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ADVISORY AND TECHNICAL ASSISTANCE

TO THE

SECRETARIAT FOR HEAVY INDUSTRIES (SHI)

TF/LIB/80/001

LIBYAN ARAB JAMAHIRIYA

Terminal Report*: Industrial Safety

Prepared for the

Socialist People's Libyan Arab Jamahiriya

by the United Nations Industrial Development Organization

Based on the work of Jagjit SINGH

Industrial Safety Expert

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INTRODUCTION

The project entitled "Advisory and Technical Assistance to the Secretariat of Heavy Industry (SHI)" was the result of a trust fund agreement signed on 24 January 1981 between the Libyan Government and UNIDO whereby UNIDO would provide a number of experts to be attached to the Secretariat for Heavy Industries. Under the terms of the agreement, UNIDO provides the following expertise:

1. Mr. N.E. SRIVASTAVA, Mechanical Engineer from 16 August 1981 to 15 August 1982;
2. Mr. N. VOSYKA, Aluminum Expert from 1 January 1981 to 30 April 1981;
3. Mr. J. URNBERG, Industrial Safety Expert from 28 June 1981 to 27 June 1982;
4. Mr. A. AFIFY, Cement Industry Expert, from 6 December 1981 to 5 December 1982;
5. Mr. J. SINGH, Industrial Safety Expert, from 3 August 1981 to 31 March 1986.

It will be seen from the above implementation that there were two Industrial Safety Experts. The assignment of the first, Mr. Urnberg, was for one year, whereas the second, Mr. Singh remained in the country for about five years. This terminal report concerns the activities, achievements, findings and recommendations of Mr. J. Singh.

After the September revolution of 1969 there was an era of industrialisation of Jamahiriya and during the last few years many new industries were established in Jamahiriya. The new industries brought in their wake hazards which, if left uncontrolled, could bring disaster to the whole community and the very purpose of industrialisation would be defeated as industrialisation is expected to bring prosperity. Elimination of accidents is, therefore, vital to the public interest. Accidents produce economic and social loss, impair individual and group productivity, cause inefficiency and retard the advancement of standards of life. The practical and moral aspects of accident prevention are inter-related because accidents result both in the waste of manpower and resources and in physical and mental anguish.

The safety situation in factories in Jamahiriya was alarming in the late seventies when the factories started taking shape because the staff were not familiar with this type of work. It was a challenging task to formulate safety systems and cover various other aspects of loss control management in this short period. Only a beginning could, therefore, be made. To inculcate safety consciousness is a slow process. Almost all the managements of various factories have now realised that a large proportion of accidents can be prevented and that the same industrial brain power that produces vast quantities of goods can also be used for accident prevention. It has been realised that efficient production and safety are very much related. It is accepted that there is no hazard which cannot be overcome by practical safety measures.

There is a definite need for continuous concerted efforts to prevent accidents.

- Needless destruction of life and health is a moral evil;
- Failure to take precautions against predictable accidents involve moral responsibility for those accidents;
- Accidents severely effect productivity;
- Accidents inflict far-reaching social harm;
- The safety programmes in our industries have proved that these techniques are effective in reducing accident rates and promoting efficiency.

I. SCOPE OF ASSIGNMENT

The comprehensive safety programmes were planned for each factory to fulfil the following requirements:

A. Personal Protection

This is the most important aspect; crippled and handicapped persons should not be the by-product of any industry. Accidents interfere with production. They waste manpower and so their prevention is vital.

B. Plant Protection

This is again very important as failure can lead to serious breakdowns as well as human injuries. Some of the latest techniques are introduced in the manufacturing processes in many of the industries. There has to be a radical change in the safety attitude of various groups of personnel at different levels to avoid serious breakdowns. To minimise the breakdowns the latest safety systems should be introduced and it requires much effort on the part of various groups of personnel. Various safety systems were suggested after surveying each plant. The details of such systems were given in the Expert's technical reports which were submitted to the SHI. The full and thorough implementation of these systems is a MUST to improve the standard of safety and to protect men, material and machinery.

C. Production

Higher productivity and safety are both sides of the same coin. Optimum productivity cannot be obtained on a regular schedule if good standards of safety are not maintained.

D. Industrial Safety Law

Jamahiriya has an Industrial Safety Law promulgated in 1976 which covers some of the facets of industrial safety. Though there is a provision to formulate detailed safety regulations under the various articles of this law by the concerned Ministeries, this has not yet been achieved.

It is necessary to formulate detailed safety rules and regulations to cover the wide spectrum of safety in industry. This was one of the important objectives of the expert, namely, to formulate safety rules and regulations with the involvement of local personnel.

E. Community

To ensure the safety of the community in and around the factory.

F. Training

To arrange training for different categories of personnel in fire and safety.

G. Fire Protection

To eliminate the causes of fire, one must first know the many ways in which it can start and then suggest to the management the methods necessary to prevent fire and to extinguish it if it does take place.

H. Organisation

Planning of safety organisation for each factory and also advising the SHI on the pattern of safety organisation for the Loss Control Management.

H. Safety Propagation

For spreading the message of safety to employees at all levels, it was desirable to propagate safety in all the factories. By formulating a comprehensive safety programme it was aimed to achieve:

- Development and implementation of safety rules and procedures;
- Prevention of accidents and fires;
- Education of employees on safety and safety consciousness.

II. VISITS TO FACTORIES

Awareness about the importance of safety and fire prevention was created by the expert with the co-operation of SHI during his field visits to factories. The first two visits to each factory were of longer duration and the opportunity was taken to discuss with the plant personnel about the role of loss control personnel in the efficient running of an industry and the expert actually participated in day to day work of Loss Control Departments. Plans were drawn out and discussed with the management for

the efficient working of Loss Control Departments and a detailed report of each visit was submitted to the SHI for follow-up action. Many of these reports were also translated into Arabic and sent to the respective factories for comments/implementation.

The list of factories visited together with the number of visits ig given below. A summary of activities and recommendations to each factory is covered in Section V, pages 22 - 34 in this report.

S. NO.	NAME OF FACTORY	TOTAL VISITS
1.	General Complex of Chemical Industries at Abukammash	4
2.	Tripoli Steel Plant at Tripoli	4
3.	Sukal Khamis Cement Plant	4
4.	Truck Factory at Tajurra	4
5.	Trailer Factory at Tajurra	1
6.	Tractor Factory at Tajurra	4
7.	Khomes Cement Plant	4
8.	Libda Cement Plant	4
9.	Zliten Cement Plant	3
10.	Missurata Steel Plant	4
11.	Raslanoof Oil and Gas Company	2
12.	Napetco at Marsa El Brega	4
13.	Benghazi Cement Plant	4
14.	Libyan Pipe Factory at Benghazi	4
15.	Dherna Cement Plant	4
16.	Jabal Akhtar Factory at Dherna	1
17.	Tyre Factory at Tajurra	1
18.	Battery Factory at Tajurra	1
19.	Metal and Construction Works at Tripoli (3 Factories)	1
20.	Metal and Construction Works at Benghazi	1
21.	Brick Factory at Swani and Zanzoor	1
22.	Scrap Yard at Missurata	3
23.	Azzawia Oil Refinery	2
24.	The National Equipment Service Company	1

There was some involvement in other areas at the request of the SHI from time to time.

III. BASIC GUIDELINES FOR FACTORIES

The Expert not only gave advisory services to the factories at the policy level, but also assisted in the implementation of the recommendations at the working level through involvement in the activities of the respective Loss Control Departments in each factory. Classroom lectures were given in some of the factories about the role of Loss Control Departments and the duties of loss control personnel apart from the safety survey of areas during field visits. The following general guidelines were given to the factories for planning their safety programmes:

A. Safety Organisation

Safety is basically a management's responsibility. Management has to provide safe conditions - by design, operation and mainterance. But safe conditions do not necessarily make a safe plant. Only when the employees of the company act safely does it become a safe plant. The basic attitude towards safety is missing in many of the factories. To achieve the objective of creating safe working conditions and involvement of persons in a company's safety programmes, it is necessary for every factory to have proper safety organisation with the backing of the top management.

Progress

The guidelines for proper safety organisation are contained in the Expert's reports on individual factories and these were explained in detail during field visits. In fact, the model for a Loss Control Department was approved by SHI and each factory has been advised to organise their Loss Control Department accordingly. Some of the factories have already set up their Loss Control Departments.

B. Safety Inspection

It is well recognised fact that safety inspection forms an important part of the whole safety programme in an operating factory, particularly in chemical plants. Safety inspection has to be undertaken of the process units/equipment at regular intervals, and the main purpose of safety

inspection is to ensure safe operations. The following should be subjected to periodic inspection:

- Safety and fire protection facilities;
- Operating procedures;
- Emergency procedures;
- Personal protective equipment;
- Unsafe conditions;
- Unsafe practices.

The comprehensive safety inspection to be undertaken by selected personnel with expert knowledge in different fields such as engineering, operation, equipment maintenance, equipment inspection, safety and fire protection. An inspection report is to be submitted to a safety management committee. These inspection committees are to be formed in each of the factories. Follow-up on the items approved by the management is to be made by the Loss Control Department.

