CHAPTER 9

ANALYSIS OF QUESTIONNAIRES
### PUNE AND PUNE REGION: BIRD'S EYE VIEW

**AS ON 20th FEBRUARY 2003**

<table>
<thead>
<tr>
<th>NAME</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HISTORY</td>
<td>Existence since Seventh Century</td>
</tr>
<tr>
<td>HISTORICAL NAME</td>
<td>Punwadi</td>
</tr>
<tr>
<td>GEOGRAPHICAL SITUATION</td>
<td>Sahayadri's West Ghat</td>
</tr>
<tr>
<td>GEOGRAPHICAL AREA:</td>
<td></td>
</tr>
<tr>
<td>1. Pune Municipal Area</td>
<td>243.76 sq. km.</td>
</tr>
<tr>
<td>2. Pimpri-Chinchwad</td>
<td>171.00 sq. km.</td>
</tr>
<tr>
<td>RIVERS</td>
<td>Mula, Mutha, Pavna and Ram River (Ramnadi)</td>
</tr>
<tr>
<td>DAMS</td>
<td>Khadakwasla, Panshet, Varasgaon and Temghar</td>
</tr>
<tr>
<td>LAKES</td>
<td>Katraj, Pashan, Lakaki</td>
</tr>
</tbody>
</table>

### AVERAGE WATER SUPPLY:

<table>
<thead>
<tr>
<th>Location</th>
<th>Water Supply per Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pune City</td>
<td>200 litres per day per person</td>
</tr>
<tr>
<td>2. Pimpri-Chinchwad</td>
<td>145 litres per day per person</td>
</tr>
</tbody>
</table>

### WATER FLOW NET

- 2000 kilometer long

### POPULATION:

<table>
<thead>
<tr>
<th>Location</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pune City</td>
<td>25,40,069</td>
</tr>
<tr>
<td>2. Pimpri-Chinchwad</td>
<td>10,06,253</td>
</tr>
</tbody>
</table>

### FAMILIES BELOW POVERTY LEVEL LINE

- 14,766

### ALTERNATIVE TRANSPORT ROUTES

- Road, Railw'ay, Air

### AERODRUM

- Lohagaon

### TAR ROAD

- 750 kilometer

### KACCHE ROAD

- 100 kilometer

### TOTAL VEHICLES

- 10,00,000

### TWO WHEELERS

- 7,27,641

### PMT

- 237

### THREE SEATER RIKSHAWS

- 54,844

### SIX SEATER RIKSHAWS

- 4,133

### SPEED OF INCREASE IN NUMBER OF VEHICLES:

<table>
<thead>
<tr>
<th>Location</th>
<th>Speed of Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pune City</td>
<td>350 vehicles daily</td>
</tr>
<tr>
<td>2. Pune District</td>
<td>1,00,000 vehicles per year</td>
</tr>
</tbody>
</table>

### SOUND POLLUTION

- Minimum 76 Decibel
- Maximum 104 Decibel

### AIR POLLUTION

- 181.76 tonnes
AVERAGE ACCIDENTS : 1,058 per year (118 Death) Registered
PRIVATE HOSPITALS : 503
MUNICIPAL CORPORATION HOSPITALS : 14
MUNICIPAL CORPORATION DISPENSARIES : 28
EMPLOYMENT AREA PER CENTAGE

Pune City : 30.80%
1. Basic Area (Primary) : 2%
2. Secondary : 27.50%
3. Service sector : 70.5%
Pimpri-Chinchwad :
1. Industries : 4878
2. Factories : 2951
3. Total Properties : 1,47,528

FIRE BRIGADE CENTRES : 07 (One proposed)
REGISTERED GANESH FESTIVAL MANDALS : 4,000

COLLEGES
1. General : 100
2. Engineering : 25

DEEMED UNIVERSITIES : 05

NUMBER OF FOREIGN STUDENTS : 10,000 (Every year 1500 Addition)
NATIONAL LEVEL RESEARCH CENTRES : 20

BANKS :
1. Nationalised Banks : 28
2. Co-operative Banks : 63
3. Private Banks : 15

FIVE STAR HOTELS : 05
CINEMA THEATRES : 44 (Two Multiplex)
DRAMA THEATRES : 05

GARDENS
1. Pune City : 52 (Proposed 30)
2. Pimpri-Chinchwad 90 (Proposed 40)

ZOO : Peshve Park, Katraj Snake Park, Rajiv Gandhi Udyan

HERITAGE BUILDINGS : 166

BIRDS IN THE AREA : 300 kinds

MAIN AREAS/INSTITUTION IN THE CITY :
1. Pune University and other reputed Educational Institutions.
ANALYSIS OF THE QUESTIONNAIRES

SAMPLE

In order to study the impact of industrial accidents and the role and responsibilities of the employees, union, management and the society in the prevention of accidents it was decided to conduct a sample survey of selected enterprises in and around Pune. Accordingly, 100 industries had been selection and questionnaire was prepared. Out of these, the response from 84 industries has been received. Normally, accidents are more related with the engineering and manufacturing units. Hence, while selecting 100 units 90% weightage has been given to the engineering and manufacturing units. Now, the following analysis is based on 84 industrial units.

