IUPAC-UNESCO-UNIDO Safety Training Program Workshop
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Abstracts

THE IUPAC-UNESCO-UNIDO SAFETY TRAINING PROGRAM

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While industries in developed countries are introducing sophisticated safety measures covering operational, health and environmental aspects in close interaction with governments and the public, there is a gap between developed and developing countries in safety education, research and implementation of technical measures. The increase in chemical production and consumption in the developing world makes it essential to promote interactions to disseminate state-of-the-art knowledge on safety and environmental protection in chemical production.

The International Union of Pure and Applied Chemistry (IUPAC), the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and the United Nations International Development Organization (UNIDO) have implemented a joint training program for safety and environmental protection in chemical, pharmaceutical and biotechnological research and production. The IUPAC-UNESCO-UNIDO Safety Training Program allows safety training experts from developing countries to learn about safety and environmental protective measures by visiting and working in plants of IUPAC Company Associates in the industrialized world. The Program is part of a broadly based safety initiative by the IUPAC Committee on Chemistry and Industry that also includes sponsorship of Workshops on Safety in Chemical Production.

Safety Training Program Fellows are professional scientists and engineers who are currently involved at a supervisory or managerial level in chemical companies, government institutions or scientific institutions; engaged in aspects of safety and environmental protection in chemical, pharmaceutical, or biotechnological production or in the teaching of these fields; and have the ability to influence safety practices in their places of employment and elsewhere within their home country. Since 2000, eight Fellows from China, Egypt, Kenya, Nigeria, Turkey, and Uruguay have received training in areas such as process safety management, environmental protection, HAZOP/HAZAN analysis, Responsible Care, ISO 9000 and 14000 series initiatives, and Legislative measures and interaction between industry, universities, government and the public. Fellows are required to submit a detailed report on their training and are then expected to disseminate and implement their learnings in their home countries.

Our recent trainees have an impressive record of success in effecting positive change in health, safety and environmental quality, and the Safety Training Program looks forward to continuing to contribute to capacity building in the developing world.

THE NEED FOR TRAINING IN THE DEVELOPMENT OF HEALTH, SAFETY AND ENVIRONMENT MANAGEMENT SYSTEM IN CHINA

Mr. Shanjun MU
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An introduction of the status of safety management in chemical industry, including private small and medium sized enterprises SME, state owned companies and multinational companies in China. The development of health, safety and environment management system in oil and petroleum industry will be explained, and the need for training for improving safety performance in chemical industry will be analysed.

The Major Challenges Facing the Proper Application of Chemical Safety Regulations in the Third World Countries

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1. The current situation in the research centres and universities in the third world countries:
There is a huge gap between the third world countries and the developed countries due to the absence of a definite and integrated health safety programs that protect the people and environment. In general, the design of the chemistry laboratories in most cases is defective, the hoods and ventilation cabinets are not efficient. The lack of PPE such as safety showers, eyewash and insufficient fire extinguishers. The handling, transport and storage of chemicals are very primitive. The chemical and biological wastes are disposed through sanitary drain, and solid wastes are treated as normal garbage. There is no periodic medical monitoring system for the employee.

2. Applications of the training and achievements:
The trainee faces several challenges which necessitate better co-operation between the trainee and the governmental authorities. Most of the achievements of the trainee in their home countries resulted from their personal contacts and to some extent through their professional authorities which is limited outside their institutions. The achievements include the use of some PPE as eye protection glasses and gloves was considered obligatory in all laboratories in the faculty of pharmacy. Improving the laboratory ventilation via installation of more efficient exhaust fans. The laboratories were supplied with safety showers, eye washers, and fire extinguishers. A new training program was introduced for laboratory technicians, and postgraduate students, the program covers the major topics of chemical safety. Organization of several symposia and seminars about the major topics of EHS. The audients were from all the Egyptian universities and chemical and pharmaceutical industries.

3. The major challenges and retarding factors:
The major retarding factors are mainly financial, technical and political. The financial factors are an important issue to set an integrated chemical safety program. The financial support is necessary to improve the laboratory safety, to construct incinerators, chemical wastes recyclers and occupational health centres. Although the financial donations of the developed countries and the international organizations are sufficient to improve the health safety in many recipient countries, the misuse of these donations and the administrative corruption in many countries retards this international effort. The donating countries and organizations should be urged to give their donations in the form of construction of incinerators, waste recycling plants and occupational health centers, instead of the monetary donations. The political factors are the most important challenge facing the improvement of the chemical safety in the third world countries, the political will is almost absent, and the environmental health and safety problems are not considered of high priority in many countries. The international community should play a greater role to enforce the governments to adhere to the international standards and guidelines.