Progress

Despite the best efforts and follow-up made on this activity, it has not so far been possible to implement this programme in totality. This responsibility has been assigned to the Loss Control Department personnel. The Expert has impressed upon each factory management during his visits to make a regular survey of plants and areas to cover all the items detailed above.

C. Factory Inspectorate Services

There is a real need to establish at the national level a factory inspectorate service for maintaining good standard of all types of industries. As stated earlier, the present Safety Law of 1976 is not adequate as it does not cover all the facets of safety in industry. The proposed factory inspectorate service should prepare a comprehensive Health and Safety Act which should legally apply to all operating industries employing 20 persons or more. It was suggested to the SHI that similar factory acts and regulations are already in force in many countries and these regulations could be used for drafting the new applicable safety act, safety codes, safety regulations, etc.

for Jamahiriya. The SHI was advised to take up this matter with the appropriate authorities (Ministry of Internal Affairs) for formulating such rules and regulations and necessary assistance in this regard can be given by the Expert.

Progress

The SHI is fully convinced about the necessity of such statutory regulations at the national level but this matter has yet to be taken up with the appropriate authorities. However, for use by heavy industries, a handbook of safety regulations was drafted in 1982 by the two Experts on Safety, Messrs, Urnberg and Singh. These regulations have since been translated into Arabic and partly accepted by the Secretary of Heavy Industries and issued by the Ministry to all the factories under SHI. As these were issued under the signature of the Minister in the form of a decree, they were considered as law by the factories attached to SHI. A copy of this regulations handbook was submitted to UNIDO in 1982. However, there have been many changes since the issue of these regulations and the handbook needs updating.

D. Training

An effective accident prevention and occupational health hazard control programme is based on proper job performance. When people are trained to do their jobs properly, they will do them safely too. This in turn means that supervisors must know how to train an employee in the safe and proper way of doing a job as well as know how to supervise. It also requires that safety personnel should be familiar with sound training techniques. Training is one way to influence human behaviour. Safe performance is encouraged by developing safe work systems, by teaching the procedures effectively and by insisting that they are followed. Safe performance is also encouraged by teaching people the facts about accident causes and preventive measures. A good training programme will not only train employees but will also help change other attitudes which will complement the effect of training.

A training programme is needed for (a) new employees, (b) when new equipment or processes are introduced, (c) procedures have been revised or updated, (d) when new information must be made available, and (e) when employees performance need to be improved. In the factories in Jamahiriya training programmes are needed to fulfil all the five requirements given above.

Progress

It has been stressed to each industry of SHI to arrange training programmes at the factory level,and in fact some of the factories have already started working on the training programmes. A two-week training course for the loss control personnel from different factories was arranged by the Loss Control Department of SHI at Benghazi Cement Plant Training Centre in July 1985. The technical aspects (lectures, etc.) of this course were attended to by the Expert and all the safety and fire-fighting lectures were delivered by the Expert with the Arabic translation by an interpreter. The security aspects in the industry were taken care of by the Loss Control Manager of the Benghazi Pipe Factory. A synopsis of the lectures was prepared and handouts duly translated into Arabic were distributed to all the trainees. This training programme was highly appreciated by the participants.

Based on the success of this first training course SHI decided to arrange such training programmes on a regular basis. Planning for the fire and safety courses to be conducted during the year 1986 has since been made and proposals in this regard are attached as Annex I and II to this report. It is hoped that the training programmes will continue to be implemented. Some time back SHI decided to expand its loss control section and maintain a library of safety and fire films, video tapes and slides and also collect literature for reference. Necessary details as worked out by the Expert have been given to SHI for further action.

E. Management Safety Committees

In order to focus the attention of the top management towards the safety problems existing in the factory, it is necessary that each factory should establish a management safety committee with the head of the organisation as the chairman of this committee. The importance of such committees was stressed in the various technical reports submitted to the SHI as well as to all the factories for organising management safety committees based on the recommendations of the Expert. The details about the constitution of such committees are contained in the safety regulations handbook mentioned earlier.

Progress

Almost 80% of the factories have formed the management safety committees but many of these committees are not very active. Efforts are being made to activate all such committees. In fact, many of the factory managements have now realised that regular meetings of such committees are essential to keep track of safety programmes. The loss control departments also remain very active in conducting such activities for which they are required to give details to the management safety committee. These committees generally meet one a month. The safety policies of the company and other main programmes are required to be approved by this committee.

F. Accident Reporting, Investigation and Analysis

Records of accidents and injuries are essential for efficient and successful safety programmes, just as records of production costs, profit and loss are essential for efficient and successful business operations. Records supply the necessary information for transforming haphazard, costly, ineffective safety measures into a planned safety programme that controls both conditions and acts which contribute to accidents. A successful accident prevention programme requires the following activities:

- A study of all working areas to detect and eliminate or control physical or environmental hazards which contribute to accidents;
- A study of all operating methods and practices;
- Education, instruction, training and discipline to minimise human factors which contribute to accidents;
- A thorough investigation of at least those incidences which result in disabling injury. Minor accidents should be regarded as a warning and therefore should not be ignored.

Accident investigation and analysis are the means used to prevent accidents and as such the investigation or analysis must give information that will lead to corrective action for the prevention of accidents. The more complete this information, the easier it will be for the Loss Control Department in the factory to design effective safety programmes. For example, knowing that 75% of accidents are due to unsafe acts of persons is not as useful as giving the percentage of accidents for each category of unsafe act (percentage due to non-usage of safety equipment, percentage due to using defective equipment, percentage due to operating without authority, etc.).

A good accident recording, as explained above, is essential for accident investigation. For the purpose of accident prevention, investigations must be for fact finding, not fault finding, otherwise they may do more harm than good. Investigations must be concerned with facts.

Progress

The importance of proper investigation was very much stressed during field visits of various factories. Discussions in this regard were held with the loss control managers and chairman of each factory. Procedures were made for accident reporting/accident investigation/accident analysis nad the forms were designed for use in each factory. The system was approved by the SHI and all the factories were advised to implement it. However, still many of the factories have yet to introduce proper systems. It is hoped that this matter will be taken up by the Libyan authorities in the workshops which are planned for 1986. These programmes were well explained before the Expert left. Details about the accident investigation and accident analysis as given to all the factories (duly translated into Arabic) may be seen in Annex III.

G. Safety Operations and Maintenance

An efficient and sound maintenance programme is essential in any industrial plant. Such a programme will help keep the plant in good condition and will affect the safety standards of the plant. Maintenance includes proper long-term care of the building as well as of the equipment. It has to include routine care to maintain service and appearance as well as preventive maintenance to retain its serviceability. These items of preventive maintenance and safety operations have an important bearing on safety programmes because the safety of employees is closely tied with the conditions of building and equipment where an individual works and also when the employees follow safety procedures in operation and maintenance the company will be able to avoid accidents. This requires much follow-up work by safety professionals.

Progress

This is one of the important aspects for enforcing safety and was stressed by the Expert during field visits. Maintenance activities are still not adequate because the attitude of plant personnel towards preventive maintenance is lacking. Efforts are, therefore, required on the part of the Heavy Industry Safety Committee to impress upon all the factory managements the need for preventive maintenance. This is essential for the smooth running of the plants and also for ensuring high productivity with fewer breakdowns and fewer accidents. This has more bearing in this country which is dependent on the outside world even for ordinary spare parts. The Expert established procedures and systems for checking safety valves, lifting tackles, pressure vessels, etc. but these have not so far been enforced in all the factories. It is hoped that SHI will take up this matter more vigorously with all the factories in the near future.

H. Safety Survey

As discussed in Item B above, safety inspections have two basic objectives:

- Maintaining safe work environment and controlling the unsafe actions of people, and
- Maintaining operational profitability.

Safety inspections, one of the principal means of locating causes, help determine what safeguarding is necessary for protection against hazards before accidents and personal injuries occur. These inspections are, therefore, very important and are vital in the accident control programmes. Inspections help to sell the safety programmes to the employees. Each time an inspection committee visits the work area, managements' interest in safety is aroused.

Apart from the safety inspection by outside safety professionals, it is part of the duty of the Loss Control Management to conduct such safety surveys.

Progress

Thorough safety surveys were carried out of all the plants and detailed reports submitted to the factories. Checklists were prepared as to what is to be inspected by the safety professionals of each factory and the Loss Control Department of each factory has been requested to make this inspection a regular feature.

During 1984, it was observed during discussions of the Expert with the senior officers at the SHI that there was a reluctance on the part of the executives to go through the Expert's detailed inspection reports because these were quite exhaustive and there may have been a language problem as well. So in 1985 a checklist was prepared and used for reporting purposes during the field visits. At a glance, this checklist can give a good idea of the general safety situation of the plant. The checklist is filled out by the Loss Control Department of each factory, but the initially, the Expert had to fill it out for all the plants visited during 1985. There is much to be done in safety in the coming years. Only the spade-work has been done and general safety consciousness has been created. The checklist format for 1986 has been prepared and it may be utilised. This format is attached as Annex IV.