1. ESTABLISHMENT OF THE UNIT

It is always an interesting statistics about the year of establishment of industrial units. This provides us insight into how old are the units in the sample and how many are being recently started. The following distribution gives the units accordingly to the year of establishment.

<table>
<thead>
<tr>
<th>Year of Establishment</th>
<th>No. of units</th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 1950</td>
<td>16</td>
<td>19.04</td>
</tr>
<tr>
<td>1950 – 1960</td>
<td>7</td>
<td>8.33</td>
</tr>
<tr>
<td>1970 – 1980</td>
<td>7</td>
<td>8.33</td>
</tr>
<tr>
<td>1980 – 1990</td>
<td>11</td>
<td>13.10</td>
</tr>
<tr>
<td>1990 and onwards</td>
<td>21</td>
<td>25.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>84</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>
Industrial Units According to Year of Establishment

<table>
<thead>
<tr>
<th>Year of Establishment</th>
<th>No. of Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 1950</td>
<td>16</td>
</tr>
<tr>
<td>1950-1960</td>
<td>7</td>
</tr>
<tr>
<td>1960-1970</td>
<td>22</td>
</tr>
<tr>
<td>1970-1990</td>
<td>7</td>
</tr>
<tr>
<td>1980-1990</td>
<td>11</td>
</tr>
<tr>
<td>1990 Onwards</td>
<td>21</td>
</tr>
</tbody>
</table>
It can be observed that 26.20% of the industrial units were established during 1960 to 1970. And afterwards another 25% of the units were established after 1990 i.e. recently. But 19% of the units were established before 1950.

GOODS PRODUCED

In order to observe the product range of the units selected it is necessary to consider to know the type of goods they produce. The goods produce vary from engineering type to Research and Development and process control. The goods manufactured are crankshaft, pipes, boards, alluminium, construction material, oven sacks, pigments, machine tools, rods, laminates, oil coolers, steel, automobile, medicines, diesel engines, capacitators, plastic bags, tools, textile, card clothing, vegetable oil etc.

Thus, it can observed that a sample is selected from various types of products units. Hence, sample is a representative from various types of product units. Hence, sample is a representative sample and it represents and industries around Pune.

SHIFTS

Since the majority of the industries selected are manufacturing industries, they work in shifts. Following is the distribution according to number of shifts.

<table>
<thead>
<tr>
<th>Number of shifts</th>
<th>No. of units</th>
<th>% (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16</td>
<td>19.04</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>20.23</td>
</tr>
<tr>
<td>3</td>
<td>51</td>
<td>60.73</td>
</tr>
<tr>
<td></td>
<td><strong>84</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>
Distribution of Units According to Shifts
It can be observed from the above table that 60% of the units are working in three shifts and only 19% of the units are having only one shift. This may be because in the sample we have considered 90% manufacturing units and 10% other units.

**TURNOVER**

For this question information is not obtained from each and every industrial unit. But from the information received, turnover is ranging between 1 crore to Rs. 6000 crores. This indicates that units selected are from small scale, medium scale and large scale. Thus, the sample is a representative according to size also.

**EMPLOYMENT**

With regard to the employment of the workers the following information was obtained.

76.02% of the total employed persons are workers. This shows that 23.98% of the persons were administrative staff or it is managerial cadre.

**THE DISTRIBUTION OF WORKERS ACCORDING TO SEX WAS AS BELOW :**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Percentage (%) of the workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>96.82</td>
</tr>
<tr>
<td>Female</td>
<td>3.18</td>
</tr>
</tbody>
</table>

The percentage of the male workers was 96.82%. This may be because the units selected were manufacturing units and they work in shifts.

The workers are also divided as skilled workers and unskilled workers. It was found that 98% of the workers were skilled.
NUMBER OF BRANCHES OF COMPANY

The number of branches are ranging from 1 to 26 all over India.

NUMBER OF ACCIDENTS

It is the part of the study of industrial accidents. The number of accidents reported by 84 industries over a period of Five (5) years are as below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of accidents taken place in 84 industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>376</td>
</tr>
<tr>
<td>1997</td>
<td>620</td>
</tr>
<tr>
<td>1998</td>
<td>1368</td>
</tr>
<tr>
<td>1999</td>
<td>1227</td>
</tr>
<tr>
<td>2000</td>
<td>24</td>
</tr>
</tbody>
</table>

It can be observed that larger number of accidents (1368) has taken place in the year 1998.

