



Unit 2

Case Studies

CASE STUDY - 1

Study :	AIDS AND HEALTH CARE WORKERS
Author:	Vijay Kanhere Year : 1999 Location : Mumbai, Maharashtra
Theme :	Occupational risks to health care workers
Target :	Health Care Workers

AIDS and Health Care Workers

AIDS (Acquired Immune Deficiency Syndrome) was first identified in 1981. AIDS is the term used to refer to the physical conditions resulting from infection by HIV (Human Immuno Deficiency Virus). HIV is the causal agent and gradually disables an important part of the body's immune system by invading the T-helper lymphocytes and macrophages that are cells in the blood stream and normally help protect the body from attack of infection.

AIDS syndrome has a long gestation period (8-10 years) during which no symptoms appear. This characteristic of the virus adds to the complexity of the situation as the person infected might act as a mute transmitter. Moreover, at present there is no vaccine or curative drug for the treatment of AIDS and prevention is the only option.

In India, the rise in the incidence of AIDS is alarming. Till August 1992 as many as 10,362 HIV positive cases were reported. All India Institute of Medical Sciences (AIIMS), Delhi, estimates show Maharashtra, Manipur and Tamil Nadu leading the percentage count. In Maharashtra and specially city like Mumbai the percentage of HIV positive persons is higher than the all India average. Some sample studies reported percentage in Mumbai to be 7 times higher than other states and areas.

Area of the Study

The study 'AIDS and Health Care Workers' is based on a detailed survey of three selected hospitals of the Municipal Corporation, Mumbai, Maharashtra. The Municipal Corporation, Mumbai runs 3 medical colleges, 1 dental college, 5 nursing colleges and 3 colleges for physiotherapists. The corporation also manages 25 public hospitals and 25 maternity hospitals. It also has a network of municipal dispensaries and community health workers. These sections are represented by many unions. The Municipal Mazdoor Union (MMU) and the Nursing and Paramedical Staff Union (NPSU) both represent the largest number of municipal health care workers in Mumbai that include the ward boys, helpers, nurses, laboratory technicians and others. Three large hospitals - KEM at Parel, the TB Hospital at Sewri and Nair Hospital in Central Mumbai were selected for the study.

In these crowded hospitals patients reach from all over the country. They come at different stages of infections. For example, KEM at Parel caters to 30,000 in-door patients and 3,60,000 out patients annually. Until blood tests are done, every HIV positive patient is treated equally with other patients. As a result care has to be taken as if every patient may be HIV positive.

Objective of study

In our country, public health strategies are very minimum to combat this deadly scourge. In government hospitals where the workloads are heavy, wards are crowded with patients and budgets for equipments are arbitrarily cut every year, the potential risk increases many times for health care workers who face the real risk of contact with body fluids of HIV infected patients.

It is important to note here that even precautions to control transfer of infection of Hepatitis B and C are exactly the same as they too are transferred by body fluids. In this sense, HIV infection or potential of HIV infection can not be seen isolation. Hence, the whole system of taking precautions has to be seen in its totality. If the awareness among authorities and health care workers is low about safe procedures regarding blood testing, prick injuries, gloves and other protective equipments then it is also expected to be low regarding HIV infections.

It is against this backdrop, the study was conducted with the following aims and objectives:

- (i) To find out the extent of awareness among all relevant health care workers about the precautions to be taken to avoid infections due to their work;
- (ii) To find out the possibilities of the spreading of infections arising due to contact with body fluids of the patients;
- (iii) To observe and record the work culture from the point of view of occupational health and safety of the health care workers;
- (iv) To draw out recommendations on the basis of the study with a view to enhance coping strategies and thereby strengthen technical and managerial capabilities.

Methodology

The study was conducted in a scientific and analytical manner. For the secondary sources a broad literature survey was done. Preliminary discussions with the office bearers and activists of MMU and NPSU constituted the major part of the primary sources. Along with the examination of a pilot questionnaire, a reformed questionnaire was finalised and distributed among the employees of three selected hospitals. In the later stage employees at different work-stations such as dispensaries were also included in the study. During the course of study, work procedures were observed and personal interviews were conducted to elicit relevant details regarding various issues. One hundred questionnaires were processed and analysed in order to assess the subject matter. The study was conducted by PRIA in collaboration with American Centre for International Labour Solidarity (ACILS), MMU and NPSU.

Profile of the employees interviewed

A total number of hundred employees were interviewed. Among them 49 were from KEM, 23 from TB hospital and 19 were from Nair hospital. All these three hospitals cater to 66,000 in-door patients and 7,90,000 out patients every year.

Nurses form the dominant part of the study as they are directly involved in the treatment and care of the patients. Out of 100 interviewees, 35 were nurses. Around 16 laboratory technicians were interviewed as they also come in close contact with infected body fluids during the process of patient's examination. Others include ambulance drivers, etc. The study sample constituted 41 women and 59 men. Married with living spouses constituted 84% and 5 were widows. Only 11% were unmarried.

Contact with body fluids

Contacts with the body fluids of the patients such as saliva, liver extract, blood and other kinds are the real hazards for the health care workers. A majority of the respondents reported such a contact on a regular basis without the use of any personal protective equipment.

Majority of health care workers i.e., around 86% reported contact with saliva in their work. Out of this, 38% accepted that it is always without any personal protective equipment while 17% said this happens frequently while 31% reported such contact occasionally. Almost 38% reported a high percentage in urine contact without any protective equipment.

In the treatment of a patient, contact with blood is a most common incidence. 91% accepted such contact. 37% came into contact with blood without personal protective equipment (PPE) always in their work. A very high percentage came in contact with other body fluids. Almost 41% reported such contact many times or always in a week.

Nine out of thirty-five nurses (25.7%) and five out of sixteen laboratory technicians (31.2%) reported injuries from sharp edged instruments or broken parts of glassware on an everyday occurrence. Compared to nurses and laboratory technicians only two out of sixteen coolies (12.5%) reported that without any protection, incidents causing such injuries always take place during the working procedures.

The worst scene can be witnessed in the TB Hospital where ICD (Internal Coastal Drainage) bottles are washed. While washing these glass bottles, some break in the process and cause minor as well as severe cuts. The fluid inside the glass drips on the cut. These incidents take place frequently. In the operation theatre if the wound is deep then it is stitched and treated. Otherwise, minor cuts, etc. are considered routine affairs and get neglected. In the laboratories the job of washing test tubes and slides (manually done) also involves such a risk.

The barber who shaves the body parts that are to be operated upon, gets cuts many times. This happens due to the awkward positions in which he has to work. The work of a barber is a risky occupation in hospitals. The dressers who clean and dress the wounds, come in contact with puss and blood all the time. In the labour room, employees come in close contact with the fluids in the uterus. There are many jobs in a municipal hospital where contact with blood, urine and other body fluids is a reality of every day.

Protective Equipment

Protective equipments are an important integral part of the health care techniques and the profession. They include items like gloves, foot covers, goggles; masks, etc. Among the respondents 77% confirmed the availability of gloves. Around 5% denied having been in need to use them ever but 18% said they are not available at all. Estimates reveal that 64% of the employees reported that the size of the available gloves is not proper. 77% employees found the quality of gloves below standard. All of them are of larger size and fit for one time use only. Sometimes these are torn and employees realise only when some substances touch the palms. Fluids enter from the sides of the wrist as the gloves are larger than the wrist size. Specially

sweepers require industrial type sturdy gloves to handle their work but they too are forced to use thin bad quality disposable gloves.