4. New initiatives for expansion of the program:
As the original IUPAC-UNIDO-INESCO program aims to enable professional scientists from developing countries to receive experiences and knowledge on health, safety and environmental protection in chemical research and production, and to act as regional experts in this field in their home countries. The trainee should play a role to expand the program to their geographical regions. The situation in many Arab countries is similar to the situation in the third world countries. A new regional program may be started in the Arab countries. The new program may be initiated by the

IUPAC or UNESCO via contacting the authorities in the countries to explain the benefits and importance of the program. The trainee may act as mediators between the IUPAC or UNESCO and the authorities in the countries in their regions. Suggested Counterparts for such program may include the Arab Nations Organization, Arab Regional Funds as the Arab Fund for Social & Economic Development (Kuwait) and the Islamic Development Bank (Saudi Arabia), in addition to some regional Non-Governmental Organizations.

DISSEMINATION OF SAFETY CONCEPTS THROUGH EDUCATION

Ms. Esma Toprak, Department of Chemical Engineering, Bogazici University, Istanbul, Turkey

Turkey is getting ready to be a member of the European Union. It has to adapt and adjust many regulations and restrictions. One of the most crucial subjects is health and safety regulations and restrictions.

It is not easy to make public behaviors conscious about safety regulations unless the government puts strict laws and regulations. Gaining of safety concept must start at early ages, best during education. Primary, Intermediate and especially College education must give safety knowledge properly with the support of Government Laws and Regulations. College graduates who gain safety concept adequately can disseminate these valuable practices wherever they work, such as academic institutions or industries.

The first step in starting implementation of safety regulations is preparing the safety manuals. The manuals should be for different areas of education:

A. Accident Prevention for College and University Students
B. Accident Prevention for Faculty and Administrators
C. Accident Prevention for Highschool Students

As for the follow ups;

- Students must be given safety quizzes
- HSE team must be established at each educational area, for safety inspections and safety meetings.
- Fire and earthquake drills must be exercised in an orderly fashion.
- Companies must have their own HSE teams and safety regulations to prevent work loss.

Dissemination of safety concept through education will be much easier and healthier with the laws and regulations of the government.

STATUS OF OCCUPATIONAL HEALTH AND SAFETY IN KENYA

Dr. Jane B. Nyakang'o, Director, UNIDO National Cleaner Production Centre, Nairobi, Kenya

The status of occupational health and safety conditions in Kenya is an issue of growing importance to the industrialists, practitioners, the Government and consumers. Occupational, health and safety issues are anchored in the ministry of Labour, department of Occupational Health and Safety. The factories Act Cap 514 which came into operational on 1st September 1951, makes provision for the health, safety and welfare of persons employed in factories and other places of work. The Act is predominantly socio- economic in nature and focuses on the shop floor conditions of the factory, safety devices, machine maintenance, safety precautions in case of fire, gas explosions, electrical faults, provisions of protective equipment among others.

In 2004, a subsidiary legislation (legal Notice NO.30) was enacted to provide for the formation of

Safety Committees by the occupier of every factory or other workplaces. The Committee is responsible for all health and safety issues of enterprises including undertaking safety audits. Despite all these, it is almost impossible to characterize the conditions under which employees work due to the scarcity of data. The ministry of Labour reports that more than half of the industrial accidents and injuries in Kenya go unreported. It estimates that reported occupational fatalities and injuries for the last five years 2000-2004 are: 1528, 1923, 1332, 1599 and 1387. This is viewed against the background that factories and other workplaces have to be registered by the Department of Occupational Health and Safety, but by the end of 2004 only 11,387 such enterprises are registered excluding the 1.3 million micro- and small enterprises (juakali).

Most of the reported accidents are those seeking compensation under the Workman's Compensation Act. In the year 2003 data indicates that mining, construction and transport accounts for 41% of accidents in Kenya, machine operators and assemblers 28% while other occupations share 31% of workplace accidents. This shows that these occupations are injury prone while matters of safety are treated casually by both the employer and employees. In relation to age groups 44.4% of the injuries occurred to persons in the age group of 20 to 29 years, 25% to the age group of 30 to 39 years and 24% to the age group below 20 years.

The Kenya National Cleaner Production Centre is playing active role in building national capacity in occupational health and safety. Since the year 2003, the Centre has integrated occupational health and safety issues in its programs especially the Cleaner Production and Environmental Audits. It has assisted a total of 85 enterprises train staff and implements occupational health and safety (OHS) programs. The Centre also runs a 3- day training of trainer's program in OHS and is involved in supply chain management where the issues of Material Safety Data Sheets are discussed. Among the key challenges in this program is to create enough human capacity to assist enterprises develop and implement safety programs. Thus, much of the Centre's focus in the future will be to mount a *"learning-by-doing"* training program for Consultants.