OPINIONS

It was further considered a qualitative type of questionnaire and opinions of the respondents were recorded.

Topic:

Almost all of the respondents were of the opinion that the prevention of the accidents and safety are inter-related and require a multidimensional approach.
The different views expressed were as below:

If the company incurs the cost of the safety then we can save an accidental consequences. Safety is not just accident prevention but total prevention of any possibility of hazard. If the cost of safety is not incurred then not only we have to take risk of accidents but also the cost of damages and its causes which are not easy to measure. It can create emotional instability, fear, rejections in the work quality not upto the mark etc.

Accident is the stigma on all the aspects of company's name Accidents can cause human loss as well as financial loss to the company.

They are two sides of the same coin.

Accidents cannot be prevented unless safety is provided.

Safety and accident prevention techniques helps the workers to work easily and tension free. They be for the benefit of the company.

2. SERIOUS ACCIDENTS TAKEN PLACE IN THE COMPANIES DURING 1996 TO 2000

The following serious accidents have taken place in 84 industries during 1996 to 2000.

(1) A worker slipped from the second floor, (2) A man slipped from height and died on the spot, (3) 5/6 workers (died) lost their life, (4) A worker was seriously injured with the iron rod, (5) One worker lost his three (3) fingers on the S.S. machine, (6) While working on crumb breaker one workers hand was injured, (7) An air compressor was burst in one of the cases, (8) Fire took place in the sugarcane waste.

Such cases have occurred in eight (8) industries in remaining 76 industries there were no serious accidents.
Number of Accidents in Five Years

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>376</td>
</tr>
<tr>
<td>2</td>
<td>620</td>
</tr>
<tr>
<td>3</td>
<td>1368</td>
</tr>
<tr>
<td>4</td>
<td>1227</td>
</tr>
<tr>
<td>5</td>
<td>24</td>
</tr>
</tbody>
</table>
3. MECHANICAL OR PHYSICAL ACCIDENTS CAUSING CONDITIONS

This particular aspect is required for further planning regarding safety measures. The accidents causing conditions as stated by the respondents were:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Mechanical accidents causing conditions</th>
<th>Number of respondents</th>
<th>% (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lathe machines was not having cover in front</td>
<td>2</td>
<td>2.38</td>
</tr>
<tr>
<td>2.</td>
<td>Workers do not use facemask while working at heat treatment plant</td>
<td>3</td>
<td>3.57</td>
</tr>
<tr>
<td>3.</td>
<td>Workers work with over confidence</td>
<td>31</td>
<td>36.90</td>
</tr>
<tr>
<td>4.</td>
<td>Workers do not follow safety guidelines</td>
<td>25</td>
<td>29.76</td>
</tr>
<tr>
<td>5.</td>
<td>Human carelessness</td>
<td>78</td>
<td>92.86</td>
</tr>
<tr>
<td>6.</td>
<td>Unguarded machinery</td>
<td>41</td>
<td>48.81</td>
</tr>
<tr>
<td>7.</td>
<td>Improper ventilation</td>
<td>10</td>
<td>11.90</td>
</tr>
<tr>
<td>8.</td>
<td>Bad Housekeeping</td>
<td>2</td>
<td>2.38</td>
</tr>
<tr>
<td>9.</td>
<td>Unsafe tools</td>
<td>15</td>
<td>17.86</td>
</tr>
<tr>
<td>10.</td>
<td>Maintenance of machines not at proper time</td>
<td>23</td>
<td>27.38</td>
</tr>
<tr>
<td>11.</td>
<td>Defective material</td>
<td>2</td>
<td>2.38</td>
</tr>
<tr>
<td>12.</td>
<td>Using machines beyond its life expectancy</td>
<td>23</td>
<td>27.38</td>
</tr>
<tr>
<td>13.</td>
<td>Weak physical health of workers</td>
<td>6</td>
<td>7.14</td>
</tr>
<tr>
<td>14.</td>
<td>Emotional instability of workers</td>
<td>15</td>
<td>17.86</td>
</tr>
<tr>
<td>15.</td>
<td>Dirty floor</td>
<td>3</td>
<td>3.57</td>
</tr>
<tr>
<td>16.</td>
<td>Insufficient place</td>
<td>2</td>
<td>2.38</td>
</tr>
<tr>
<td>17.</td>
<td>Failure of steam taps</td>
<td>1</td>
<td>1.19</td>
</tr>
<tr>
<td>18.</td>
<td>Short circuits</td>
<td>1</td>
<td>1.19</td>
</tr>
<tr>
<td>19.</td>
<td>Workers are not trained for safety measures</td>
<td>3</td>
<td>3.57</td>
</tr>
<tr>
<td>20.</td>
<td>Poor eyesight</td>
<td>1</td>
<td>1.99</td>
</tr>
</tbody>
</table>