I. Personal Protective Equipment

The cardinal principle in controlling an unsafe condition is to remove the hazard. This could be achieved through better design, change in process or guarding by mechanical means. In spite of best design and operating conditions, there are certain situations during the running of a plant which may require the regular use of personal protective equipment. Some examples are handling chemicals, welding, grinding operations, etc. Personal protective equipment also becomes inevitable against leakage or emergency breakdown of process equipment. Many injuries are known to have been avoided by the use of protective equipment.

Progress

This aspect was stressed by the Expert during his field visits by personal contacts with persons at all levels. The Expert showed safety films in all the plants about the necessity of usage of proper type of safety equipment. Though there is a fair amount of safety equipment in the factories of reasonably good quality, workers still need motivation to use it. This work has to be carried out in the forthcoming years and may be disciplinary action should be resorted to. Regarding standardisation of fire and safety equipment, it has been decided that instead of having high inventory of fire and safety equipment of different makes and of different standards, it will be necessary for Jamahiriya to make its own standards for all the fire and safety equipment. This requires a detailed study of fire and safety equipment available in the factories vis-à-vis international fire and safety standards. Based on this field work/studies the Jamahiriya standards can be prepared. To finalise the fire and safety standards, a Committee has been formed by the Heavy Industry Safety Committee and the Expert was closely associated with this Committee. The Committee has already started the work and has to report on progress to the Heavy Industry Safety Committee. This is an important assignment for which international expert services are definitely required.

J. Safety Propagation

There is still a general need to heighten the awareness in loss control activities in different industries. A well-planned programme is needed which can create and maintain more interest in safety. Such programmes can:

- Help develop safety work habits and safety attitudes;
- Focus attention on specific causes of accidents;
- Supplement training but it cannot replace training programmes;
- Give employees a chance to participate in accident prevention activities, eg. suggesting safety improvements in job procedures;
- Provide a channel of communication between workers and management because accident prevention is certainly a matter of common interest for both;
- Improve employee-public relations because it is evidence of managements' sincerity with regard to accident prevention.

Progress

Such programmes were stressed in individual reports made on each factory but implementation has not been reached to the extent expected. It is pertinent to mention at this point that unless loss control managers are motivated on this subject, better results cannot be achieved. In order to achieve this objective, the Expert has suggested extensive training programmes for 1986, see Annexes I and II. It is hoped the if the SHI implements these programmes, another milestone will have been reached in safety promotion activities.

K. Safety Rules and Regulations

It is essential that Jamahiriya must have its own written standards and rules on safety. Its legislation as far as industrial safety is concerned is not adequate. Enforcement of safety rules is mostly a matter of education, but before that, it essential to develop and promulgate occupational safety and health standards and issue regulations.

Progress

As the national legislation on safety does not meet the requirements the Ministry of Industries issued the Safety Regulations Handbook prepared by the two UNIDO Experts in 1982. The Handbook, although filling an important gap, requires updating and would not constitute a substitute for a national legislation to cover the subject for all industries in the country.

L. Fire Protection

Fire protection includes all measures relating to safe-guarding of human life and preservation of property, namely, fire prevention, fire detection and extinguishing of fires.

It is principally amatter of physical arrangements such as sprinkler systems, water supplies and fire-extinguishers, consisting of:

- Fixed system: hydrants, fire-pumps, water-monitors, hose-reels, foam chambers for tanks, etc.;
- Portable system: various types and sizes of fire extinguishers, nozzles, hoses, etc.;
- Mobile system: foam-tender, water-tenders, equipment-truck, trailer-pumps and portable foam and water monitors, etc.

A good source of sufficient quantity of water supply is a basic necessity for fire protection. Fire protection is usually understood to include the fire prevention procedures. Both aim to protect employees, property and continuity of operations. An effective loss control programme must include these objectives:

- Prevent loss of life and personal injury;
- Protect property;
- Provide uninterrupted operations;
- Prevent inception of fire.

Progress

As far as equipment and facilities are concerned, most of the factories do have an adequate arrangement, but the main drawback is the lack of trained personnel, dedication of personnel and an inadequate mantenance system/procedures. Without good organisation, even the best equipment may not function in the event of emergency and moreso when these are not properly maintained. This matter was stressed at various levels and efforts were made during visits to factories to formulate systems for the maintenance of fire-fighting equipment, training of fire personnel and other staff, daily routine work at the fire station, etc. This is just the beginning and efforts are needed to strengthen the fire station programmes in almost all the factories. It needs follow-up action from SHI and involvement of senior executives of each factory in the loss control programmes, but unfortunately there is little progress in these activities.

M. Emergency Disaster Control Plan

Advance planning and proper training of each and every employee is necessary to prevent any misunderstanding and disorder during an emergency. Emergencies can arise at any time and from many causes, but the potential harm is the same - people and property. Planning for emergencies, as with the managements' other functions, must be done in advance. Only in this way can the potential harm to people and property be minimised. A comprehensive management plan is intended to take care of all expected emergency situations. This includes both the most spectacular and common accident situations.

Progress

Guildelines have been given to each factory to prepare its own disaster control plan and to ensure its practicability. Very little has so far been done. One the plans are prepared, a schedule will have to be prepared for exercises. In order to avoid confusion during actual emergency, every person should be familiar with his/her job in the event of emergency. The Expert impressed upon each factory to submit to the SHI their emergency plant on the basis of which mock exercises would be organised.

IV. ACTIVITIES AT THE SECRETARIAT LEVEL (SHI)

A. Technical Reports

At the end of the visit of each factory, a detailed report is prepared and then discussed with the Director for Loss Control/Director General of SHI. These reports are then translated into Arabic, and then forwarded to the Chief of the concerned factory for comments and further follow-up action. Implementation of recommendations is, however, very slow and it definitely requires a very dedicated effort from the Loss Control Department at the SHI. The officials at the SHI must be fully involved in the programmes of each factory and must be concerned with each factory. Mere policing by the SHI staff is generally not effective. The Expert has given many suggestions in this regard, but the SHI is unable to follow-up for lack of qualified staff.

B. Safety Newsletter

A safety newsletter is prepared at the SHI level each month and is translated into Arabic and then sent to each factory. Initial work till mid-1985 was done by the Expert. This newsletter has been appreciated by all the factories and these was a general request from each that it should be made a regular feature. The SHI has since started regular issuing of the newsletter in Arabic. It has, however, been suggested to the SHI that in order to make the newsletter more interesting and informative to the reader, items such as safety performance of each factory and brief details of incidences could be introduced.

C. Meeting of Safety Managers

The Central Safety Committee of Heavy Industry has been formed. The Loss Control Manager of each factory is a member of this Committee with the Deputy Minister of SHI as the Chairman. Earlier meetings were held once a month, but now the meetings are held every two months. The purpose of this Committee is to discuss and decide policy matters concerning loss control activities in the factories under the SHI and also to review the loss control activities of each factory.

In a nutshell, the activities of this Committee are to:

- Understand safety problems of each factory;
- Review the safety performance of each factory;
- Appraise all the industries of developments in the field of industrial safety;
- Formulate safety regulations applicable to factories under the SHI;
- Review loss control organisation of each factory;
- Review the monthly safety report of each factory;
- Introduce safety systems and review any difficulties encountered by the Loss Control Department in its day to day work;
- Review the safety inspection report of the Industrial Safety Expert and his suggestions for improving the standard of safety.
- Make a general round of the factory where the meeting is held. Initially, the Expert took part in these meetings, but subsequently, it was attended by only Libyan nationals. This Committee meeting has roused much interest amongst different factories. A good beginning has been made and the functioning of this Committee must be kept up in the coming years.

D. Safety Manuals

All the factories have been advised to prepare their own safety manuals. Assistance in preparing the safety manuals was given by the Expert from time to time.

E. Safety Statistics

Compilation of safety statistics of all factories under the SHI is essential. These statistics are prepared in the SHI in Arabic and necessary assistance in this regard was given by the Expert. However, the Expert has suggested some new systems for preparing accident statistics to obtain a more realistic picture so that preventive measures can be planned accordingly. These are yet to be introduced.

V. Present Safety Situation in Factories under the SHI

A short resumé of the present safety situation in various factories under the SHI is detailed below. There is an overall improvement in some of the factories and general awareness about the loss control is increasing at various levels of management, with the new activities and programmes being introduced by the SHI from time to time. Much remains to be done to inculcate safety consciousness and to propagate safety, as it is a never-ending job.

It may be stated here that the general safety situation in the factories taken over by the SHI since 1985, requires special attention. Some of these factories do not meet any safety standards at all and are not fulfilling many of the requirements of the Jamahiriya Industrial Law of 1976. It, therefore, calls for immediate action from the top management as otherwise such factories may have to be closed down for safety reasons as factories cannot be the by-product of handicapped and crippled persons. The industrialisation is done for the general welfare of the whole society and its very purpose is defeated if there are human sufferings and miseries due to failure to introduce total loss control programmes.