Only 32% said that the quality of footwear is good. Only two employees said they get proper goggles. About masks too, 29% said they are not of good quality. Employees in the TB Hospital said that even when it is very necessary they are not provided with masks. Cotton masks are provided which have to be reused after washing. They do not get properly disinfected.

The study observed that the general protection measures are neglected such as in the simple and important aspect of providing antiseptic soaps and serious matters such as the provision of lead aprons. Lead aprons are not provided to every one who is exposed to X-rays or nuclear radiation. Among cath-lab employees, only the ones with permanent posting are provided radiation badges. Employees posted in Cath-lab for 2 years or less are not provided any radiation badge. Wherever portable X-ray machines are used, radiation badges need to be provided to the employees. But the affected employees are not provided with such badges.

Training and Medical Check-ups

No special training is provided to the employees on the job regarding health and safety issues. All the precautions and tasks regarding health and safety are learnt on the job. No special training regarding cadavers, infected cadavers and AIDS is provided to the employees. Only 4 employees have so far attended health and safety training courses.

Medical check-ups are not regularly done as reported by 85% of the employees. Pre-employment medical check-up is mandatory. Only in the case of accident leave or sick leave, it is repeated before resuming duties. Otherwise there is no regular periodical medical check-up. Only TB Hospital employees reported chest X-rays being arranged periodically. Earlier even periodical sputum test was arranged but this practice has been discontinued now.

Inoculation

A large majority of 93% reported that they are not inoculated for Hepatitis B. Only 6% have been administered vaccine for Hepatitis B. KEM hospital authorities had asked the employees to submit a written request for Hepatitis B vaccine, but the employees who made such a request, were told later that such a vaccine can not be administered now. They denied the request orally because the authorities realised that the whole process was quite costly. Anti-tetanus (AT) injections are administered to children with a schedule including boosters but this is not provided to health care employees. Some employees reported the possibility of injuries due to the rusted trolleys and so on. These employees too are not administered AT with proper schedule. Only injured employees get a one time injection.

Diseases reported

The study also tried to elicit responses about HIV infection among the employees. About 92% refused to have such infection and 8% said the question is not applicable to them. Though the employees unofficially disclosed some of the cases among them who were reported to be HIV positive. Later it was also learnt that those infected with HIV were unofficially told not to come to work in the hospital. According to a laboratory technician, "HIV infection is associated with people with immoral behaviour. This belief is due to whatever we have heard or read". Another

employee added, “Even if I am infected, I do not think I will report it”. The stigma attached to it creates a huge burden when others come to know about it”.

In the case of jaundice 17% reported that they were affected at some point of time in the past in ten years. Out of reported 17, 5 are nurses and 3 are lab technicians. 18% reported to be affected by TB in the last 10 years. Out of these 8 are nurses and 4 are lab technicians.

Recommendations:

After analysing all the secondary and primary information on the various aspects of the issue, the study has come to certain conclusions. The following recommendations based on these conclusions can be of immense help to the policy planners not only in preventing the infection to spread in the society but also in making the occupation of health care workers safe and healthy.

1. Educational inputs on various aspects of occupational health and safety should be made compulsory for all levels of employees in health care profession.
2. There should be systematic efforts to incorporate suggestions made by the health care employees.
3. Every hospital and nursing home must have a vibrant and participatory Infection Control Committee.
4. Considering the increasing number of AIDS cases and also the available funds for AIDS control under various AIDS control programmes, efforts should be made to provide proper protective equipment to all the employees who face the real risk of exposure.

A study in the United States regarding Hepatitis B has shown that its virus had been transmitted from health care workers to patients. The health care workers included surgeons too. Therefore, the necessity of effective mechanisms at the hospital level to control HIV transmission is important even for the society in general and for the health care employees in particular.

5. An active Health and Safety Committee of employees and supervisors need to be formed. This committee would be responsible to constantly review the practices regarding waste disposal mechanism, health and safety of the employees and the safety of the patients.
6. Health and safety audits should be undertaken with the active co-operation of the employees in the municipal hospitals.
7. The procedures like recording accidents and injuries, getting sick-leave and other matters should be made less cumbersome.
8. Proper procedures of waste disposal should be strictly implemented. They should not remain confined to the domain of bureaucratic formalities.
9. While realising the severity of the impending health hazards, proper medical check-ups and inoculations must be made a regular practice. Precautions against AIDS, Hepatitis B (also transmitted through blood) and TB demands that research must be geared to develop economical and useful inoculation techniques and vaccines.

CASE STUDY – 2

Study :	BUILDING SORROWS!
Author:	NIRMAN Year : 1997 Location : Mumbai, Maharashtra
Theme :	Health aspect of the construction workers
Target :	Construction workers

The Construction Workers of New Bombay

This study was conducted by NIRMAN and PRIA in 1996-97

Introduction

Construction industry is the second largest economic activity in India next to agriculture. It absorbs the largest number of unorganised labour force. These workers from the unorganised sector are involved in various occupations namely agriculture, construction, fishery, forestry, home-based industry, small scale production and manufacturing.

According to the 1991 Census, the total labour force in India is estimated to be 317 million, in which the organised sector employs only 26.8 million (8.5%) while the unorganised sector employs as many as 290.2 million (91.5%)

It has been observed that around 50% of our total capital outlay in the successive five year developmental plan has been on construction itself. There is no accurate data available regarding the number of construction workers engaged in construction activity. According to the NCC-CL (National Campaign Committee for Central Legislation), there are approximately two crores of construction labourers in India.

Construction industry covers a wide range of activities. It is not only involved in constructing bridges, roads or buildings but also includes construction of dams, barrages, funnels, canals, power plants, industrial structures, factories, sewerage, laying of railways, tramway, pipelines, cables and ropeways, erection of towers, chimneys etc. Construction industry also includes demolition and maintenance of structures and services.

There are many ancillary industries and activities such as brick kilns, tile factories, stone quarrying, sand dredging, wood, glass, limestone and paints, cement, steel, electrical constructional fixtures, furnishings, fittings etc. with which construction activity is closely interlinked.

In order to understand the workers' life situation, it is necessary to know the features of the industry such as:

1. In construction industry, the product remains stationary and production unit is mobile. This means that the construction site remains at one place only and the whole unit along with the workers has to move from one site to another. This is one of the unique characteristics of the industry.

2. Majority of the workers are employed on a contract basis, so there is no direct relationship between the employer and the employee. The principal employer directs the job to the contractor which is again given to a sub contractor. The sub contractor gets the job done through a Mukadam or petty contractor. The whole process of employing construction workers is thus through a long chain where both ends never meet each.
3. Since the construction job is seasonal and mobile, there is no continuous employer-employee relationship. The nature of the job it self is casual and temporary.
4. Majority of the workers employed are migrant poor from drought prone or such problem areas. Being uneducated, landless and unemployed, they get easily absorbed in construction industry as 'unskilled workers'. As construction workers, they face various problems such as:
 - Non-payment of minimum wages, equal wages,
 - No regularity of employment,
 - Lack of welfare facilities such as creche, canteen and medical aid,
 - Working under hazardous conditions and facing various health hazards,
 - Absence of any social security measures.

