specificity of radiology could be improved by using category 1/0 or 1/1 as a cut off for a positive diagnosis for workers exposed to a low average concentration of respirable silica dust. (62296)

- **CIS 94-245** An epidemiological survey of respiratory morbidity among granite quarry workers in Singapore: Radiological abnormalities. Ng T.P., Phoon W.H., Lee H.S., Ng Y.L., Tan K.T., Annals of the Academy of Medicine, May 1992, Vol.21, No.3, p.305-311. Illus.7 ref. (In English) The prevalence of radiological abnormalities among 219 quarry workers was estimated according to a number of parameters of dust exposure. Silicosis was noted in eleven subjects. The prevalence of silicosis was 12.5% in highly exposed drilling and crushing workers and 0.8% in maintenance and transport workers with low level exposure of granite dust. No cases of silicosis was noted in any quarry worker first exposed to granite dust after the introduction of control measures in 1979. It is concluded that reduction in dust exposure since 1979 has so far been successful in producing nil or negligible risks of silicosis among active quarry workers over ten years. (61716)

- **CIS 94-254** A cohort mortality study of two California refinery and petrochemical plants. TsaiS.P., Gilstrap E.L., Cowles S.R., SneedP.J., Ross C.E., Journal of Occupational Medicine, Apr. 1993, Vol.35, No.4, p.415-421 ref. 38 (In English) The study examined the mortality experience of employees who worked for more than six months before 1989 and pensioners who were alive as of January 1973. More than half (57%) of the total study population worked for 20 years or longer. The total population exhibited 11% lower all causes mortality and 20% lower cancer mortality, as compared with the California general population. There were no significant excesses of any cause specific mortality including cancer. Among total employees mortality for several cancer sites showed a statistically predominant work area for job assignment. In contrast to studies based on local country rates lung cancer mortality in this study was significantly lower (SMR= 0.73). In addition statistically significant deficits in mortality were found for cirrhosis of the liver (SMR=0.63) and all external causes of death (61598)

- **CIS 94-259** A study of occupational dermatoses in the electronics industry Koh D.S.Q., Journal of Occupational Medicine-Singapore Jan 1993, Vol.5, No.1, p.x-y,1-76, 130 ref. (In English) This thesis presents the results of a literature survey on dermatological hazards in the electronics industries along with a questionnaire survey of workers in two electronics factories in the United Kingdom and Singapore. Work related skin disorders were common 94 (33%) of the UK workers and 482 (19%) of the Singapore workers had at least one previous episode of work related skin disorder. The majority of skin disorders were due to trauma of skin (burn scars, abrasions) while cases of irritant or allergic contact dermatitis were infrequent. There was an increasing trend in the occurrence of acne. (61714)

- **CIS 94-260** The Aging Worker. Ilmarinen J., ed., Scandinavian Journal of Work, Environment and Health 1994 Vol.17, Suppl.1, Special Issue, 141p. Illus. Bibl.ref. (In English) Contents of this special issue devoted to the problems of aging municipal employees in Finland as revealed by the results of a major research project involving cross sectional and follow up studies during 1981-1985: the aging worker: background and aims of the project; stress and strain; mortality, disability and occupational changes; symptoms of mental and physical stress in different categories of municipal work; work related stress symptoms work load and person-
al factors affecting the work disability: changes in maximal cardiorespiratory capacity; musculoskeletal capacity and related changes in work categories; performance efficiency; relationship between functional capacity and work ability; work load and personal factors affecting work ability; summary and recommendation of the project. (61623)

- CIS 94-1175 Working Safety with chemicals in the laboratory - A Student Guide Gorman C., Ed., Genium Publishing Corporation, One Genium Plaza, Schenectady, NY 12304-4690, USA, 1993. vi 123p. Illus.ISBN 0-931690-52-8 (In English) Content of this subject guide: hazardous chemicals and their routes of entry into the body; exposure limits, recognizing the physical and health hazards of the chemicals, material safety data sheets (MSDS); first aid; spill, leak, and disposal procedures; OSHA regulations; the environment protection agency (EPA) and environmental data; tips for working safety with chemicals; hazards of selected chemicals; glossary of terms and aberrations (62534)

- CIS94-1227 Occupation and cancers of the lung and bladder - A case-control study of Bombay. Notani P.N., Shah P., Jayani K., Balakrishnan V., International Journal of Epidemiology, Apr. 1993, Vol.22, No.2, p.185-191 ref. (In English) Association between occupation and cancers of lung (n=246) and bladder (n=153) were examined in a case-control study of males. Controls (n=212) comprised cases of oral and pharyngeal cancers and non-neoplastic oral diseases. For lung cases, significantly elevated risks (adjusted for smoking) were found for textile workers (odds ratio OR=1.99, 95% confidence interval CI:1.3-3.6) and cooks (OR=4.48, 95% CI:1.2-16.9). High risks were also observed among ship and dockyard workers (OR=2.87, 95% CI:0.8-10.1) and wood workers (OR=2.88 95% CI:0.9-9.6). For bladder cancers, significantly elevated risks were observed only for chemical and pharmaceutical plant workers (OR=4.48 95% CI:1.2-16.5). Two other sets of risks estimates were obtained: one by comparison with a second exposed group made up of occupations with little exposure to cancer causing agents, and the other by filling logistic regression models to the data. All methods yielded similar risk estimates. (62564)

OTHERS

- LEADING CASES ON OCCUPATIONAL HEALTH AND SAFETY
  Authors: Colin Gonsalves, Ramez Bhat, Maharukh Adenwala and Kerban Ankesaria.