A. Chemical Complex

The main chemical industry with the SHI is at Abu Kammash. The majority of accidents are of the kind common to all industries - fall of persons, contact with moving objects, hand-tools, electricity, fire and explosion, eye injuries by chemicals, gassing accidents, which can be very serious and these require special attention. Though the number of casualties and fatalities in the chemical industry may not be alarming, accidents in this industry and transport of products by road may pose a risk to the public due to physical and toxicological consequences - spillages, fires and explosions.

The above hazards are being faced at Abu Kammash due to the nature of materials handled there. Therefore, constant alertness is required with regard to possible short and longterm toxicological effects, and in order to keep exposures below hazardous levels the handling of various chemicals

is a matter of concern for the management as well as Loss Control Department.

It is observed that safety systems have been adopted to combat the chemical hazards, but the Loss Control Department should ensure that there is no slackness on the part of supervisors to introduce these systems. It is understood that three safety expatriates left this plant in the past one year. It has to be ensured that trained personnel are placed in these jobs so that enforcement of safety rules is not affected. There is a definite need to have more trained personnel in this field of activity to ensure implementation of various safety systems. Regular plant inspection is required by the safety personnel, detailed accident investigations are needed for each accident and also safety meetings at plant and management levels should be regularly conducted. Likewise, more emphasis should be given to train operators in fire and safety through regular programmes arranged with the co-ordination of the training department. Fire station personnel must ensure thorough inspection of their equipment placed at various location, and records of such inspections must be maintained.

B. Steel and Engineering Industries

This group includes factories in Tajurra Industrial Belt, steel plants and a pipe factory at Benghazi. The hazards associated with this group are:

- Material handling hazard;
- Environmental stress (dust, fumes, gases, heat and noise);
- Chemical hazards.

Incorporating safety in the design is one aspect, but still the more important aspect is how to inculcate safety consciousness, how to ensure that built-in safety systems are maintained, how to ensure proper introduction of safety systems, etc. The present safety situation in each of the factories under this group is given below. This a very brief report of each factory

1. Tripoli Steel Plant

This plant has a Loss Control Department but it needs re-organisation. There is a shortage of trained personnel. The management has become safety conscious but the responsibility of line personnel is required to be determined. More safety inspection and follow-up of pending jobs is required to be made. Fire and safety training programmes are required to be arranged for all the employees. It is disappointing to note that none of the safety systems as given by the SHI have so far been introduced in this plant. A Central Safety Committee must be formed and it should meet regularly once a month. This can go a long way in improving the overall safety standard of this plant.

2. Metal Works Factory at Tajurra (taken over by SHI since 1985)

It has three factories - one at Tajurra, the other two at Tripoli (one in the Phalla area and the other at the Tripoli airport road). All these factories have been inspected by the expert recently. There are no safety activities in any of these factories. There is one officer responsible for co-ordinating activities and he is mostly concerned with the placement of fire-extinguishers and some other security duties. Even the fire-extinguisher coverage in respect of factories at the airport road and at Phalla was not found to be proper. The condition of the factory at the airport road is alarming. This factory does not even have a proper approach road. All these points were taken up with the chairman of the Committee of this complex. The chairman promised to organise a Loss Control Department and will take such other measures to improve the safety situation of this complex.

The SHI may have to render further assistance in formulating various programmes for the propagation of safety. The first step of course will be to organise the Loss Control Department. In a nutschell, the safety standard of the airport factory is inadequate whereas the other factories are slightly better. Management must, therefore, act without any further loss of time.

3. Battery Facotry at Tajurra (taken over by SHI since 1985)

It is evident that in this factory nothing exists as far as loss control activities are concerned. Hazards lurk in very corner. there are very few activities for the health, safety and welfare of employees The incidence of overexposure of lead to employees is very high and ultimately this factory may have a lot of lead poisoning cases which modern society cannot afford. Safety and welfare of employees must be the first objective of any modern management. It is really very surprising that no serious though has so far been given to this important aspect of safety which plays a very important role in this factory in particular. The risk of lead exposure to persons working in this factory is a serious hazard. The management has a moral and legal obligation to the workers and staff who are the main tools in running this plant. During the Expert's inspection of the first aid post of this factory, he saw a copy of the report of INAS doctors who visited this factory in 1984. It appears that no action was taken to implement the recommendations given in this report. It can only be said at this stage that there should be no further delay in implementing safety activities. A Central Safety Committee should be formed without any further delay. This Committee must select a safety expert and a complete study of the working conditions should be made and a report prepared. After this report is scrutinised at the management level, the management should introduce various safety programmes to improve the working conditions and should establish proper loss control organisation for monitoring as well as implementing a safety programme. This factory is violating the requirements of Article (1), Article (2), Article (3), Article (4), Article (5), Article (6), Article (7), Article (8), Article (10) and Article (11) of the Jamahiriya Industrial Security Law issued in November 1976. In fact, this factory has violated all the clauses pertaining to health, welfare and safety of workmen which is a very serious offence under the Law. It is, therefore, earnestly suggested that the SHI kindly look into it and initiate such actions as are necessary for the safety and welfare of the workmen.

4. Tyre Factory at Tajurra (taken over by SHI since 1985)

The Expert paid a very short visit to this facto . It can be said that the general housekeeping of the factory is quite up to standard and the fire-fighting facilities are reasonably good. In the matter of safety, this factory too has drawbacks. It has no proper loss control set-up. It has not introduced any safety system so far. There is a complete absence of safety activities. There is no follow-up action programme for the unsafe conditions existing in the plant, nor is there any accident reporting system. The present incumbant is basically a fire-oriented officer and he does not have any person who can help him with conducting safety programmes. The management appears to be interested in loss control activities, but in the absence of any trained and experienced staff in the safety department of the company nothing can be implemented. It is, therefore, suggested to formulate the safety policy, work out the safety organisation, arrange for local training of the persons of the Loss Control Department and then start the safety activities in a phased manner.

There is an urgent need to establish the Loss Control Department to fulfil the requirements of the law which stipulates as per Article (10) '..... which the number of its workers is more than two hundred must assign a specialist responsible for the workers safety and execution of this Law and regulations and procedures issued therefor'.

5. Tajurra Truck Factory

The general safety situation in this factory is below the normal international safety standards. It is the Expert's presumption that very little thought has been given in the recent past by the management as well as by the plant supervisors towards safety. No efforts are being made by the Loss Control Department for improving the deteriorating safety standards. There is no enforcement of general safety regulations and persons do not care to use safety equipment even those available, which is a contravention of the Industrial Law of Jamahiriya Article (6) and Article (7).

safety and fire-fighting programmes the programmes suggested by the SHI have still not yet been introduced. The management of this company is now interested for the SHI to provide on-the-job training for the safety personnel and help the factory in organising the Loss Control Department through actual participation. The chairman is completely convinced about the importance of loss control programmes and informed the Expert during discussions that he will take up this matter with the SHI in a meeting in the near future.

A detailed report in this regard has since been given to the SHI for their consideration and final decision.

8. Missurata Steel Plant

The plants and facilities of this huge complex are likely to be commissioned in the near future. It is desirable from the safety point of view to carry out all the pre-commissioning safety activities before the plants are put on stream. The Expert has already given a checklist of items which need checking by the Loss Control Department. This checklist only gives the items which need to be thoroughly checked before commissioning. This is a large task and the Loss Control Department must be equipped with all the systems and procedures before the plants are started. The main task, therefore, ahead of the management of EBISCO is to have proper loss control organisation so that all the systems are well lined-up in time. Safety and productivity are both sides of the same coin and safety cannot be kept in isolation. Management should, therefore, simultaneously do the planning for safety.

The Loss Control Department has not yet been fully organised. A safety system for this huge complex has not yet been established. A separate note was given to the management for the organisation of a Loss Control Department but no decision in this regard has been taken yet by the management.

A fire station building has been completed, however a full-fledged team has not been formed to organise various activities. The fire and safety

manual has yet to be prepared. The management may be interested in having this manual prepared by an international consultant. Whatever the case may be, involvement of the Loss Control Manager is essential for preparing such a manual. No fire and safety training of plant personnel is possible without a full-fledged Loss Control Department. Fifty percent of the trained stall should have been recruited already. Setting up of the Department takes a lot of time and before the plants are commissioned, operating personnel should be very clear about the safety systems. It is, therefore, suggested that recruitment of more trained persons in the Loss Control Department should be achieved with well-defined duties. The staff should make a regular survey of plant areas to inculcate safety consciousness and the safety proformas/safety systems must be planned without any further loss of time.

9. Benghazi Pipe Factory

There is very little improvement in this factory towards loss control activities. The existing systems for fire-fighting are still to be commissioned. The new incumbant who took over the functions of loss control management in 1984 has made a complete survey of the plant and has prepared a proposal for implementation, but things have yet to take final shape. The management has yet to give clearance to his various proposals. The management of this factory is more production-oriented and so the other activities at times are overlooked. Safety systems have yet to be established and regular safety surveys to be started to improve working conditions. There is a definite need for safety indoctrination for all the employees. The supervisors should be made answerable for their failure to improve safety working conditions. The management should declare a safety policy and it should be made known to all supervisors that safety is also one of their main responsibilities.