Thus, it can be observed that Human carelessness is the most common cause of the accidents.
4. CAUSES OF ACCIDENTS

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Causes of Accidents</th>
<th>Number of respondents</th>
<th>% (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Muscular weakness</td>
<td>4</td>
<td>4.76</td>
</tr>
<tr>
<td>2.</td>
<td>Emotional instability</td>
<td>53</td>
<td>63.09</td>
</tr>
<tr>
<td>3.</td>
<td>Visual disability</td>
<td>31</td>
<td>36.90</td>
</tr>
<tr>
<td>4.</td>
<td>Recklessness</td>
<td>56</td>
<td>66.67</td>
</tr>
<tr>
<td>5.</td>
<td>Hostility</td>
<td>7</td>
<td>8.33</td>
</tr>
<tr>
<td>6.</td>
<td>Indifference</td>
<td>25</td>
<td>29.76</td>
</tr>
<tr>
<td>7.</td>
<td>Unsafe working conditions</td>
<td>75</td>
<td>89.76</td>
</tr>
<tr>
<td>8.</td>
<td>Unsafe act of employees</td>
<td>78</td>
<td>92.85</td>
</tr>
<tr>
<td>9.</td>
<td>Defective plant/Shop layout</td>
<td>18</td>
<td>21.42</td>
</tr>
<tr>
<td>10.</td>
<td>Insufficient space</td>
<td>68</td>
<td>80.95</td>
</tr>
<tr>
<td>11.</td>
<td>Excessive hours of work</td>
<td>7</td>
<td>8.33</td>
</tr>
<tr>
<td>12.</td>
<td>Outdated machinery</td>
<td>3</td>
<td>3.57</td>
</tr>
</tbody>
</table>

According to the respondents main causes of the accidents were ranking wise as below:

1\textsuperscript{st} Rank: Unsafe act of employees

2\textsuperscript{nd} Rank: Unsafe working conditions

3\textsuperscript{rd} Rank: Insufficient space

4\textsuperscript{th} Rank: Recklessness

5\textsuperscript{th} Rank: Emotional instability
5. SPECIFIC REASONS OF ACCIDENTS

<table>
<thead>
<tr>
<th>Specific Reasons</th>
<th>Number of respondents</th>
<th>% (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam boilers</td>
<td>6</td>
<td>7.14</td>
</tr>
<tr>
<td>Explosives</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Electricity</td>
<td>18</td>
<td>21.43</td>
</tr>
<tr>
<td>Not by above reason</td>
<td>58</td>
<td>69.04</td>
</tr>
</tbody>
</table>

Majority of the respondents i.e. 69.04% said that accidents does not occur because of the specific reasons steam boilers, explosives and electricity, there might be some other reasons. But 21.43% of the respondents said that accidents are due to electricity.

6. SITUATIONS FOR REPEATED ACCIDENTS AND ITS REASONS

The accident may take place in the industry. It should be observed that accidents should not repeat and if repeated, it is necessary to see the reasons for it. Following are the situations for repeated accidents and its reasons.

1. **Eye injury** Foreign particles have harmed the workers.

   **Reason**: Workers do not use personal protective equipments of eye protection.

2. **Material handling equipment**: Lifting, tackles cranes.

   **Reason**: Unsafe material handling

   Inadequate maintenance inspection system.

3. **Electrical accidents**

   **Reason**: Short circuits
Specific Reasons of Accidents

Steam Boilers
7%

Electricity
22%

Other
71%
4. Occurrence of repeated accidents

**Reason**: (a) Safety equipments are not being used by the employees, (b) Lack of education to the workers about safety, (c) Lack of proper safety measures.

Out of 84 only 4 (4.76%) have admitted that repeated accidents had taken place. Remaining 80 out of 84 (95.24%) have opined that no repeated accidents have taken place.

7. OPINION ABOUT THE AGE, EXPERIENCE AND SUPERVISION ARE RELATED TO THE RECURRING NATURE OF ACCIDENTS AND INJURIES

There are two possible opinions some have opined that the age, experience and supervision increases recurring nature of accidents and some have opined that, it is reduced. Some opinions are mixed. They said that one of the factors age, experience and supervision increases the possibility of accidents and other opinion was that these factors help to decrease the possibility of the accidents.

**FOLLOWING ARE THE DIFFERENT OPINIONS**: 

Growing age increases the number accidents : The reasons advocated are:

1. Due to age the physical weakness results into accidents.
2. Young workers are reckless in work.
3. Young workers are over confidents they have lack of experience
4. Workers loose eyesight, they have blood pressure
5. Young workers are of lack of knowledge

6. Sometimes elder workers are also overconfident.

**Growing age decreases accidents**: Reasons advocated are:

1. Man becomes mature, keeps his eyes open
2. Workers become more cautious due to growing of age and the more cautious about safety.