There are various labour laws which are applicable to construction industry such as Minimum Wages Act, Workmen's Compensation Act, contract Labour Act etc. but due to the peculiar nature of the industry they are difficult to implement. Some of the other reasons, like inefficiency of the implementing authority, lack of awareness among the workers, unorganised nature of employment and also lack of attention on the part of the trade unions, politicians and social activists, make them more vulnerable to the existing situation.

Health at Workplace

Among all the burning issues, health is a very important aspect of workers' lives which is the basis of their entire working life. It has been observed that workers are so involved in their work, that their health takes the last priority. The employer also hardly takes any interest in the workers' health. Since the site workers are mobile in nature they have to stay on site itself while working. So when they are on the job, their working place and living place are the same. Thus when one deals with the issue of health at the workplace, it is difficult to separate their living and working conditions.

Life of Construction Workers

Majority of the workers move from site to site, from one village to another, from one state to another, from one work to another. As they change the place, they have to adjust to a new climate and make new staying arrangements.

On the construction site, they stay in very filthy conditions. They have to make their hut with the limited given material. Here the unskilled workers are given the lower quality material compared to skilled workers so they stay in temporary structures exposed to hot sun, rains and cold. The basic facilities such as bathrooms, toilets, water connections are mostly absent where they are left to make their own arrangements. Here women workers suffer the most. Other than this, problems like water logging, unhygienic environment, pollution etc. also exist.

Construction workers many times come in contact with various substances such as cement, dust, acid and chemicals. They have to carry heavy loads of mud, water, cement, bricks etc. women

workers are involved in strenuous, hard and repetitive work where they have to carry material from one place to another. Many times, they work at heights without any safety measures. Other types of risky jobs, such as climbing on scaffolding, working on the roofs for tiling, are also done by the workers as their daily routine. They work in hot sun and rains. As they work on a casual basis, leaving their homes in the native place, they have a lot of insecurity which affects their psychological health.

About the Study

Rationale

There is hardly any information available on this issue. The available information talks more about the labour in general, where health aspect is not focused upon or very little attention is given to it as compared to other issues.

This study which was a collaborative effort of PRIA and NIRMAN aims at assessing the workers' perception and understanding their health problems. It also focuses on the accidents and safety at work site where not much data is available.

The objectives of the study are:

- To understand the socio-economic profile of the construction workers.
- To study the occupational health problems of construction workers.
- To study the general health problems of construction workers in relation to their living conditions.
- To find out the information about the safety measures and accidents at work site.

Sample Design

In order to achieve the objectives and to get valid information, NIRMAN systematically worked out the methodology of data collection. In the initial phase of work, it was found out that there are approximately 5000 workers working at four major areas at New Bombay on CIDCO sites. So 10 percent of the total workforce (i.e. 500 workers) was decided as sample for this study. This could cover all types of workers such as male, female, skilled, semiskilled, unskilled representing different construction sites. After getting the basic information, we selected four major projects, which were NRI site, Mass housing, Railway stations and nodes. Initially, preliminary information was collected from each company and also the number of sub contractors working for each of them. According to the number of subcontractors, we calculated the percentage and in total, covered 500 workers from 100 contractors.

The data was collected from men, women, and various types of skilled, semiskilled and unskilled labourers working on CIDCO sites in New Bombay. The information was collected through individual interviews, focused group interviews and observation techniques.

Limitations

Since the data collection was done on construction sites only, the focus of the study is on site workers only where possible suggestions made pertain to construction sites in general and area of New Bombay in particular.

The information was asked in relation to the particular site they were working at that time. So in case of working conditions, safety measures, record of accidents, information collected is in relation to this site only.

Data was collected during the work time only with the employers' permission so the information was collected in a very limited time. This was the major limitation of the study where we did not get sufficient time to prepare the worker for an interview.

Background Information

Site at New Bombay

New Bombay is being developed as a satellite city under the authority of CIDCO in order to reduce the burden of Bombay City. It covers (some parts of the city) two districts of Maharashtra which are Raigad and Thane. As it is a developing city, construction is one of the major activities in the city. So there are a large number of construction workers, who are migrant workers from different states of India. Since construction work is mushrooming everywhere in the area, we found groups of workers shifting from one site to another within the city.

Six major sites were chosen for data collection from Vashi to Belapur in New Bombay. These sites were namely, Vashi Railway Station, Belapur Railway Station, Mass Housing-Nerul, Mass Housing - Juinagar, NRI Site – Nerul, and Nodal Development – Sanpada.

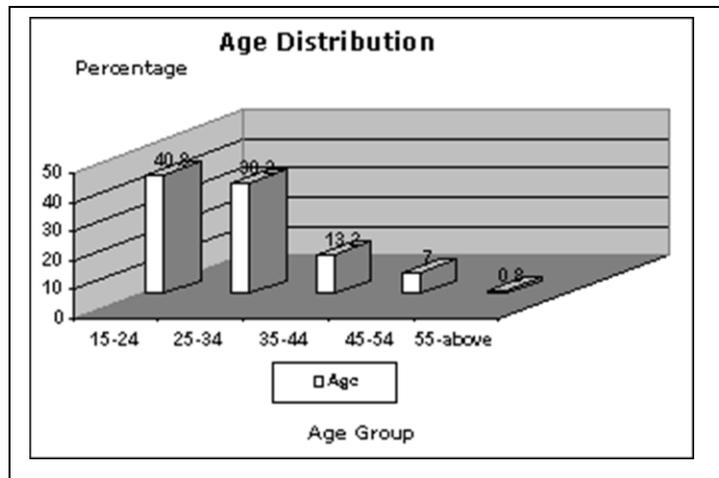
Analysis

The profile of the workers can be understood through analysis of the following graph and table.

Distribution of Construction Workers by Source of Income		
Source of Income	Workers	Percent
First job in Construction	14	2.8
Construction & Agriculture	258	51.6
Construction & Other	20	4.0
Only Construction	208	41.6
Total	500	100.0

Personal Information

The above graph shows that of the 500 workers interviewed for the study, 40.8% were in the age group of 15-24 years whereas 38.2% were in the age group of 25-34 years. It is interesting to note that only 21% of the workers belonged to the age group above 35 years. This means that the majority of the workers were young. The observation and field experience also show that the construction industry draws the younger age group workers, as the work pattern is tedious and heavy, requiring a lot of physical hardship.



Gender

The data collected indicates that only 47 (9.4%) women workers could be interviewed for the research. It was extremely difficult to reach out to women through individual interviews. They were difficult to locate and also reluctant to respond due to cultural barriers.

Native Place

Around 23% of the respondents had migrated from interior parts of Maharashtra. The other workers had migrated from far-off states like Orissa (10%) Bihar (19%), U.P. (15%) and West Bengal (11%). Some workers had also come from Andhra Pradesh, Karnataka, Madhya Pradesh, Rajasthan, Tamil Nadu and Karalla. This data clearly indicates the diversity in this particular type of unorganised labour force. It also indicates the strong push and pull factors in almost every state forcing the poor to migrate to the cities of other states and work in hostile conditions.