C. Cement and Building Material Industries

This group includes factories spread all over Libya, from Sukal Khamis to Dherna. This is the main industry and in its nucleus there are six cement-producing plants, 3 brick factories and 1 paper- a factory.

In the quarries from which the clay, limestone nad gypsum for the production of cement are extracted, workers are dxposed to hazards of climatic conditions, dust produced during drilling and crushing, explosions and falls of rock and earth. Road transport accidents occur during haulage to cement works.

During cement processing, the main hazard is dust. Dust levels ranging from 26 to 114 mg/M^3 were in the past measured in quarries and cement works (this is an overall figure). Also, the air pollution in the neighbourhood of cement plants is marked, moreso near the older plants where the electrostatic filters are not functioning satisfactorily. The occupational disease encountered in the cement plants is silicosis which is due to the presence of free silica in the dust. Other hazards encountered include high ambient temperatures, especially near furnaces, radiant heat and high noise level (can be 120 dB) in the vicinity of the ball mills. Pathological conditions encountered in the cement industry include diseases of the respiratory system, digestive disorders, skin diseases, rheumatic and nervous conditions, hearing and visual disorders and chronic bronchitis. In cement plants, the main type of accident injuries are bruises, cuts and abrasions which occur due to manual work.

The situation at present in the plants under this category is detailed below:

1. Sukal Khamis Cement Plant

The management in this plant is now keen to do some spade-work in this field of activities (loss control programmes). The effectiveness of safety personnel needs to be improved. The Loss Control Department has to be reorganised. There are no proper accident reporting, accident investigation and accident analysis systems. There is a definite need to adopt all such systems as have been given in the safety inspection of the Expert. The present housekeeping standards are poor and there is a definite need to have a regular plant inspection by plant loss control personnel. There is a shortage of trained fire and safety personnel and so it is essential that loss control personnel should be trained as a

first step for the better working of this Department and after proper training, these persons should be made answerable for slackness, if any, in accident prevention programmes. Safety awareness is low in this plant, the management must arrange more in-plant safety and fire-fighting training with the help of audio-visual aids and practical demonstration. Safety propagation activities should be undertaken.

2. Brick Manufacturing Company at Swani and Zanzoor (taken over by SHI since 1985)

These two factories have very recently been taken over by the SHI. there is no safety organisation and safety activities are almost nil. Standard of housekeeping is very low, especially of Zanzoor factory. All types of loss control activities are to be organised from scratch. No system exists for accident reporting. Management of both these factories have to be motivated for safety as "Safety" stems from the top. Zanzoor factory in particular is in vulnerable and unless some action is taken to improve existing working conditions some serious accident could occur. If nothing serious has occured to far, it is a matter of luck only. By all standards, the factory at Zanzoor does not fulfil the requirements of the Industrial Safety Law of 1976.

The SHI may have to arrange for a very thorough inspection of these two plants and details should be worked out for establishing a Loss Control Department which should be made responsible for introducing all the required safety programmes. Training of loss control personnel should be the first step for starting any safety programme.

3. Khomes and Libda Cement Plants

There is a loss control organisation for both Khomes and Libda cement plants. According to the Loss Control Manager, not enough support is given by the top executives for implementing fully the safety programmes in both of these plants. There is a need to have a regular safety survey of both these plants by the loss control personnel to develop confidence of plant personnel. The loss control personnel must be fully involved in the day-

to-day safety programmes and should render necessary assistance to plant personnel for improving safety standards. This aspect is very much lacking. There is a fire station at each of these plants, but there are no specific schedules for routine activities at the fire stations. The personnel of the fire department do not plan their regular schedule of maintenance and hence their fire-fighting and other equipment remain unattended. In a recent fire incident at Libda cement plant, the fire-extinguishers were found empty. Follow-up action on the inspection reports submitted by the Expert from time to time is very much lacking. Likewise, the plant personnel are not interested in safety. The present safety situation though better than in the past is still not acceptable. Safety indoctrination programmes are needed. During the Expert's discussions with the top management, the impression was given that they were genuinely interested in safety programmes, but in practice things are moving very slowly. The top management must, therefore, give priority to the safety aspects of these factories to bring them nearer to the acceptable safety standards. The necessary assistance in this regards must be given by the SHI. It is further suggested that at Libda cement plant, the Indian operating company must give more attention to safety. Their objectives should not be only productivity, but production with safety. They must be made responsible for maintaining safe working conditions and should definitely be made answerable for maintaining good housekeeping and accountable for accidents.

4. Zliten Cement Plant

The safety standards of this company were very good at the start, but these have now deteriorated. The Korean company which is responsible for the operation of this plant has also relaxed to a great extent its safety activities. There is a lack of interest from the loss control personnel of this factory towards their jobs. To begin with, the personnel need training. The entire system has to be put in gear so that this plant, which is doing otherwise well, maintains good safety standards as well.

The top executive is interested in safety and it is hoped that implementation of the recommendations on the safety programmes which have been suggested by the Expert in his last safety report will commence.

There is a general slackness towards safety and other loss control activities and the management has to take more interest and give more incentive to the persons for implementing safety programmes. The management must take up seriously with the operating contractors the ensurance of safety and follow all the safety systems. The firefighting section has become inactive due to inexperience staff. Special emphasis is needed to activate this section and they must have a daily schedule of work, including the maintenance of their equipment so that in the event of emergency, there is no panic and all systems work satisfactorily.

5. Benghazi Cement Plant

The present safety situation of this factory is not very encouraging. Much work needs to be done to streamline safety programmes of this company. The attitude of the whole management has, however, undergone a radical change since the last visit of the Expert in July 1985. There now appears to be a positive reaction towards the Expert's proposals for introducing certain safety systems. The new incumbant who has taken charge of the fire station appears to be very much dedicated to the job assigned to him and is making an effort to put thing in order. Though it is a very challenging task to change the attitude of persons at various levels, it is hoped that if the activities can be sustained and there is a positive contribution and backing from the top management there is bound to be an improvement in due course. The management of the Libyan cement plant needs positive guidance and support from the SHI as they lack expertise in this field of activity.

6. Dherna Cement Plant

This plant has a very good in-built fire and safety system, but lately there appears to be some slacking in the total loss control programmes. The standard of housekeeping has dropped. The management though is interested in safety, but is facing a shortage of trained loss control personnel which is one of the factors contributing to the present conditions. Safety systems

procedures have yet to be introduced. It is hoped that conditions will improve if efforts by the loss control personnel are sustained and regular plant surveys are conducted with follow-up action taken on the points detected during field inspections. It is, therefore, necessary for the management and also for the Loss Control Department to review the Expert's previous reports for implementation of various suggestions made therein.

VI. RECOMMENDATIONS

During the Expert's visits to various industries it was observed that though the industrialisation of Jamahiriya is expanding on a big scale, the standard of safety is not keeping pace. There is still much to be done for improving the standards of safety in the industry. New technology brings in its wake new hazards and when one accepts this new technology one has to face new hazards. Most of these hazards can be eliminated if safety regulations are applied in the day-to-day work. In many of the factories, the workforce does not have an adequate background in industrial safety. Moreover, there is a lack of trained fire and safety personnel who can take up the challenging task of safety indoctrination. Safety has to be made part and parcel of the day-to-day activities as one unsafe step by an individual can bring about destruction and catastophes with the loss of human lives. It has been observed that even in industries with all the good safety systems that there can be accidents. There have been many incidences in the recent past which testify to this statement. In Jamahiriya, the responsibility towards safety is large because the application of safety programmes is lagging. Safety is generally given little importance in many of the factories. Though the SHI may be fully aware of the importance of industrial safety, that is to say, loss control management, the task is formidable. The mere existance of a safety unit in the SHI is not enough. It has to be given proper recognition and should be properly manned by trained and experienced persons who are fully devoted to the cause of risk management. The activities of this unit need to be expanded with trained manpower and more resources so that it can make a more effective contribution in promoting safety. One of the main responsibilities of the SHI at present is to reorganise this Loss Control Unit. It must cover all the facets

of loss control management and must have a substantial say in the overall running of factories under its jurisdiction. The following recommendations are made for the better functioning of this unit at the SHI. It must include the various facilities stated below:

A. Training

It is strongly felt that trained nationals should occupy the posts and be responsible for safety and fire-fighting. At present there is a shortage of such persons and more reliance has to be placed on expatriates Since the stay of expatriates is not permanent there could arise a vacuum whenever these expatriates leave the country. To overcome this problem the following is suggested:

- To induce local persons to accept fire and safety as their career. This profession is generally not attractive to local persons for varying reasons. The SHI should give special incentives to persons accepting this challenging profession:
- Proper training for loss control personnel is essential. Programmes suggested in Annexes I and II should be implemented in totality to avoid greater problems in the near future.