**Experience increases accidents**: Reasons given are:

1. Due to experience, an attitude is developed that the person is a master.
2. The operator becomes overconfident.
3. He feels that he is experienced and hence does not require safety equipment.
4. Less experience means lack of knowledge.

**Experience decreases accidents**: The reasons given are:

1. Experience teaches a man lot. He keeps his eyes and ears open.

**Supervision increases accidents**: Main reasons are:

1. Insufficient supervision
2. Carelessness about supervision
3. There is no supervision at all

4. No quality check-ups.

**Supervision decreases accidents**: Reasons are:

1. Proper and regular supervision

2. There is strict supervision

3. Supervisor guides the new comer and trains the new comers.

8. **OPINION ABOUT THE STATEMENT**

   Industrial accidents are regarded as a menace to the community from individual, industrial and natural point of view.

**FROM THE POINT OF VIEW OF AN INDIVIDUAL**

1. Accidents cause danger to lives.

2. Sometimes accidents are fatal. In such cases it is difficult to judge the loss also.

3. An accident may cause permanent disability.

4. Disabled persons are permanent burden on the Nation.

5. An accident is a personal loss.

6. Due to accident the workers family gets disturbed.
7. If the worker loses his limbs, legs, hands etc. his efficiency gets hampered.

8. The worker mentally gets disturbed.

9. Accidents cause instability among the labours, mental, physical, social workability and create unnecessary disturbances in employer employee relations.

FROM THE POINT OF VIEW OF THE INDUSTRY

1. Industry suffers a financial loss due to medical assistance, reinstallation of machinery. This is national waste.

2. Industry suffers a loss of man hours, finance revenue, as well as it is harmful for the goodwill.

3. It causes discomfort among the workers. The employees lead to strikes and thus productivity gets affected.

4. Due to mistake of one worker whole industry has to suffer a loss.

OTHER OPINIONS

1. Industrial accidents should not be considered a menace to community.

2. Industrial accident is a national waste.

3. Sufferer becomes a burden to the society.
4. From the national point of view it seems that the industry is negligent in the safety of workers.

5. Accidents have social impact also e.g. Bhopal gas tragedy.

6. Accident certainly affects quality of the product.

9. PREVENTION OF INDUSTRIAL ACCIDENTS AND PRECAUTIONS REQUIRED FOR THE INDUSTRY.

The following precautions have been suggested by the respondents in order to avoid industrial accidents:

(1) A proper training should be given to workers, (2) Unsafe acts and unsafe conditions should be prevented, (3) Strict adherence of safety rules using safety measures, (4) Maintaining good housekeeping, (5) Looking after labour welfare, (6) Good maintenance helps to maintain good atmosphere, (7) Safety culture should be developed, (8) There should be proper maintenance of machines and equipments, (9) Regular check up of the workers is essential, (10) Educating the workers about safety measures from time to time, (11) Safety Inspectors should be appointed, (12) By providing necessary facilities to the workers for avoiding mistakes and replacing outdated machinery and maintaining it timely, (13) There should be proper handling of machinery equipment, (14) Every worker should be trained for first aid, (15) Safety awareness programmes to be conducted frequently, (16) Machines should be kept upto date, (17) Proper interaction with the employees, (18) Providing safety equipment to workers, (19) Periodic inspection of technical officers, (20) Sufficient space between two machines should be maintained, (21) Faulty machines are to be replaced, (22) There should be sufficient lighting and ventilation.
10. MEASURES TO AVOID OR REDUCE THE NUMBER OF ACCIDENTS

Measure 1: Periodic inspection by the technical officers it

1. guarantees safety, 2. will definitely reduce the number of accidents, 3. improves proper working conditions, 4. ensures that everything is in order, 5. helps workers to be alert, 6. keeps a check on the staff safety aspects, 7. helps the machines to put in proper working conditions, 8. helps in finding out exact cause of accident, 9. will keep in touch about the condition of the machines working, 10. helps us in maintaining the machines and its smooth flow.

Measure 2: Appointment of the inquiry committee

1. The recommendations of the investigation committee should be implemented as far as possible, 2. It avoids any fault, 3. It creates awareness, 4. This will throw light on the main purpose behind the accident, 5. It creates some reliability among the workers, 6. Workers faith in company increases.

Measure 3: Advice to the employers and State Government to ensure the health and the safety of the workers

1. Not very effective measure, 2. It passes on the responsibility down the line and make people accountable, 3. This will alert the workers not to drink during the office hours.

Measure 4: Bulletins and posters illustrating some of the common causes of the accidents in the factories:

1. This is the best method of communication to create an awareness, 2. It brings awareness and education to the staff, 3. Publish internal magazines, 4. They will come to know the causes of accidents, 5. Bulletins and posters work on psychology of the workers and makes much careful, 6. This will alert the factory management about the accidents.
Measure 5: Work of accident prevention by voluntary bodies such as SAFETY FIRST ASSOCIATION etc.