Education level

Only 37.4% of the workers interviewed were illiterate. Whereas 14% of the workers interviewed had studied upto S.S.C. and H.S.C. level also. Almost 47% of the workers had at least primary level education. This clearly brings forth the fact that today the construction work force that draws not only from the illiterate masses, but also from the semi-literate people.

Nature of Job

The workers were involved in three types of jobs, i.e. skilled, semi skilled and unskilled. 37.4% were engaged as helpers forming unskilled category. In the semi skilled category, 21% were working as carpenters and 11.2% were working as masons. The remaining skilled categories could be listed as acid work and bar bending.

As mentioned earlier, the different construction sites chosen for the study were at different stages of completion, involving different types of skilled and unskilled labour force. The building construction site known as “housing complex for non residential Indians” at Nerul was at the last stage of completion. The finishing work (like fixing mosaic tiles, Marble flooring) was station of

Vashi, Nerul and Belapur, the skilled workers were involved in acid work. Remaining were involved as masons or carpenters.

Source of Income

It can be seen from the table that nearly 41.6% of the workers were working only as construction workers. This means that their only source of income was through working as construction labourers. They visit their native place but are not involved with agricultural work. Whereas 51.6% of the workers seem to be seasonal workers. They work in the fields during monsoons and then come to the cities to work as unskilled workers. Around 2% of the workers were very recent migrants, this being their first job.

Family Living Pattern at Present

It is significant to note that a majority (63.4%) of the workers did not have any family members staying with them. This means that these workers had migrated alone in search of work and left their family members in the villages or native place. Around 18% of the workers seem to have migrated or brought all of their family members to work in the construction industry. The remaining construction workers (18%) had some family members staying with them while others were staying in the native place.

Reason for Migration

The major reason reported for seasonal migration was insufficient income (44%) or lack of employment opportunities in the villages (17%). Among the 27% workers migrated permanently to Bombay, drought, unemployment, insufficient income and no land holding or source of earning were reported as reasons for migration.

It is important to note here that even construction industry does not provide all types of work opportunities. The pace of work is slack and jobs opportunities few. These factors push many workers back to their villages.

Working Conditions

After establishing the socioeconomic profile of the workers, it is now essential to look at the work conditions, which form the basis for understanding the work hazards and possible occupational health problems in construction work.

Working Hours

The data shows that workers did not have fixed hours of working. They started working at a fixed time in the morning but there was no fixed time to go back. 61.4% of the workers were putting in around 9 hours of work per day. 22% of the workers were working for 10 hours a day. 18% of the workers claimed that they had to put in much more than 10 hours of work per day. This means that workers put in much more than the stipulated working hours and considering the type of work which they do of both skilled and unskilled types, one can say that the nature of work is stretching for long hours, indirectly affecting the health of the worker.

Break Time

Nearly 99% of the workers got a break time for lunch of n hour or two, but tea break seemed to be luxury. Only 50% of the workers got a tea break. This means that the working day is divided

in only two parts i.e. pre lunch starting from early morning and post lunch continuing till late evening.

Presence of Proof of their Work

As many as 26.6% of the workers said the employer kept that no records, nor did they have any written document to show for their work contract. 70.8% of the workers however claimed that the Mukadam or the site engineer took their attendance daily and kept some record, but no written document was given to the worker in the form of attendance card or work document.

It is significant to note that almost 96.6% of the workers never signed on any thing like muster roll or attendance register. This emphasises the point that there is no legal proof of their work.

Almost 92.4% of the workers said that they never signed or put their thumb impression on a wage register. This again pinpoints the vulnerable and exploitative situation of the workers.

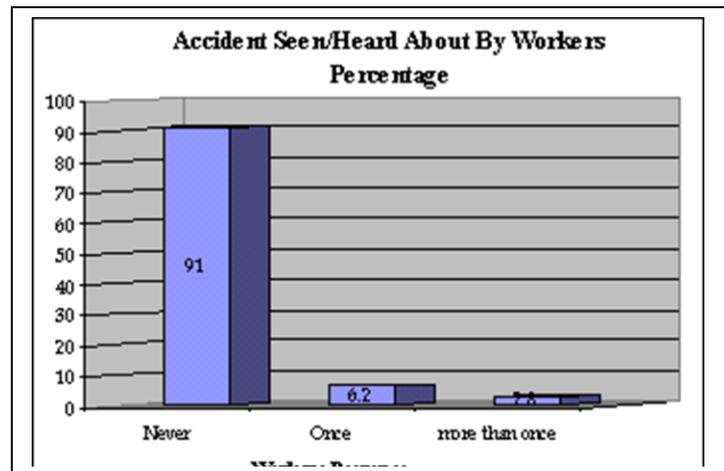
The same kind of trend can be seen in case of advance money taken or overtime done. Around 98.4% said that they never signed on any document for the advance taken and 97.8% of the workers said the same thing for the over time done.

Accidents and Safety

Accidents on Site

Construction is a very hazardous industry where a number of major and minor accidents take place while working on any construction site. We tried to find out how many accidents the workers had heard about/seen while working on this particular site.

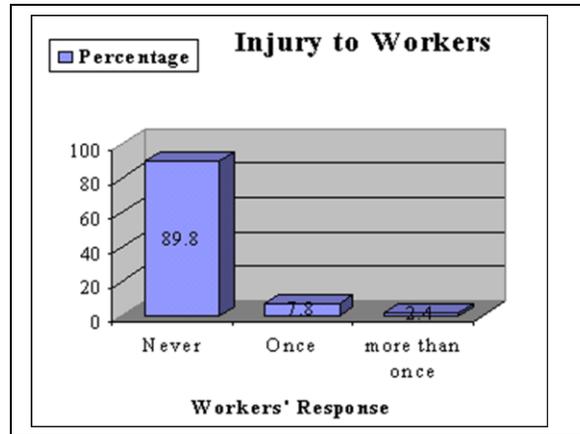
The above graph shows that almost 91% of workers had not seen/heard about any accidents while working on this particular site. Only 2.8% of workers had seen/heard about the accidents more than once and 6.2% of the workers were aware about the accidents that had taken place while working on this particular site.



The above data needs to be seen in the light of following factors:

- Even though interviews tried their best to develop a rapport prior to the interviews, the workers felt uneasy answering questions regarding accidents and deaths.

- It is also significant to note that, on many sites, the work was at the initial stage where the chances of accidents were less. Moreover, the workers had come to the site only a few months back.
- It was also observed that workers migrating with their own group along with the Mukadam, had very little contacts outside the group. So they were not even aware about the things happening around or knew the event but did not know he details.
- It was observed that workers were not encouraged or rather pressurized into not sharing information on accidents as it was related to legal issues.
- Those who knew more details about the accidents that had taken place on their site said that after the event some kind of a preliminary medical help of doctor, first-aid was given. In serious cases patient was sent to the hospital.
- They also reported, that many times, medical expenses were given to the workers at the time of an accident, but afterwards, the same amount was deducted from the salary.



Self Injury

The graph shows that 89.8% of people had not suffered from any injury while working on this particular site. But 7.8% suffered an injury once and 2.4% had suffered an injury more than once.

Again, it is important to note that, since the question is related with this particular site only, the chances of them getting injured on this site is low as they were not working for a long duration.