B. Fire - Training Institute

Industrialisation of Jamahiriya has occured on a large scale. The best available equipment in fire-fighting has been installed in many industries. It is essential that this equipment is kept in good condition by proper maintenance. Trained persons are needed who can handle this sophisticated equipment efficiently and also maintain it in a proper way. There is a definite need to have a fire services college which can organise such fire-fighting training at different levels in Arabic. Such a training institute is very necessary for Jamahiriya. Though it may not be within the scope of the SHI, it is strongly recommended that the SHI should take up this issue very strongly with the appropriate authorities in the Government in the near future.

C. Safety Centre

In order that risk management activities and its importance is instilled in the minds of nationals, it is necessary to set up a safety centre at the SHI level wherein working models be exhibited on safety, accident analysis of all the factories under SHI and various other exhibits such as good and bad equipment, accidents and their causes and safety equipment, etc. This centre can have sections dealing with home safety, road safety and industrial safety. It should make arrangements for screening safety films, etc. Such a centre will definitely be essential for improving the safety standards in this country where general awareness needs improvement. It may be stated here that safety cannot be enforced with an iron hand, but once the individual is convinced, he will follow the safety procedures. No doubt, it is a big task but it has to be taken up by the SHI for better propagation of safety. This was personally discussed by the Expert and emphasis was placed on organising such a safety centre in the near future. The proposed central safety centre should be attached to the SHI and can be located either at Tripoli or at Missurata. Missurata is preferable because the large steel complex is located there and also it is a suitable place for all other industries. It should have the following facilities:

1. Auditorium

One auditorium with a seating capacity of 200 persons which can be used for arranging safety lectures, safety seminars, safety films and other programmes for all the industries under the SHI.

2. Classrooms

A few classrooms, each to accommodate 30 - 40 students with all the training gadgets installed in the rooms.

3. Exhibition Hall

In this hall various charts and equipment could be displayed. It should also have home safety and traffic safety wings. Full details to be worked out.

4. Pollution Control Laboratory

A small pollution control laboratory to analyse samples. There should be arrangements for carrying out field sampling and also for conducting survey tests in the factories.

5. Occupational Health Wing

To critically analyse all occupational hazard problems in various industries in Jamahiriya and give guidance to all factories in Jamahiriya.

6. Library

A central library pertaining to all aspects of loss control management and the latest reference books and codes of practices should be available for reference purposes. Such information can be very useful for all the factories in Jamahiriya. Important extracts from various technical journals to which the library will subscribe will be circulated to all the industries for their reference in the form of a bulletin.

7. Films on Loss Control and Other Propagation Materials

This centre should have a full collection of safety propagation materials, such as films, video cassettes, safety signs, safety posters, slides, etc. which can be given to each factory for their use.

8. Safety Vans

It should have 2 - 3 safety vans with proper equipment installed therein which can be used for site training programmes and field surveys.

9. Fire Ground

In order to give practical training to the staff concerned with fire-fighting techniques, a fire ground should be reserved with all the built-in facilities for actual practical training with live fire demonstrations. Such a fire training ground will be very useful in imparting fire training and will have a very good impact on the trainees because they will be exposed

to actual conditions which they will be facing in the event of fire.

D. Operation Safety 1986

In order to emphasise the importance of safety in factories under the SHI, the Expert proposed to declare the year 1986 as 'Operation Safety - 1986' and all the factories should be asked to place special emphasis on safety in this year so that safety is instilled in the minds of all the factory personnel. The Loss Control Department at the SHI has to be very active if such programmes are introduced in 1986. In the opinion of the Expert, this is the time when programmes of this nature could contribute to the creation of safety consciousness.

ANNEX I

SPECIFIC TRAINING PROGRAMMES

Sufficient safety survey work has been carried out in all the factories and the Expert's inspection reports are available with each factory. It may be stated here that building-up of safety consciousness is a very slow process, even in the developed and industrially advanced countries. In Jamahiriya, where industrialisation has grown rapidly and industrial safety legislation is still in the making, one should not be discouraged with the slow progress but must continue more vigorously with the programmes in the years ahead, as for example with the implemention of the specific training programmes during 1986.

Accident Reporting

It has been observed that factual reports of accidents are not prepared by all the factories. There are cases where so-called minor accidents are not reported. Moreover, there is no proper system for accident investigation/accident analysis though in this regard an Arabic version of procedure for accident investigation and accident analysis were circulated to all the factories in 1984. It has been observed that loss control managers of all the factories are not familiar with the complete full facts; it is essential to impart rraining to all the loss control managers and their deputies. It is, therefore, suggested that a one-day workshop be organised on the theory of accidents for the benefit of the loss control managers. This workshop can be arranged at the following places and in order to ensure that understanding of the subject is perfect and thorough, attendance should not exceed 10 persons in each session. Details of venue are suggested below:

S. No.	Venue	Attended by
1.	Training Centre Tajurra Truck Factory	Tajurra Truck Factory Tajurra Trailer Factory Tajurra Tractor Factory Construction & Metal Works, Tajurra Tyre Factory at Tajurra Battery Factory at Tajurra
2.	Training Centre Abu Kammash Chemical Complex	Abu Kammash Complex Tripoli Steel Plant Sukal Khamis Cement Plant Brick Factory at Swani Brick Factory at Zanzoor
3.	Training Centre Missurata Steel plant	Missurata Steel Plant Missurata Scrap Plant Zliten Cement Plant Libda Cement Plant Khomes Cement Plant
4.	Cement Plant Training Centre Benghazi	Training Centre Benghazi Cement Plant Benghazi Pipe Factory Building & Metal Works Benghazi Workshop at Benghazi Dherna Cement Palnt

The above programme will cover all the factories and can be planned in May 1986. It is hoped that with this training, accident reports will be improved. This activity should, therefore, be given first priority.

2. Introduction of Safety Systems and Procedures

The SHI has already advised all the factories to follow the safety systems given by them but not many factories are following such systems properly. Perhaps some workers in the factories are not aware of these systems and it is, therefore, necessary to introduce it to them. There are many systems, the most important being the Safety Permit System. Negligence of safety rules can be very costly and it has been observed that failure to follow the safety systems can lead to very serious accidents.

It is strongly felt that one workshop on this very important subject may be organised in the month of July 1986 on the Locations as given in Item 1, above.

3. Good Housekeeping

Housekeeping standards of many factories are low and there is a slackness on the part of supervisors to maintain a high standard of housekeeping. Housekeeping in a factory is not only a push-broom effort but it covers various facets of industrial safety. It is one of those aspects which can go a long way in improving the safety standards of the company. What is required to be done to improve the standard of housekeeping and to define the role of the supervisor in improving the housekeeping standards are subjects which can be discussed in the workshop. It is, therefore, suggested that a workshop on this subject of 2 days' duration should be held at all the locations as given in Item 1, above. This can be arranged in the month of September 1986.

4. Propagation for Safety

It was observed during the Expert's inspection safety visits of various factories that this aspect is missing in almost all the factories. The details about the methods to be adopted for safety propagation are given in the Expert's reports. All the supervisors and safety department personnel need to be trained on this subject. To inculcate safety consciousness at all levels is very important and this can create awareness in the employees' minds towards industrial safety. It is suggested to have a 3-day workshop on this topic to cover almost all the categories of personnel from each factory. These workshops must also be arranged at locations given under Item 1, above, and should be arranged in the fourth quarter of 1986.

It is the Expert's opinion based on his experience in Jamahiriya that slow dosage will help in promoting safety rather than overdosage at one time. This has to be coupled with regular surveillance by the SHI.

ANNEX II

FIRE AND SAFETY PROGRAMMES DURING 1986

There is a definite need to train all the categories of personnel in loss control activities. In 1986 full emphasis on training should be given to have better results in subsequent years. The following training programmes are, therefore, recommended, which must be arranged by the Loss Control Department of the SHI.

S.No.	Title of Course	Duration	Venue	Contents
1	2	3	4	5
1.	Supervising for Safety	3 days	A B C D	-Principle of accident prevention -Legal aspects -Hazard analysis -Accident investig-atin/analysis -Safety systems etc. etc.
2.	Loss control Managers' course	6 days	A B C D	-Introduction -Health & safety -Technical safety -Safety audit -Safety systems -Accident analysis -Safety survey -Emergency procedure -Fire hazards -Fire fighting etc. etc.
3.	Training workshop for management and other concerned personnel in loss control	3 days	A B C D	-Accident reporting -Accident analysis -Good housekeeping -Safety systems -Motivation-safety -Fire prevention -Fire fighting etc. etc.

1	2	3	4	5
4.	Senior management safety programme	1 day	A B C D	-Importance of safety (Risk management) -Legal requirements -Identification & control of hazards -Safety propagation -Safety & housekeeping -Safety incentives etc. etc.