1. Safety First Association conduct seminars and give free booklets,
2. Nobody is bothered about the workers, they are just watchers, not doers, 3. This will bring the factory and their workers in one level.

11. IMPACT OF INDUSTRIAL ACCIDENTS

Impact on the employees:
1. Mental disability, 2. Physical disability, 3. Nervousness, 4. Fear to work, 5. Frustration, 6. It is individual loss, 7. Sometimes accidents are fatal, the loss cannot be judged, 6. If the worker has lost his limbs legs, hands, etc. his efficiency is hampered, 7. Employees become more alert, 8. Workers feel insecure.

Impact on the trade union:
1. Frustration, insecurity about the future, temptation to work study, 2. The union is held responsible by the management, 3. Unions try to protest, 4. It creates conflicts between the union and the management, 5. It may spoil industrial relations with the labour, 6. Bargaining for the safe working conditions.

Impact on the Management:
1. Accident exposes inefficiency of the management, 2. The management suffers less of revenue and man hours, 3. Accident gets bad name, 4. Managements have to spend more money to reduce the number of accidents, 5. The work schedule gets disturbed, 6. Prompt enforcement of the law, 6. Managements have to face statutory problems, 7. Loss of compensation, 8. Loss of production.
Impact on society:

1. Society has a feeling of insecurity about the organisation. It refuses to co-operate.
2. Any loss to individual, management or union is a loss to the society.
3. Disabled person is a permanent liability to the society.
4. Industries become sick and hence development cannot take place.
5. Economic instability to the society.

12. THE ROLE AND RESPONSIBILITIES OF THE EMPLOYERS UNION, MANAGEMENT, SOCIETY TO PREVENT THE ACCIDENTS AS OPINED BY RESPONDENTS

A. Role and responsibilities of the employees:

1. The employees should abide by safety rules.
2. Work as per process layout.
3. Abide by law.
4. Implement and apply sense of mind to work safely.
5. Innovate ideas for safe working conditions.
6. To keep emotional stability.
7. The workers must be made aware of the causes of accidents.
8. To inform the management regarding any problem arising with machinery.

B. Role and responsibilities of the trade unions:

1. To see that all workers are abide by safety norms.
2. To see that the management also follows safety rules.
3. To educate the employees.
4. The union must reinforce the instructions.
5. To lay down precautionary measures.
6. The trade union should explain the consequences of the accidents to the workers.

C. Role and responsibilities of the management:

1. The management should see that all the norms laid down by the Government are implemented.
2. To act upon the suggestions made by the workers and the union.
3. The management must motivate workers to follow the safety rules.
4. To see safety equipment is up to date.
5. To lay down the precautionary measures.
6. Training programmes to be conducted.
D. Role and Responsibilities of the society:

1. Society must be aware, 2. Society can help in spreading safety methods, 3. Society should act as a body of exerting pressure on employee union.

13. PRECAUTIONS TO BE TAKEN TO PREVENT THE ACCIDENTS

The following precautions are essential in order to avoid industrial accidents as suggested by the respondents.

(1) A proper training should be given to the workers, (2) Unsafe acts and unsafe conditions should be prevented, (3) Strict adherence of safety rules using safety measures, (4) Maintaining good housekeeping, (5) Looking after labour welfare, (6) Good maintenance helps to maintain good atmosphere, (7) Safety culture should be developed, (8) There should be proper maintenance of machines and equipment, (9) Regular check up of the workers is essential, (10) Educating the workers about safety measures from time to time, (11) Safety Inspectors should be appointed, (12) By providing necessary facilities to the workers for avoiding mistakes and replacing outdated machinery and timely maintenance, (13) There should be proper handling of machinery equipment, (14) Every worker should be trained for first aid, (15) Safety awareness programmes to be conducted frequently, (16) Machines should be kept up to date, (17) Proper interaction with the employees, (18) Providing safety equipment to workers, (19) Periodic inspection of technical officers, (20) Sufficient space between two machines should be maintained, (21) Faulty machines are to be replaced, (22) There should be sufficient lighting and proper ventilation.

14. MAIN DUTIES AND RESPONSIBILITIES OF A SAFETY DIRECTOR AND SAFETY COMMITTEE

DUTIES AND RESPONSIBILITIES OF A SAFETY DIRECTOR:

1. Responsible for the overall co-ordination of all activities related with safety management, 2. To make sure that the industry complies will all the set of rules and guidelines, 3. Create general awareness amongst workers, 4. To see that all of the workers are provided with safety equipment or not,
5. Make a routine checkup of machines, 6. To advice with respect to planning, layout as per Act, 7. To solve the problems, regarding safety, 8. Assisting and co-operating with the management in achieving goals, 9. Updating safety measures and systems, 10. Safety Director is the link between management and workers, 11. To ensure that employees are in perfect physical health.