There is a gap between the law and its implementation in labour and factory setting. This gap needs to be bridged by educating the beneficiaries about these laws on their legal claims about which the employers are most often elusive. This book under review and brought out by Friedrich-Ebert-Stiftung (FES) provides useful guidelines to the workers and their unions by increasing awareness through citing leading cases on occupational health and safety as decided in various courts in India. Advocate Colin Gonsalves has worked extensively in the field of labour related matters and it is felt that this book would render further service to the cause of workers' welfare.

Browsing through the book what emerges is a neat compilation of cases in various courts in India which support the cause of the hapless workers' welfare. Broadly the issues which the cases support are as follows: Workman covered under the Workmen's Compensation Act, compensation, notional extension of employers premises, employment injury, negligence or disobedience on the part of the workmen, liability of principal employer, workers sent abroad to work, delay in filing claim, insurance company when liable, termination due to ill health and radiation. On each issue several cases decided in courts have been discussed in detail which should increase awareness regarding Occupational health and safety among workers and unions and help them fight for their legal rights.

Friedrich-Ebert-Stiftung, Year 1993
D-9, South Extension 2, Pages: 206
New Delhi 110049

- PESTICIDES AND HUMAN HEALTH
  Authors: W.H.Hallenberg and K.M. Cunningham-Burns

This book provides a relatively complete summary of the human health effects of pesticide exposures. It contains a compilation of information from numerous sources including texts, government documents and journals. The information regarding the health effects are classified as - acute exposure effect, chronic exposure effects, suspected effects and toxicology. Information on active as well as inert ingredients can be easily obtained without excessive detail or the need to consult other sources. The extensive coverage of chronic health effects is very impressive. A very ideal book for a busy reader who can have access to a crisp source of reliable information on this important group of substances.

Publisher: Springer-Verlag New York, Year: 1985, Pages: 166, Price: DM 108

- SYSTEMATIC SAFETY TRAINING
  Author: Kingsley Hendrick

There has always been a gap between the management and safety measures at work places. Safety training becomes a necessity in work places but this has not been thought of as cost effective for long; it is perceived as taking away from the productivity of employees and the profits of an organization. A safety training programme must be comprehensive, so that the lowest level of risks is achieved in congruence with the organization's goals. This book does not only focus on tasks that are typically reported as accidents but also on preventable mishaps at work sites. The ultimate responsibility of implementing safety training will fall on organization's safety professionals. This book provides suggestions for a systematic approach to safety training that is congruent with other organizational strategies. This book is a very effective manual for the practicing safety professionals who want to manage an effective safety training programme.

Publisher: Marcel Dekku Inc. New York & Basel
Pages: 343, Price: USD 115.00, Year: 1990
ANNOUNCEMENTS

• Regional Training Programmes on Dust related Occupational Diseases:
In response to demand from various concerned groups, PRIA, is going to organise regional training programmes on Dust Related Lungs Disease in the first half of 1995. These trainings will be organised at Orissa, Ahmedabad and Nagpur. The basic objective of organising such training programmes is to increase the capacities of the participants to understand the issue and undertake action at their level. The course content will cover: human body and its vulnerable points, industrial dusts and its nature, monitoring and control of dust pollution, diagnosis and diseases and legal aspects. The faculty will include doctors, lawyers, safety professionals and activists. For detail information write back to us.

• XIV th World Congress on Occupational Safety and Health
22 to 26 April, 1996, Madrid, Spain

The XIV th World Congress on Occupational Safety and Health will be held in Madrid from 22 to 26 April, 1996. The organisers are the Spanish Ministry of Labour and Social Security, Through the National Institute for Occupational Safety and Health (INSHT), the International Labour Office (ILO), Geneva, and the International Social Security Association (ISSA), Geneva.

The main focus of this Congress will be on the consequences for occupational safety and health of processes of international and national integration (e.g. EU, NAFTA) and of the globalisation of economic relations, on an in-depth analysis of chemical risks and on new proposals for cooperation and participation within enterprises.

For detail write to:
Secretaría del Congreso
Instituto Nacional de Seguridad e Higiene en el Trabajo
Calle de Torrelaguna, 73
E- 28027 Madrid- Spain
PRIA

The Society for Participatory Research in Asia (PRIA) is an independent, non-profit, non-government organisation registered under the Society Registration Act 1860.

Over the last twelve years PRIA has promoted people-centered development initiatives within the perspective of participatory Research. As the cherished mission, PRIA endeavors to promote people-centered, holistic and comprehensive evolution of society characterised by Freedom, Justice, Equity and Sustainability, by

- creating opportunities of sharing, analysing and learning among formations of the Civil Society (in particular, people’s organisations and NGOs);
- engaging in independent and critical analysis of societal trends and issues, development policies and programmes; and
- enabling dialogue across diverse perspectives, sectors and institutions.

The focal aim of PRIA’s Centre for Occupational and Environmental Health is to promote and contribute towards making work and living place healthier and safer. On one hand the Centre collects information from networks, organisations and individuals through research studies, documentation and data bases and it on the other, disseminates information through Bulletin, publications, training/workshops and information service.

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