Faculty

-- Director (Loss control)
-- Safety expert
-- Loss control manager from other industries in SPLAJ
-- Representative from loss control department of the Secretariat

Venue

A -- Training Centre
Tajurra truck factory

B -- Training Centre
Abu Kammash Chemical Complex

C -- Training Centre
Missurata Steel complex

D -- Training Centre
Cement plants-Benghazi

Note: Dates to be decided as per the convenience of the SHI

ANNEX III - GUIDE FOR ACCIDENTS INVESTIGATION

INVESTIGATION OF ACCIDENTS

One of the most fundamental aspects of accident prevention programme is the investigation of accidants.These investigations should be carried out for:

1. Prompt identification of hazardous conditions or practices.
2. Corrective actions to prevent similar or other accidents either inthe area affected or elsewhere in the organisation.

This is done by :

1. DETERMINING ACCIDENT CAUSES

   Seeking out the elements and sources from which the accident developed.

2. DETERMINING CORRECTIVE MEASURES

   Analysing the causative factors and making recommendations for their elimination.

WHICH ACCIDENT SHOULD BE INVESTIGATED

All accidents are potentially serious.All are important regardless of the degree of seriousness of any resulting injurysince the injury result of any set of accident producing circumstances is impossible to predict. Hence all accidents including the near misses should be promptly investigated.

WHEN AND HOW INVESTIGATION IS TO BE MADE

- The investigation should begin as soon after the accident as possible and while the accident is still fresh in every body's mind.
- Delays-even those of only few hours can permit information or items of importance to be removed ,destroyed or forgotten.
- Examine the accident scene with particular attention to the item that was the direct cause of the injury.
- Make notes rapidly of conditions as you find them.
- Interview the injured person if he is not in pain and can answer questions without distress.
- Interview any one who saw the accident.

SIX BASIC QUESTIONS FOR ACCIDENT INVESTIGATION

1. WHO was injured?
2. WHERE did it happen?
3. WHEN did it happen?
4. HOW DID THE accident happen?
5. WHAT were the materials ,machines,equipmentor conditions involved
6. WHY did it occur?.

It should however be remembered that

— Most accidents occur as the combined result of both unsafe conditions and unsafe acts. In many cases there are several of each. A thorough investigator is not satisfied when he has identified an unsafe condition or one unsafe act.

— What may appear to have been a simple accident, may have contributing circumstances which are quite involved. Underlying causes must be sought.

— A report that a workman 'got particle in his eye' of that 'he was not wearing his goggles,' gives no clue as to how or why the accident happened. Determine where the particle came from , and how. Why wasn't the workman wearing his goggles? Get the whole story.

— Never say a workman was 'careless' This is an effect, not a cause. If you think he was careless, find out why—there always is a reason.

BROAD PRINCIPLES OF ACCIDENT INVESTIGATION.

1. Use Common Sense.
2. Investigate each clue. An apparently reasonable conclusion will often be changed by exploring factors which may not appear to be important.
3. Check for Unsafe Conditions and Acts—both may be present in the great majority of cases.
4. Make Recommendations— No investigation is complete unless corrective action is suggested.
5. Investigate all Accidents.
6. Make Investigation Report—Written reports are helpful tools for study and analysis, to determine specific areas or operations in which accidents are occuring, and for follow up acton on recommendations.
7. Take Corrective Action—It is very necessary to avoid recurrance.
8. FOLLOW-UP— Make sure that the unsafe conditions and unsafe acts get corrected. The ability and willingness of a supervisor to effectively 'follow up' is often the characteristic that leads to effective accident prevention and to career promotions.

IT IS THEREFORE RECOMMENDED THAT ALL ACCIDENTS MUST BE INVESTIGATED THOROUGHLY BEARING IN MIND TH E ABOVE MENTIONED PRINCIPLES AND TECHNIQUES.

We are giving in the enclosed list main causes of accidents for the information and guidance of our plant personnel.

MAIN CAUSES OF ACCIDENTS

I. UNSAFE ACTS

—— Operating without authority ,not warning others.
—— Operating or working at unsafe speed.
—— Making safety devices inoperative.
—— Using unsafe equipment.
—— Unsafe loading,placing ,mixing combining etc.
—— Taking unsafe position or posture.
—— Working on moving or dangerous equipment.
—— Distracting,teasing ,abusing ,startling etc.
—— Failure to use safe attire or personal protective devices.
—— Other miscellaneous.

II. UNSAFE MECHANICAL OR PHYSICAL CONDITION

—— Improperly guarded agencies.
—— Defects of agencies
—— Hazardous arrangement,procedure,etc,in,on or around the agency.
—— Improper illumination.
—— Improper ventilation.
—— Unsafe dress or apparel.
—— Miscellaneous unsafe physical conditions.

ANNEX IV - SAFETY CHECK LIST - 1986

NAME OF THE FACTORY _____

DATE OF REPORTING _____

1. ORGANIZATION

—— DO YOU HAVE A PROPER LOSS CONTROL ORGANIZATION?

—— TO WHOM LOSS CONTROL MANAGER REPORTS?

—— AVAILABILITY OF TRAINED FIRE AND SAFETY OFFICER.

—— DO YOU HAVE AN AGREED SAFETY POLICY AND WHETHER IT IS PROPERLY EXHIBITED?

—— IS SAFETY INCLUDED IN WRITTEN INSTRUCTIONS ON OPERATING PROCEDURES?

—— DO YOU HAVE PROPER SAFETY RULES PREPARED AND ARE THESE DISTRIBUTED TO PERSONNEL?

—— HAVE YOU PREPARED THE EMERGENCY AND DISASTER PLANS AND DO THE PEOPLE KNOW THEM?

—— HOW OFTEN YOU CONDUCT THE EMERGENCY DRILL AND WHEN IT WAS CONDUCTED IN THE RECENT PAST?

1 A. SAFETY MEETINGS

—— DO YOU HAVE A PLANT SAFETY COMMITTEE AND HOW OFTEN IT MEET: AND WHAT IS THE INTEREST OF PARTICIPANTS?

— DO YOU HAVE A CENTRAL SAFETY COMMITTEE AND HOW OFTEN IT MEETS?

— WHO ACTS AS A SECRETARY OF THIS COMMITTEE?

— WHAT IS THE INTEREST OF MANAGEMENT PERSONNEL TOWARDS CONDUCTING SAFETY MEETING?

— DEPARTMENTAL MANAGERS' AVAILABILITY TO DISCUSS SAFETY PROBLEMS.

— SPEED OF IMPLEMENTATION OF SAFETY RECOMMENDATIONS.

ACCIDENT REPORTING, INVESTIGATION AND ANALYSIS

— WHAT TYPE OF ACCIDENTS ARE REPORTED?

— WHETHER EVERY CASE OF ACCIDENT/INJURY -HOWEVER SMALL IS PROPERLY INVESTIGATED.

— WHO INVESTIGATES THE ACCIDENTS?

— WHAT IS THE INVOLVEMENT OF LOSS CONTROL DEPARTMENT IN ACCIDENT INVESTIGATION?

— ARE PROPER ACCIDENT AND SICKNESS RECORDS KEPT AND BY WHOM?

— IS THE INVESTIGATION REPORT OF ACCIDENTS SUBMITTED TO THE MANAGEMENT AND FOLLOW UP ACTION TAKEN BY LOSS CONTROL DEPARTMENT?

— IS THE CLASSIFICATION OF ACCIDENTS DONE AS UNDER :?

- AGENCY WISE
- CAUSE WISE
- LIMB WISE
- AGEWISE

— WHAT IS THE MONTHWISE FREQUENCY RATE OF YOUR COMPANY DURING THE YEAR 1986 (BASED ON 2 FULL DAYS ACCIDENTS)?

—IS FIRST AID POST KEPT OPEN ROUND THE CLOCK AND THE AVAILABILITY OF DOCTOR AND OTHER PARA MEDICAL PERSONNEL DURING SHIFTS?

3. HAZARDS(ALL TYPES)

— IS THERE SUFFICIENT PROVISION FOR EXTRACTION OF TOXIC DUSTS AND WHETHER ALL THESE EQUIPMENT ARE WORKING EFFICIENTLY?

— IS NOISE LEVEL HIGH ,IF SO—HAS IT BEEN MEASURED IN THE RECENT PAST AND WHAT IS THE OUTCOME OF THE SURVEY?

— AVAILABILITY OF LIST OF HAZARDOUS MATERIALS IN THE COMPANY WITH ANTIDOTE AND LIFE SAVING PROCEDURES.

— DO YOU HAVE A MONITORING EQUIPMENT TO CHECK THE WORKING ATMOSPHERE AND HOW OFTEN THESE ARE USED AND WHAT IS THE OUTCOME OF THIS INSPECTION.

— ARE THERE SUFFICIENT SAFETY PRECAUTIONS FOR THE USE OF HAZARDOUS SUBSTANCES?

— ARE THERE PROPER SYSTEMS FOR THE DISPOSAL OF WASTE CHEMICALS AND WHAT IS THE CHECKS BY LOSS CONTROL DEPARTMENT?

— ARE THERE WARNING SIGNS IN THE DANGER AREAS?

— IS THERE ANY IDENTIFICATION FOR THE DANGEROUS MATERIALS?

— COULD BULK STORAGE ,FUMES OR DUSTS OF HAZARDOUS MATERIALS BE A COMMUNITY HAZARD -IF SO WHAT HAS BEEN DONE FOR THE GENERAL SAFETY OF COMMUNITY?