DUTIES AND RESPONSIBILITIES OF THE SAFETY COMMITTEE:

1. They must appoint director to see safety rules are followed, 2. To ensure proper safety standards are being adhered, 3. To follow Government rules, 4. Provide proper safety requirement, 5. To create awareness regarding safety among workers, 6. To develop safe management system, 7. To conduct a safety audit, 8. To solve problems/disputes among management and workers and mental capability to complete jobs given to them, 12. To make sure that the management provides a proper working environment.

15. OPINION ABOUT WHETHER SAFETY SHOULD BE GIVEN EQUAL IMPORTANCE CONSIDERATION WITH THAT OF OTHER FACTORS OF PRODUCTION

<table>
<thead>
<tr>
<th>Opinion</th>
<th>No. of respondents</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>84</td>
<td>100</td>
</tr>
<tr>
<td>No</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td>100</td>
</tr>
</tbody>
</table>

Reasons who said 'yes' are:

1. Safety first

2. Without safety measures there cannot be any surety of the smooth working of different factors of production.

3. Safety measures directly or indirectly helps to increase the efficiency of the other factors of production.
16. STEPS TAKEN IMMEDIATELY AFTER THE ACCIDENTS

1. First aid, medical attendance

2. Ensured that the work is resumed as soon as possible

3. Proper investigation is conducted

4. The causes of accident are found out

5. Preventive measures are developed

6. The family members of the workers are informed

7. Financial help is required to be provided.

17. FACTORS TO BE INCORPORATED WHILE ORGANISING A SAFETY PROGRAMME

(a) Collecting accident data:

Collection of data is useful in training. It creates awareness among the workers, it helps in investigations.

(b) Investigation of accidents:

This provides details where we have gone wrong. These reasons can be avoided so that in future such accidents will not occur.

(c) Help in developing engineering applications:

This may not be included in organising a safety programme however in engineering applications certain safety measures can be taken.
(d) **Conducting safety training** :

This is of top most priority in conducting safety programme. We cannot have safety programme without proper planning for safety training. It should be given at all levels i.e. lower level, middle level, top level management.

(e) **Information meetings by management personnel** :

Information meetings also should be part and parcel of safety management programme. With this safe working conditions can be introduced.

(f) **Introducing safe working procedures** :

Safe working procedures is execution part of the safety programme. Whatever is decided in policy and programme is to be introduced in safe working conditions.

(g) **Preparing instruction material by safety foreman** :

In safety programme, for training purpose instruction materials is required by the safety foreman who provides practical guidelines and not theoretical.

(h) **Appointing safety officer** :

By appointing safety officer number of accidents can be reduced. This will facilitate routine checkup of machinery, equipment environment etc.

(i) **Safety policy, safety education, safety publications** :

This is long-term measure and application in safety programme. This will be related with legal requirements and rules and regulations also in consultation with the unions.
18. OPINIONS OF THE RESPONDENTS REGARDING THE IMPORTANCE OF DEVELOPING SAFE HABITS AMONG THE WORKERS.

1. Safe habits are useful to both the workers and the management, 2. Safe habits are helpful in avoiding accidents and mishaps, 3. Safe habit helps to develops personality of an individual, 4. One becomes aware about his responsibility, 5. There is increase in morale due to safe habit, 6. A worker can work more easily and freely, 7. Qualitative production becomes possible, 8. Quantity of production increases, 9. Development of safe working conditions become possible, 10. Accidents can be prevented, 11. Employees will become less negligent, 12. Hygienic point is very important, 13. Workers will get mental peace, 14. Safe habit is advantageous to organisation, 15. Safe habit provides safe working environment, 16. The workers can actively participate in the training programme, 17. One can save the life of a worker, 18. Workers can be made alert about the hazardous injuries caused by the accidents, 19. Employees can work with proper guidance without any faults and mistakes, 20. Employees do not have consequent of any misdeed, 21. Environment will be clean and tidy, 22. No loss to man, machine and material, 23. Loss of productive time can be avoided, 24. Delay in work can be avoided, 25. Safety habit helps to develop good behaviour.