From the 39 workers (7.8%) who suffered injury, it can be seen that 27 did not get any help on the site. This show that the employer hardly takes any interest in these issues and does not bother much about the health problem of workers. Among the remaining who got some (1.1%) workers got some medical facility and 17 received medical expenses. Here the workers themselves have mentioned that they did get some medical expenses but is was always deducted form their salary. So actually they don't get monetary help but only get timely help.

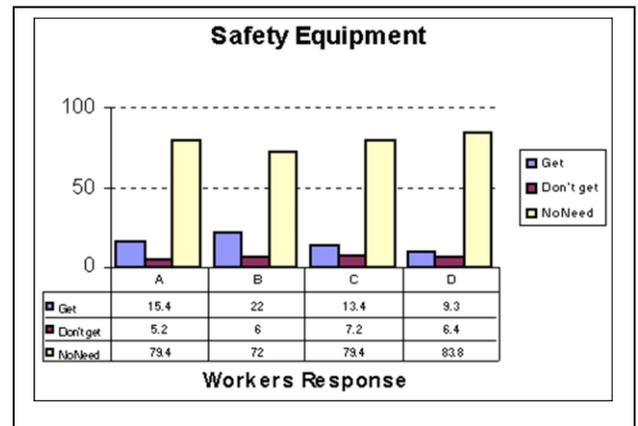
Another very important aspect in this connection is that the workers keep getting minor injuries while working on the site and have become used to such injuries. They don't give much importance to these injuries and do not bother to mention such injury.

Safety Equipment

The questions regarding safety equipment were asked to the workers to know what kind of equipment they got while working on this particular job. Most of the time it was reported that workers were in need of equipment as per their skill and all the workers did not need all the equipment all the time. Here, it was tried to find out whether workers were getting safety equipment, which they were entitled to get.

Few points observed while collecting information:

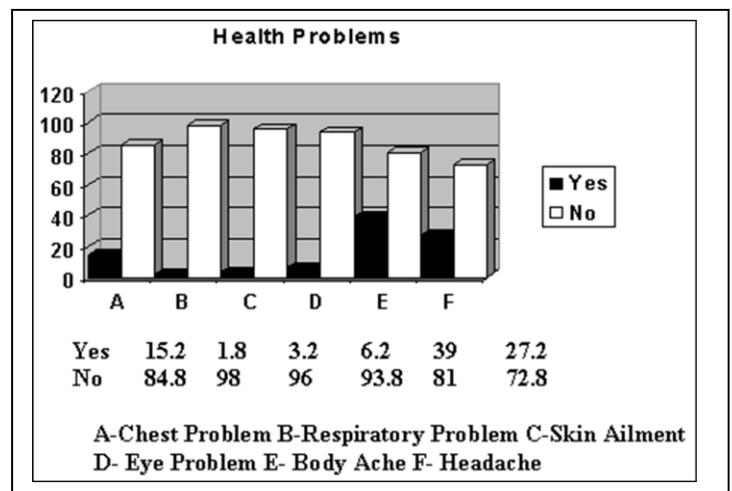
- Certain types of equipment are needed for certain types of skilled job, e.g., safety belts are needed only while working at heights.
- Many times it was noticed that even if they say that they are getting the safety equipment, it means that they can get it if they ask for it. So it also depends on the awareness of the worker what he should ask for. Sometimes they are only kept in the office and not used by anybody.
- Few times, workers also don't use the equipment, e.g., workers working at heights are supposed to wear the safety belt, but sometimes they don't use it because it is not convenient for them while working.
- Many times, it has also happened that workers are not aware about using safety equipment so the employers do not give them any unless they ask for it. At the same time, workers are willing to take the risk even at the cost of their life, as work becomes the priority for them.



Occupational Health

It can be seen from the above graph that 15.2% of the people were suffering from chest problem. Majority of them said that the problem of chest pain was acute when they had to walk on higher floors in a building or when they were involved in heavy work.

Respiratory disorder was not a major problem. The above table further indicates that 3.2% of workers were suffering from skin ailments and hardly any worker reported suffering from respiratory tract disorder. The table shows that 6.2% of the workers were suffering from eye problems because they worked in the hot sun without using protective equipment. It is very important to mention here that 39% of workers were suffering from joint pain/body ache. All the women workers were involved in work which was strenuous and repetitive causing lot of gynecological problems. They mentioned that they never realised that their body was pining when they were on the job but suffered when they were resting at night or when they did not work for a few days.



The above graph also indicates that a very high percentage of people (27.2%) were suffering from headache. Since they work for a number of years continuously, it affects them very badly.

Psychological problems related to job insecurity, economic pressures and temporary living conditions play on their mind and indirectly affect their health.

It was observed that most of the time, workers do not openly talk about their health problems because they do not feel it is a problem unless and until it is a major problem. Among other pressing problems, such as irregularity of work, non-payment of wages and lack of welfare facility, health gets the least importance.

Many a time, the workers do not get to know about their problem until they visit a doctor. This came out very clearly in the medical camps which were conducted along with this study.

A very high percentage of workers (56% of them) suffered from malaria after they came on this site for work. Among them, 36.6% of workers experienced it sometime after they came on this particular site, 14% of them got malaria often and 5.4% of them got it very often. So it can be clearly seen that it was one of the major problems, since workers who were suffering from it in large numbers and some even lost their lives to the disease.

Medical Benefits

Provision of medical facility on the construction site is a very important aspect of labour welfare. Since most of the sites are situated in the areas far away from the community, the access to medical facility is very difficult for the workers.

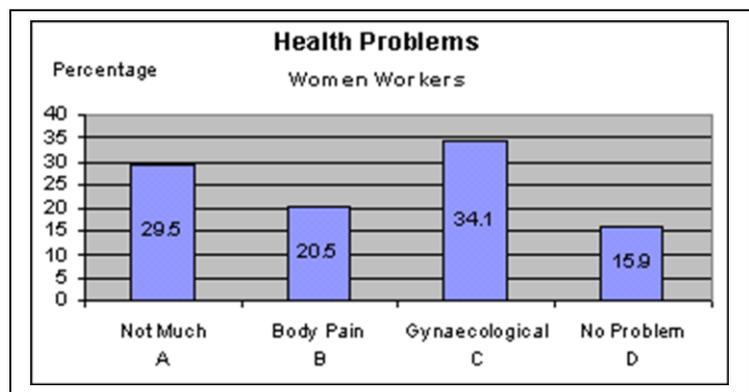
83.8% of workers reported that they did not get any medical facility while working on site. Only 5% of the workers got medical allowance or medical reimbursement and only 7.2% of the workers got checked by the doctor on site.

This shows that a majority of the workers were deprived of medical facility. Even if they got a medical allowance, it was later deducted from their salary.

Medical Treatment

94.2% of workers went to private doctors as medical facilities were not provided by the employer. Among the rest, 2.4% did not go to any doctor and 3.4% preferred visiting the government doctor.

It was also observed that a majority of the workers visited private doctors, rather than visiting the government doctor or the company doctor. The reason which they gave was that they trusted private doctors for faster recovery.



Women Workers

Of the 500 workers, only 44 women workers were interviewed. From the above table we can see that 20.5% of the women workers interviewed reported complaints of joint/body pain and 34.1% reported suffering from various gynecological problems. While talking to women workers, they shared information about some of their problems such as irregular menstruation, frequent abortions, and other gynecological problems. During pregnancy they did not get any maternity leave. They were either sent to their native place or they delivered at the site itself.