— DO YOU HAVE EMERGENCY PROCEDURES FOR HANDLING EMERGENT SITUATION AND WHETHER THE PLANT PERSONS ARE FAMILIAR WITH THESE PROCEDURES?

— DO YOU HAVE A PERMIT TO WORK SYSTEM AND WHETHER IT IS STRICTLY FOLLOWED, IF NOT WHAT ARE THE DIFFCULTIES IN INTRODUCING SUCH SYSTEMS?

4. MACHINERY

— ARE SAFETY GUARDS FITTED TO ALL DANGEROUS PARTS?

— IS IT CONVENIENT TO REACH THE STOP CONTROL IN THE EVENT OF EMERGENCY?

— WHAT ARE THE GENERAL CONDITIONS OF MATERIAL HANDLING FACILITIES SUCH AS FORK LIFT TRUCKS, CONVEYORS ETC. AND SYSTEMS FOR THE PREVENTIVE MAINTENANCE OF THE SAME?

— IS THERE ANY SYSTEM WHICH PREVENTS THE START UP DURING THE MACHINE MAINTENANCE?

— SPACING OF MACHINES:

- ENOUGH APART FOR SAFETY
- FAR ENOUGH FROM GANGWAYS ETC.

— ARE LIFTING GEARS(CRANES, CHAIN PULLEY BLOCKS ETC.) AND SLINGS ETC. ARE INSPECTED ONCE A YEAR AND A RECORD OF MAINTENANCE KEPT?

— ARE PROPER LIFTING GEARS AVAILABLE FOR VARIOUS JOBS?

— ARE ALL ELECTRICAL EQUIPMENT EARTHED AND PROPERLY MAINTAINED?

—— IS WORK DONE ON ELECTRICAL EQUIPMENT BY QUALIFIED PERSONS?

5. HOUSEKEEPING

—— DOES THE COMPANY MAINTAIN GOOD HOUSEKEEPING STANDARDS STATING IN GENERAL CONDITIONS OF

— AISLES, STAIRS AND FLOORS -

— STORAGE AND PILING OF MATERIAL-

— LIGHT & VENTILATION -

— WASH AND LOCKER ROOM -

— DISPOSAL OF WASTE -

— YARD & PARKING LOT -

— STANDARD OF TOILETS -

— STANDARD OF WASHING FACILITIES -

— PROVISION OF PURE DRINKING WATER -

6. COMPRESSED AIR

—— ARE AIR LINES, VESSELS AND PRESSURE RELIEF VALVES TESTED REGULARLY AND RECORDS MAINTAINED?

7. FIRE

—— IS IT POSSIBLE TO GET OUT QUICKLY IN THE EVENT OF FIRE/EMERGENCY AND WHETHER THE EXITS MARKED DISTINCTLY IN THE WORKING AREAS?

—— CAN ALL ESCAPE DOORS BE OPENED FROM INSIDE?

—— HOW IS THE EFFICIENCY OF FIRE BRIGADE CALLING?

SYSTEMS

— ARE FIRE ALARMS AND EMERGENCY ADEQUATE TO PROTECT AGAINST FIRE BREAKING OUT AND SPREADING OUT-ARE THESE TESTED REGULARLY AND RECORD OF TESTING MAINTAINED?

— WHETHER WARNING SYSTEM IS AUDIBLE IN EVERY PART OF PREMISES?

— DO YOU HAVE AN AUTOMATIC FIRE DETECTION SYSTEM IN CRITICAL AREAS AND IF SO WHETHER IT IS TESTED REGULARLY.

— IS SMOKING PROHIBITED IN ALL AREAS WHERE THERE ARE COMBUSTIBLE MATERIALS, VAPOURS OR GASES?

— ARE NO SMOKING AREAS CLEARLY DEFINED AND MARKED?

— NEAR NO SMOKING ZONES-WHETHER YOU HAVE SAFE AREAS WHERE SMOKING IS PERMITTED AND IF SO WHETHER SAFETY INSTRUCTIONS ARE DISPLAYED IN SUCH AREAS?

— IS THERE ANY TEMPORARY WIRING, IF SO - COMMENT ON SUCHLOCATIONS?

— WHETHER THERE EXISTS A MUTUAL AID SCHEME WITH THE NEARBY INDUSTRIES OR WITH THE LOCAL FIRE BRIGADE - HOW OFTEN YOU CONDUCT THE PRACTICE TO SEE THE EFFICIENCY OF THE MUTAL AID SCHEME.

— ARE THERE SUFFICIENT PROVISIONS OF FIRE EXTINGUISHERS OF RIGHT TYPE PLACE IN APPROPRIATE RISK AREAS?

— ARE FIRE EQUIPMENT INSPECTED/TESTED REGULARLY AND RECORD MAINTAINED

— IS FIRE BRIGADE HEADED BY A QUALIFIED FIRE AND SAFETY OFFICER/ FIRE OFFICER AND DO YOU HAVE TRAINED FIRE PERSONNEL IN EACH SHIFT?

— IS FIRE BRIGADE MANNED ROUND THE CLOCK?

— DO YOU HAVE A REGULAR PROGRAMME FOR THE FIRE FIGHTING TRAINING OF ALL EMPLOYEES?

— DO EMPLOYEES UNDERGO REFRESHER TRAINING AS WELL AND WHETHER THE COMPANY MAINTAIN RECORD OF SUCH TRAINING?

— DO YOU HAVE A FIRE TRAINING GROUND?

— DO YOU HAVE AN AUXILIARY FIRE FIGHTING TEAM?

— DO FIRE MEN KNOW THE HAZARDS THAT COULD ENDANGER THEM?

— DO YOU CONDUCT REGULAR FIRE DRILL?

— WHEN WAS THE FIRE DRILL LAST HELD?

— IN HIGH RISK AREAS, IS THERE ANYTHING TO CAUSE

SPARKS ? ——

FLAMES ? ——

EXCESSIVE HEAT ? ——

8. PROTECTIVE EQUIPMENT

— DO THE COMPANY HAVE A SUFFICIENT SUPPLY OF SAFETY EQUIPMENT?

— DO EMPLOYEES KNOW THE USE OF SAFETY EQUIPMENT?

— IS RIGHT EQUIPMENT ISSUED FOR THE JOB?

— WHAT IS THE APTITUDE OF PERSONS FOR THE USAGE OF SAFETY EQUIPMENT?

— IS THERE PROPER SUPERVISION TO ENSURE THAT PROTECTIVE EQUIPMENT ARE USED WHEREVER REQUIRED?

— PROVISIONS FOR THE UPKEEP OF VARIOUS TYPES OF SAFETY EQUIPMENT.

9. SAFETY PROMOTION

— IS THERE SUFFICIENT DISPLAY OF SAFETY POSTERS?

— HOW OFTEN SAFETY POSTERS ARE CHANGED?

— ARE SAFETY FILMS SHOWN REGULARLY AND IF SO WHAT IS THEIR FREQUENCY

— ARE THERE ANY SAFETY INCENTIVE SCHEMES AND IF SO BRIEF DETAILS TO BE GIVEN.

— ARE SAFETY COMPETITIONS CONDUCTED REGULARLY?

— FREQUENCY OF SAFETY TALKS BY OUTSIDERS AND CONDUCTING OF SAFETY AND FIRE SEMINARS.

— ARE SAFETY BULLETINS ISSUED AND IF SO WHAT IS THE FREQUENCY OF ISSUE?

— HOW OFTEN REGULAR AND REFRESHER TRAINING IN SAFETY ARE CONDUCTED?

— DO YOU HAVE A SYSTEM OF CONDUCTING A SHOP FLOOR TALK ON SAFETY AN IF SO HOW OFTEN?

10. MISCELLANEOUS

— WHETHER THERE EXISTS A SYSTEM OF PRE JOB ENTRY SAFETY INDOCTRINATION-IF SO GIVE DETAILS.

— DO YOU HAVE A SYSTEM OF PERIODICAL MEDICAL EXAMINATION OF EMPLOYEES - IF SO GIVE DETAILS.

— WHAT IS THE INVOLVEMENT OF INAS DOCTOR S ATTACHED TO YOUR FACTORY IN THE LOSS CONTROL PROGRAMMES. GIVE DETAILS.

— DO YOU HAVE AN OCCUPATIONAL HEALTH CONTROL PROGRAMMES .IF SO HOW THESE ARE IMPLEMENTED.

— IS COLOUR CODIFICATION APPLIED IN YOUR PLANT?

— DO YOU MAINTAIN AN ANNUAL REPORT OF EXAMINATION OF ALL PRESSURE VESSELS-IF SO BRIEF DETAILS TO BE GIVEN.

— ARE ALL PANEL BOARDS,SWITCH AND FUSE CABINETS CLEAR AND UNOBSTRUCTED-IF NOT WHAT ARE YOUR VIEWS.

SIGNATURE _____

NAME _____

DESIGNATION _____

SEAL OF COMPANY