PHARMACEUTICAL AND CHEMICAL WASTE MANAGEMENT IN URUGUAY

Dr. Ana Luisa Arocena, Pharmaceutical Chemist, Montevideo, Uruguay

Uruguay is a South American country between Argentina and Brazil. In its main environmental law, the first political guideline is "*Uruguay Natural*". Uruguay occupies the third place, after Finland and Norway, in the 2005 Environmental Sustainability Index from Yale and Columbia Universities (1).

In this context, the pharmaceutical and chemical waste management has to meet a great challenge dealing with an important lack of regulations, no public budget available for development of waste treatment technologies, non-attractive market for private investments and a social-environmental conscious society, who is awake to prevent implementation of industrial waste management plants with potential negative environmental impacts.

Since eight years ago, a group of chemists decided to offer operations in this area, developing an economic and environmental sustainable enterprise, very closed to the local Government and the public University.

This paper presents the IUPAC-UNESCO-ONUDI Safety Training Program contribution to the above-mentioned process.

Challenges / Applications of Safety & Environmental best practices; IUPAC-UNESCO-UNIDO fellowship feedback.

Mr. T.C. Gwaza, Shell Petroleum Development Company, Port Harcourt, Nigeria

The IUPAC-UNESCO-UNIDO safety fellowship accorded me the opportunity to undertake a two-week training at the SASOL Chemical Industries in the Republic of South Africa from June 2, 2002 to June 16, 2002.

In South Africa, Sasol converts coal into value-added synfuels and Chemicals through unique Fischer-Tropsch technologies. The group also refines crude oil into liquid fuels. My training visit to several of their facilities and offices at Sasolburg, Secunda and Johannesburg was focused on the following:

1. Aspects of responsible care and integrated approach for SHE (Safety, Health & Environment).
2. Occupational hygiene.
3. Process Safety Management with emphasis on HAZOP awareness.
4. Material Safety Data Sheets (MSDS).
5. Hazard Identification Risk Assessments (HIRA).
6. Topset accident investigation technique.

Key issues on Environmental, Waste Management and aspects of process safety, accident investigation were key areas of discussion during the fellowship.

This fellowship is a worthwhile investment

- Has sensitized me to a greater commitment to Safety and Environmental issues.
- Hope to build on this, benchmark and contribute to best practice in Safety, Health and Environment in my place of employment and Nigeria.
- Improved contribution to HSE Plan, Audits and Projects supervision.
- Make contributions to Training of Staff and Contractors in my Company.

Facilitate awareness and application of Safety Management Tools (JHA, HAZID, HAZOP) and requisite Procedures. Results: Improved Safety and Environmental Performance.

IUPAC-UNESCO-UNIDO ESM Training: The Impact on Research Institutes in Nigeria.

Dr. Isiaka O. Bakare, Rubber Research Institute of Nigeria, Benin City, Nigeria

On 17th August 2005, Committee on Chemistry and Industry (COCI) organized a workshop on Environmental Safety and management during the 40th IUPAC congress in Beijing, China. The workshop was well attended by representative of IUPAC, UNESCO, UNIDO, and petrochemical industry across the Globe. Each of the recent training IUPAC- UNESCO-UNIDO safety fellows from developing countries presented a paper each on their experience in their home countries and various place of work on Environmental Health and safety (EHS).

I presented a paper on my training at Mitsui Chemical Inc, (MCI) Japan on Environmental Safety and Management (ESM) training and the impact on research institutes in Nigeria. My training at MCI cover different aspect of safety which includes; ESM audit, material safety data sheet, HAZOP study, accident investigation techniques etc, with series of lectures, demonstrations and practical exercise at wastewater treatment and utility plant. Some of the achievement as a result of the training includes; renovated of our laboratory at Rubber Research Institute of Nigeria with safety facilities put in place.

Provision of safety showers, eye wash, sectional chemical stores, protective gears, fire extinguisher, developments of laboratory safety manual and training of laboratory staff on ESM. Since, environmental safety and health is not thought as a course in our University, we have incorporated this as part of the Industrial training course for final year students attached to my Institute. There were a lot of suggestion and encouragement on how to improve EHS generally in developing Countries during discussion at the workshop.

Other papers presented during the workshop by experts from Industries centered on a good practice of occupational hygiene and environmental health and safety that brings comfortable and safe work-environment in Industry and academic institutions. A workshop on occupational hygiene and environmental safety with active participation of industrial sector, academic, research institutes, governmental and non-governmental organizations, will be held at Kenya, in 2006.

Appreciation to BP Chemical Inc USA; Mitsui Chemical Inc, Japan; Sankyo Co Japan; SASOL Chemical Industries, South Africa; and a host of other IUPAC Company Associates who have trained and those who have also shown interest to train Safety fellows. And finally, to COCI members for their sustained interest in Safety Training Program.