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Conclusion

The study of Occupational Health Problems of Construction Workers in New Bombay was a unique experience for us as well as for the workers. It was not an easy task to detect occupational health problems faced by workers. Since construction workers are mobile in nature with no continuous employer-employee relationship and with hardly any records, there is no legal proof available about their work.

From our data and experience it can be said that there is a need to study this aspect in much more detail. Efforts should be made to continuously study their health condition through discussions, studies, medical camps, and by inspecting working condition/atmosphere since this will be helpful to specifically identify their occupational health problem.

This study will hopefully open different avenues and challenges for all of us to study and to discuss and find solutions for further intervention. It has been proved from the study that 'health' is as important as any other issue of construction labourers and should thus be given adequate attention.

Tamilasaran, Govindraj and Chndrasekhar were employed by local "mistry" to work on a building construction site. One day, a high-tension wire snapped and all three of them suffered serious burns. They were take to the hospital by their colleagues, but Chandrasekhar and Tamilsaran succumbed to their injuries.

The story, s narrated by Tamilasarn's sister, goes on to say that, the families of the affected workers were not informed about the circumstances of the accident. After the death of the two workers, a trifling amount was offered to them on "humanitarian grounds". The families, however, refused to accept the money. With the help of the workers' union, they collected all the necessary documents, like, death certificate, autopsy report and legal dependent certificate, and filed a case in the court of the Labour Commissioner.

The owner of the building, on being summoned to the court, admitted that, he had not informed the workers about the high-tension wire. But he insisted that, since, at the time of the accident,

the height of the building was less than the minimum height required (12 feet) for claiming compensation, he did not owe the affected workers, or their families any money. However, keeping in mind that the completed building was more than 12 feet high and also considering several other relevant factors, the court ordered the building owner to pay compensation to the bereaved families.

CASE STUDY – 3

Study :	HEALTH HAZARD IN SMALL SCALE FOUNDRIES
Author:	Sanjeev Pandita Year : 1998 Location : Ahmedabad, Gujarat
Theme :	Socio-economic and work conditions among foundry workers
Target :	Foundry workers

Introduction

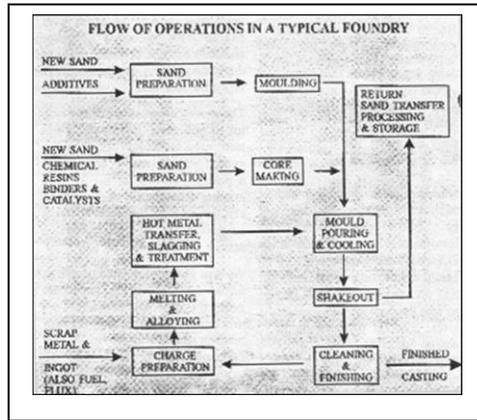
The foundry industry is a basic industry is a basic place in development and growth of engineering industries. This is one of the oldest industries known to man and dates before 4000BC. Casting of iron, brass and bronze idols in various temples is ample testimony of the antiquity and mastery of Indian engineers.

With advancement of science and technology, the foundry industry has undergone tremendous transformation both in magnitude and variety. The large industrial establishments, which have generally more finances and technological superiority, have perhaps satisfactory work conditions and better work environment. This however does not behold true for the foundries in the small scale sector, which still remain in the primitive state as far as the working conditions, work practices and general hygiene are concerned. The problem of environmental health and associated health effects on the workers continue to plague the industry.

In India more than half of the foundries are located mainly in six states viz. Punjab, Uttar Pradesh, Gujarat, Tamil Nadu, Maharashtra, and West Bengal. In Gujarat most of the small foundries are located in Ahmedabad, Rajkot, Surat, Jamnagar, Baroda, Karia, Surendarnagar and Bhavnagar. Gujarat, is well known for its textile and power loom industry, so the development of small scale engineering industries to cater to the needs of the large number of textile mills and power looms in the state is not surprising.

The Ahmedabad Scenario

Ahmedabad, with a population of over 33 lakh is the seventh largest city in India. Ahmedabad, which is well known for its textile mills also has large foundry industry. At present, there are about 1333 registered foundries in the district under small scale industries. This figure, which is given by Zila Udyog Kendra Limited Ahmedabad, is argued by the Institute of Indian



Foundry-men, New Delhi, who believe that the truly functional units cant be more than 300. Many persons register foundries just to get the quota of cast iron. There are also many foundries which are operating illegally.

The small foundries which are more in number, collectively employ a large number of persons including women and children. However, the hygienic conditions prevalent in these foundries are very bad with almost none of the safety measures being followed. Workers are always posed to the threat of dust, toxic vapours, heat, injury, radiation etc.

Present Study and its Scope

PRIA for the past many years, with the support of local organisations, has been actively involved in issues related to occupational health in various industries, not only in Ahmedabad but in Gujarat as a whole. The present study was carried out in collaboration with "Shramik Sewa Sansthan" (SSS). The basic objective of this study is to highlight the serious problems which the workers of foundries in general face, stress has been laid on the workers of small foundries. In this regard, PRIA along with SSS did a survey of small foundries in Ahmedabad in November 1997.

The study also attempts to analyse the various hazards, labour related problems, health problems, etc. which are prevalent in these foundries. Besides, this study will act as a baseline study for any further research or detailed study on each aspect of the problem area.

Manufacturing Process in a Typical Foundry

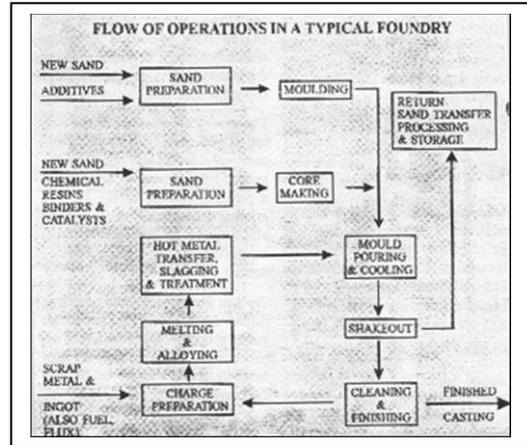
The basic principle of founding concepts of pouring of molten metal into a mould which is made to the outer shape of a pattern of the article required and contains in some cases, a core which will determine the dimension of any internal cavity. The basic principle of foundry technology has changed little in thousands of years. however, in recent times the founding process has been subject to a considerable amount of development and modernisation. Processes have become more mechanised and automatic, new substances have been developed for the many new processes of producing cores and moulds and a very wide range of alloys are used to supplement the output of base metal castings. This however does not hold future for the small scale foundries. They still use the age old founding technologies. The processes are carried out manually in a very unsafe manner or may be semimechanised but in nor way can they be considered as 'safe'.