19. PREVENTIVE AND PUNITIVE ACTIONS TAKEN BY THE INDUSTRIES ON THE FINDINGS OF INQUIRIES REGARDING THE OCCURRENCE OF ACCIDENTS

Actions:

1. After conducting the inquiry regarding the accident the industries have tried to increase the safe working habit amongst the employees, 2. A strict control has been exercised over the use of all safety devices, 3. Working permit system has been introduced, 4. Safety nets for working on heights,
5. Safe access for working on heights, 6. Each and every record is kept regarding accidents, 7. Inquiry committee is set-up, 8. Safe clothes and proper knowledge is provided to the workers, 9. The guidelines given by the government were followed, 10. Training regarding equipment is provided, 11. A separate safety training programme as introduced, 12. A safety officer periodically checks the machines and workers which reduces accidents, 13. Periodically reports are prepared, 14. Warning and show causes notices, are given, 15. Engineering education is imparted, 16. Dated machines are discarded, 17. Seminars of First aid, prevention etc. are conducted, 18. Industrial safety programmes and behaviour training is conducted, 19. Developed engineering controls at the hazardous sites and use of personal protective equipment, 20. Safety department has been established, 20. Safety committee is appointed. Safety consultant has been hired and proper measures are taken to avoid further accidents.

**BENEFITS OF ACTIONS**

1. There is reduction in accidents, 2. Workers are using safety devices, 3. More awareness about safety among workers, 4. Once cause of accident is known it can be avoided for further accidents, 5. One can develop certain rules and regulations, 6. Certain safety procedures are laid down.

**20. CONTENTS OF THE ACCIDENT REPORT**

The following are the contents of accident report

21. NECESSITY OF MAINTAINING PROPER REPORTS AND RECORDS OF THE ACCIDENTS BY AN ORGANISATION.

All are of the opinion that such reports and records are to be maintained.

The different reasons for maintaining proper reports and records given are:

1. It is requirement of law, 2. It is required for future reference, 3. Useful for setting insurance claim, 4. It helps in designing safety policy, 5. Helps in formulating safety rules, 6. Helps in developing safety equipment, 7. It can avoid repetition of accidents, 8. To study causes of accidents, 9. It helps in improving working conditions.

22. MAINTAINING COMPLETE INFORMATION ABOUT ACCIDENTS

All 84 industries have to maintain complete information about any accidents and circumstances attending the death or disablement of a worker or any other serious injuries to him. Such information is to be submitted to the Government.

23. LOSSES SUFFERED BY THE MANAGEMENT DUE TO THE TIME LOST DUE TO ACCIDENTS.

No quantitative data could be obtained. Qualitatively, the responses are as below:

Direct costs:

Indirect cost:


24. STATISTICAL RATIOS USED TOGETHER ACCIDENTS INFORMATION

All industries are using the following ratios

Frequency rate: Number of accidents

Severity rate.

25. WHETHER INSURANCE POLICY OF EACH AND EVERY WORKER IS TAKEN OR NOT?

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of respondents</th>
<th>(%) Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earn worker policy taken</td>
<td>81</td>
<td>96.43</td>
</tr>
<tr>
<td>Policy not taken</td>
<td>3</td>
<td>3.57</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td>100</td>
</tr>
</tbody>
</table>

26. THE CONCEPTS OF TOTAL DISABLEMENT, TEMPORARY PARTIAL DISABLEMENT, PERMANENT, PARTIAL DISABLEMENT.

Total disablement

1. Two limbs, both eyes lost.

2. Worker cannot walk again (Permanently handicapped)

3. Worker cannot be taken on any type of work.

4. Loss of any part of body.
Temporary partial disablement:

1. One of the limb is fractured.

2. The worker involved in the accident is out of work for a small period of time.

3. Worker is away from work for a short period of time.

5. Slight cut which can be cured.

Permanent partial disablement:

1. One limb or one is permanently disabled.

2. Worker can only work in a certain way restricting certain movements.

3. Loss of limb not fully disabled.

27. OUT OF 84 INDUSTRIES NOT IN A SINGLE INDUSTRY ANY CASE IS FILED AGAINST THE COMPANY BY ANY WORKER OR GROUP OF WORKERS OR BY A TRADE UNION.

In some cases the reason given is in case of accidents a full compensation is given from the side of the management to see that the employees should be treated well and the expenses are beared by the management and certain aspects regarding his family are also taken into consideration by providing them modern facility.

28. IN NOT A SINGLE INDUSTRY ANY MATTER PENDING WITH LABOUR COURT OR SESSIONS OR HIGH COURT.
29. FOLLOWING MAJOR ACCIDENTS WERE TAKEN PLACE IN THE RESPONDENT INDUSTRIES.

1. In 1998 when fire took place in the company.

2. One worker has lost his arm in 1984.

3. In 1996, when an air compressor had burst in the company.

4. 8th January 1993 a chain pulley block accidentally fell and proved fatal for a worker.

5. The crane snatch box wire broke and the block hit the workers head the top most level was exceeded by the worker.

30. IN ORDER TO PREVENT INDUSTRIAL ACCIDENTS WHETHER HELP OF FOREIGN DELEGATE, CONSULTANT WAS TAKEN

1. Conducting training programme for the workers.

2. Take the help of consultants to prevent the accidents as they are the person who take care technical hard of overcoming those types of accidents.

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