Manufacturing process in a typical foundry can briefly be summed up into following steps:

1. Moulding
2. Core Making
3. Melting & Pouring
4. Knock Out
5. Fettling
6. Miscellaneous

Moulding

Moulding is the process of preparing the moulds into which the molten metal is poured. Sand is invariably employed in the process of moulding, and has been part of iron founding process for centuries. Various additives are added to the sand to enhance its strength as they act as binders. The traditional green sand is invariably employed in the process of moulding, and has been part of iron founding process for centuries. Various additives are added to the sand to enhance its strength as they act as binders. The traditional green sand mould is made from natural silica sand and coal dust. Molasses are used as additives used, impart different strengths and mould properties, thus deciding the type of sand to be used for any particular type of casting.



The process of moulding is carried out either manually or mechanically in automatic plants. Smaller foundry units generally have manually operated moulding units. In both cases, the moulding process involves mixing the sand with various additives (depending on the cast in mould boxes). The desired metal pattern is embedded in the sand, left there for few seconds, then the pattern is carefully removed so that it leaves its outer configuration on the sand. In large foundries, there are three general methods of mould production: thermosetting, cold self-setting and gas hardened.

In thermosetting process, a metal pattern heated usually by gas, to around 4500C is clamped to a hopper, or dump box, containing the sand coated with a phenolic, thermosetting resin. The unit is inverted, so that the resin sand falls onto the upturned pattern, and is held for about 30 s to allow bonding to take place. After a further short curing time the shell has hardened considerable and can be pushed clear of the pattern plate by means of in built ejector pins.

In the cold setting process, several types of hardening system are presently in use. These include acid catalysed furnaces and phenolics; alkyl and phenolic isocyanates; Fascold; self-set silicates; Ionoset; cement sand and fluid or castable sand. All these systems are similar in that they do not require external heating to effect the reaction.

The gas hardened type of moulding process essentially comprises of CO₂ silicate and the Icocure (or "Ashland") process. In both processes the mould is hardened by the passage of gas (CO₂ in CO₂- silicate process and amine in Ashland process).

Core Making

Cores are made, and inserted into the mould, in order to determine the internal configuration of a hollow casting. The core must be strong enough to withstand the casting process but at the same time must not be so strong as to resist removal from the casting during the knock-out stage. Traditional core mixtures comprise of sand and binders, to give necessary strength, such as linseed oil, molasses. These are dried in an oven and produce a core which, although initially firm and dry, become fragile when exposed to molten metal and then breaks down, facilitating core removal during knockout.

Melting and Pouring

This process involves primarily melting of the scrap metal and pouring it into the suitable moulds. Various types of furnaces are employed for melting the metal, depending upon the size of the foundry. Some of the furnaces commonly employed are; Cupola furnace, Rotary type, Pit furnace (employed in very small foundries).

Cupola is essentially a tall, vertical furnace, into the top of which is charged coke, pig iron, limestone and scrap iron or steel. Rotary furnace is a rotating type of furnace which is generally oil fired (ignited by furnace oil) or sometimes gas fired. This type of furnace produces less slag as compared to Cupola. Pit furnace is used in small-scale foundries and essentially consists of small under ground pits which are ignited by coal. The scrap metal is melted in a crucible.

Once the scrap metal is melted, it is to be poured into moulds. Various techniques are employed for this purpose. In mechanised foundries, it is done with the help of a crane which is operated either manually semi-mechanised or is automatic in its operation (fully mechanised). However, in small foundries the hot molten metal is poured manually into the moulds.

Knock-out

After the molten metal has been poured into the mould, it is allowed to cool for sufficient time. This is followed by removal of rough casting from the mould. The main bulk of the mould is separated from the casting usually by jarring impact. Frequently the moulding box, mould and casting are dropped into a vibrating grid. The sudden impact and continued shaking dislodges much of the sand, which then drops through the grid into a hopper or onto a conveyor where it can be subjected to magnetic separation and recycled.

Fettling

This is the process of stripping away unwanted metal on the cast. It includes processes like grinding, shotblasting, water or water/sand blasting, tumbling, despruing and chipping. As much as half of the metal cast is superfluous to the final casting, but vital to the casting process itself. The mould must be obviously filled with metal to ensure a complete cast object and to make sure that the right regions of the mould solidify in the right Order. A feeder is included in the mould. This essentially is a reservoir or cavity, which can be relatively large, to ensure that sufficient head of pressure will be present to produce the correct metal distribution. The mould cavity and any associated feeders are filled via the sprue which is the vertical channel of metal between the pouring basin and the rest of the casting. Knockout stage but sometimes despruing is carried out during the fettling operation. This is done by hand usually by knocking the casting with a

hammer. After despruing, most casting go through a cleaning process to remove unwanted mould materials and to improve the surface finish.

Miscellaneous

Pattern making : This is the process of forming a pattern which resembles the final casting. It is not identical as allowances have to be made for the shrinkage of the metal in the mould. Pattern making is a highly skilled trade, traditionally made in wood but nowadays, metal, plastic or foam patterns are also made.

Painting : Some castings must be painted before being dispatched to the buyer. Both dipping and spraying methods are employed.

Founding in Ahmedabad

Ahmedabad has both small and large foundries, which produce castings weighing from a few grams to many tonnes in a single day. The small foundries which outnumber the larger ones produce a variety of products like textile machinery and its spare parts, sanitary fittings, watch-cases, safety razors, building materials and domestic utensils.

Raw Material used:

- The most important raw materials used in these foundries are scrap metals, pig iron, gun-metal, steel, copper, zinc, tin, etc.
- Sand, binders, clay various additives and surface coating agents are used for the mould.
- Good quality seasoned wood is used in the pattern shop.
- Gujarat Small Industrial Corporation procures the pig iron and supplies it to the foundries on a quota basis.

Process:

The founding process employed in small foundries is very primitive with very little or no mechanisation. The scrap metal is melted in furnaces which are of various types. Most of the small foundries use Pit furnace. it consists of inter-connected pits a combustible material. The scrap metal is put in a crucible and lowered into the pit, where it is retained till all the scrap metal melts into red fiery liquid (known as 'raas' in local language). Other furnaces used are Cupola and Rotary type. The moulds are prepared using sand as the primary constituent. Molasses are used as binders and some other additives are used so as to give a fine finish to the castings. The molten metal is poured into the sand mould and kept for cooling. After sufficient cooling, the casting is knocked out using a hammer. Residual sand is reused for moulding process. This crude casting requires further cleaning and finishing process. This is done by a technique known as grinding where the unwanted portion of the casting is chipped out. This is carried out on a lathe machine. The finished casting is painted and sent to the customers.

Workers Employed and Their Composition

In these small foundries, on an average, 10-15 workers are employed, out of which 2-5 workers work in the moulding department, depending on the number of pit-furnaces and work in the finishing department.

There are basically two type of workers in the foundries:

1. Migrant workers mostly belonging to Uttar Pradesh and working in moulding and casting sections of the foundries.
2. Local Gujarati workers who work mostly in processing and finishing sections.

Workers working in the casting department are mostly from Uttar Pradesh (approx 90%). The job demands tremendous hard work under utmost harsh conditions. Very few women are employed in foundries. Children are employed mostly to collect the small scrap metal pieces at the workplace. However, the coal, which is used as a fuel. Pit furnaces, is unloaded from trucks mostly by women and children.

Workers are also classified as skilled or unskilled. Skilled workers are those who may have attained specialisation in some field like pattern making, making of moulds, working on lathe machine etc. workers who do not possess any skills or who are learning are classified as unskilled. Women and children invariably come under the unskilled category.

Socio Economic Condition of Workers

Foundry workers, both migrant and native, live a very hard life with minimal available amenities. Migrant workers mostly live within the premises of the foundry. They live without their family, and work for ~9 months and go to their native places for the remaining period. They live under utmost harsh conditions. They toil hard all day and at night, these workers sleep at the workplace on waste jute bags. The wages they get are very little and can hardly satisfy their basic necessities like food and clothing, good shelter is out of the question. These workers are mostly illiterate or might have studied up to some primary class.

The condition of local workers is not better. They live in the slums near the foundries. The houses there are very small with only one room the rooms are very suffocating with no windows nor any other point of ventilation. The workers generally have large families, which adds to their woes. Since the workers are living in illegal accommodations they have no access to safe drinking water and women have to travel long distances to fetch potable water. At some places, the workers are living alarmingly close to the foundry, in fact adjacent to the wall of the foundry. This creates a very hazardous situation for them as all the smoke from the foundries enters their homes along with the fine soot which keeps on falling over their homes. This makes their life miserable, as many of them including their children suffer from various respiratory ailments.

Work Conditions

After making a survey of foundries, the prevalence of hazardous work conditions was quite evident. On entering, one can feel the dark gloomy atmosphere with dust and toxic fumes everywhere. The area of foundry unit is very small (generally less than 100 square meters) and all the processes are carried out in this small space, causing overcrowding. The ventilation is also poor in most of the units.

In the moulding section, 2-4 pit furnace are tended by one or two workers while 2-4 workers prepare mould just a few meters away from the furnace. All the workers are subjected to severe heat and dust exposure of varying degrees throughout their shift of 8 hours or more. The condition is far worse in the summer months when temperatures are very high (generally above 40°C). The workers perspire all day and suffer severe dehydration. Furnace workers are not

provided with any sort of protective equipment, not even simple shoes. They work bare foot or with rubber slippers. When the metal melts in the furnace, they take it out holding the crucible with long tongs, with bare hands or with a wet cloth and pour it into the moulds. This is really a horrifying scene as the metal is red hot and even a small spill from it can melt the flesh.

Workers in the finishing section are exposed to the hazards of noise caused by various machines. The illumination is also very poor. Since workers are not provided with any protective equipment, injuries are common as grinding and chipping of crude casting causes small pieces of metal to fly. This operation also creates lot of dust which has a high level of free silica.

There are not facilities provided for workers at the workplace, even drinking water has to be arranged by the workers themselves. There are no on site medical facilities available, not even a first aid box.

Wages and Labour Legislation

The wages of workers vary depending upon the type of work. The minimum wages set by the Government of Gujarat for foundry workers is Rs. 50.20. however workers generally do not receive even the minimum wages. Skilled workers receive wages from Rs. 40-50 per day, unskilled workers received Rs. 25-30 per day and children merely receive Rs. 15-20 per day.

In most case, workers are not registered anywhere and there is not record of their attendance. They are not given weekly off, casual leave etc. and in case a worker is absent from work, his wages are deducted. This is done even if he is ill or sustains some injury at the workplace itself. The workers do not receive any benefits like PF or any medical facility like ESI etc. Most of the workers are ignorant about their legal rights. Surprisingly no compensation is given to workers in lieu of any accident, they are not even reported. Only in case of death at the workplace, the management, in order to conceal the case, pays some amount (which by no account can be termed as 'compensation' as it is too less) to the survivors of the victim.

Debt Problem

The problem of indebtedness is faced by almost each and every worker. The salary that workers get is too meagre and quite often they have to take loans for various purposes like marriage, rituals etc. they take loans from the foundry owners. The owner gives the loan but then the worker has to work for fewer wages and is in a way bound to work there even if he gets a better offer somewhere else. Workers have to take loans also for buying medicines etc. on questioning some workers, it was found that, on an average the loan taken by them ranges from minimal Rs. 1,000 to maximum Rs. 15,000. However, in some cases it was as high as Rs.25, 000 to 30,000.

Alcoholism

The interesting fact about Gujarat is that even though alcohol is banned by the Government, it is available everywhere. The quality is very poor as it is prepared illegally in an unscientific way. Working under most unpleasant conditions makes workers very tired, and they get enticed by any sort of intoxicating drink. This way they not only ruin their health but also spend the last penny of their savings, making their financial condition worse. Many a time, due to adulterated drinks, many workers fall ill or even loose their lives.

Workers' Union

There is no union among the workers. Even if there is any move (internally or externally) to unite the workers, it is crushed ruthlessly by the foundry owners. If a worker indulges in any such activity, he loses his job. This has created a sort of fear in the minds of workers and they themselves oppose any move of unity fearing they might lose their livelihood. This was evident because most of the workers even refused to talk to the study team.

Health Status of Workers

The National Institute of Occupational Health (NIOH) recognised the various health hazards to foundry workers as early as 1975 and in this regard, carried out various studies in the small foundries of Ahmedabad. The study gave an alarming picture regarding the health of foundry workers. It may sound surprising or even absurd but in reality the conditions of foundry workers has not improved even after so many years. The workers in the foundry face various health hazards:

- Workers working at furnaces are exposed to tremendous heat stress. In Ahmedabad, the temperature summer can go up to 45°C or more. The workers lose body fluids due to excessive perspiration. Due to non-availability of water, the workers cannot take the requisite quantity of water to maintain the water balance. This dehydration puts physiological strain on the worker, which lowers his work efficiency.
- Various operations in the foundry generate considerable amounts of dust. Metallic fumes are also produced during the pouring of hot metal. This exposes workers to the threat of various respiratory hazards. The concentration of carbon monoxide is also high in foundries. Carbon monoxide, if present in high concentration, is absorbed preferentially via alveoli (sac like structures present in the lungs) into the blood which can produce serious complications. Exposure to metallic fumes makes various other organs also susceptible. Since river sand is used in the moulding process, the dust in the foundry has high percentage of free silica which can cause silicosis among the workers.
- Noise level is high in the processing section of the foundry where operations like grinding etc. are carried out. The persons working on these machines are not provided with any protective equipment like ear muffs etc. hence are directly exposed to high noise levels. Persons working for many years on such machines are hard of hearing.
- In small foundries, the materials are scattered all over the workplace without any order, this often leads to falls which can cause minor or major injury to the worker. Burn injuries while handling the hot metal are quite common. Eye injuries during chipping of the crude casting are also quite common.
- Many solvents and resins, used in the bigger foundries as additives the bigger foundries as additives etc., can cause severe complications to the health of workers particularly when they do not use any sort of protective equipment like mask etc.

Other Concerns

Apart from the problem of health and safety caused by these small foundries, there is also a grave problem of pollution caused by them. This has made life difficult for the communities which live in the vicinity of these foundries. The thick smoke which comes out of these foundries is choking their lives. Ratilal Parmar of 'SSS' has recently filed a writ petition in the High Court against many such foundries of Ahmedabad. The case is under hearing in the court.

Conclusion

It is quite clear that foundry workers are marred by innumerable problems. as already stated, in spite of the detailed study carried out by the NIOH, as early as 1975, not much has been achieved in terms of improving any of the stated conditions. The implies that there is a need not only for a detailed study but also of constant further follow-up so as to generate requisite consequences in improving the lot of workers.