



International Occupational Hygiene Association NEWSLETTER

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Letter from the Editor

Dear Colleagues,

I hope you are all having a very good Summer, or Winter☺ For some of us, in the North Hemisphere, the heat has been a bit too much, which reminds us that our profession has some contribution to make concerning global warming!

A very important international event was ICOH 2003, held in February 2003, in Brazil. It was very gratifying to see the importance given to Occupational Hygiene in this wellknown Occupational Health Congress, which gathered more than two thousand participants from all over the world. Although already posted on the IOHA Homepage, I am mentioning the “ICOH and IOHA Declaration to Strengthen the Position of Occupational Hygiene”, which constituted an important milestone in the recognition of occupational hygiene, as an essential component of occupational health. In this respect, we must all congratulate David Zalk, then IOHA President, who was the driving force behind this major achievement, and Kurt Lechnitz who kindly volunteered to write the first draft. A Round Table on Occupational Hygiene was held during ICOH 2003; from this, I am presenting to you the replies from Linnea Lilienberg, to which I do not have anything more to add since she covered all key points. In fact, it is interesting to note that, although we are colleagues from such distant parts of the world (Sweden and Brazil), we have a very similar vision of the scope and benefits of occupational hygiene and of what has to be done in this field, which demonstrates that the occupational hygiene philosophy is universal.

In fact, for the section “Highlights from Meetings around the World”, readers are kindly asked to provide information on the main outcomes from meetings in their countries, as a means to increase the dialogue among people aiming at the same ideals. For example, you will see a set of recommendations from an occupational hygiene meeting in Brazil (mentioned in the previous Newsletter), which I believe is important to share with colleagues from other countries.

Under “Request to Readers”, I am starting to post practical subjects, which require further information and investigation. Please, kindly suggest topics for this section and, whenever possible, contribute with examples.

I take this opportunity to also request contributions on any relevant occupational hygiene subject, which should be shared with colleagues from other parts of the world. Suggestions concerning the Newsletter as well as IOHA’s activities and programmes (see IOHA Plan of Work) are very much welcome. Thank you a lot in advance !

Best greetings to all,

Berenice I. F. Goelzer
berenice@goelzer.net

IOHA Board Meeting, Dallas, USA, 2003

During this Board meeting, David Zalk passed the gavel to Heather Jackson (Photo below), who is now the new IOHA President. Heather presented David with a personal memento in recognition of his hard work for IOHA.



Some highlights of this Board Meeting are hereby mentioned.

Kurt Lechnitz's proposal to accept the *Japan Association for Working Environment Measurement* (JAWME) into IOHA membership was approved unanimously.

The *Co-operation in Occupational Health Programme* continues and a set of draft criteria will be considered at the next IOHA Board meeting (6-7 December 2003, Adelaide, Australia).

Activities aimed at testing, disseminating and, whenever necessary, adapting the *Control Banding Approach* are progressing and were discussed; many IOHA members are actively involved, working closely with the ILO and WHO. **N.B.:** The previous IOHA Newsletter presented a notice about the "International Control Banding Workshop", held in London, November 2002, and its final Report, prepared by Heather Jackson (IOHA President) and Carolyn Vickers (IPCS), is posted on the IOHA Web Site and the direct link is: http://www.ioha.com/topics/control_banding/cbwupdate.pdf.

The work of the *Certification Committee* continues; at the Dallas Meeting, the Board formally recognised the certification schemes of ABIH and BIOH (now BOHS).

The *IOHA 6th International Scientific Conference* was discussed. This important event will be held in the Pilanesberg National Park, North West Province, South Africa, 19-23 September 2005. Detailed information may be obtained at the Web site: <http://saioh.org/ioha2005/> The contact person is David W. Stanton, Johannesburg, South Africa (Tel: +27 11 498 7374; Fax: +27 11 498 7320 and e-mail: davidws@asosh.org).

IOHA Plan of Work

This is just a reminder of the IOHA Plan of Work, since many of its items are of direct relevance to the readers' professional practice and to national initiatives in the field. Interaction and exchange of ideas concerning the implementation of IOHA's activities and programmes, as well as its future goals, would be beneficial for the profession worldwide. The IOHA Plan of Work is online and the direct link is: <http://www.ioha.com/epubs/ioharef/pow2002.pdf>

New Association

Malaysia now officially has a national association, the Malaysian Industrial Hygiene Association, whose the mission is to:

- a. Heighten the level of competence among IH practitioners
- b. Promote awareness of IH among the working population in Malaysia
- c. Become the center for IH information dissemination

Heather Jackson will liaise with David Grantham and we may expect that MIHA will become an IOHA member.

Highlights from Meetings around the World

ICOH 2003 - 27th International Congress on Occupational Health, Iguassu Falls, Brazil, 23-28 February 2003

ICOH and IOHA Declaration to Strengthen the Position of Occupational Hygiene

A milestone in the recognition of occupational hygiene, as an essential component of occupational health, was the signing of the ***ICOH and IOHA Declaration to Strengthen the Position of Occupational Hygiene***, by Professor Bengt Knave (President, International Commission on Occupational Health, ICOH) and David M. Zalk (President, International Occupational Hygiene Association, IOHA), on 27 February 2003, during the 27th International Congress on Occupational Health (ICOH 2003). The Declaration was also countersigned by representatives of the ILO (Dr Jukka Takala, Director, ILO InFocus Programme on SafeWork, International Labour Office, Geneva) and of WHO (Dr Maged Younes, Coordinator of the Occupational and Environmental Health Programme, World Health Organization, Geneva). Among many important points, the Joint Declaration promotes “*the implementation and further development of occupational hygiene through measures at the national and international levels*” and states that “*hazard prevention and control in the work environment is a multidisciplinary task, which should involve occupational health professionals, such as occupational physicians, occupational hygienists, safety engineers, ergonomists, and nurses.*” Further information and the full text of the Declaration are available online at: <http://www.ioha.com/epubs/other/icohioha.htm>

Keynote Speeches and Round Tables

Round Tables on specific subjects followed the presentations by Keynote speakers. There was a Round Table on “*Improvement of Working Conditions on Equitable Bases: How Can Industrial Hygiene Contribute ?*” This followed the presentation “*Responses to the Equity Challenge in Safety and Health at Work: Improvement of Working Conditions in Equitable Bases*”, by Dr. J. Takala, Director, SafeWork, International Labour Office, Geneva

This Round Table involved short presentations by four occupational hygienists, who replied to a specific set of questions proposed by the organizers, followed by discussions with the participants. The Panellists were: Linnéa Lillienberg (Sweden), Horacio Herrera (Switzerland), Eugenio Cantuarias (Chile) and Berenice Goelzer-Moderator (Brazil). The “**Answers from Linnéa Lilienberg**” to the questions suggested by the organizers of the conference are hereby presented.

Question: What is your understanding on the concept of “improvement of working conditions on equitable bases”?

Reply: Improvement of working conditions on equitable bases is an ideal, which means to provide safe workplaces for everybody, regardless of the type of work, level of worker in the organisation of the enterprise, or the part of the world. This is an important goal to keep in mind and strive for.

Unfortunately, the usual scenario today is that working conditions are very different depending on where you live, what type of job you have, age, gender, class of society, etc. A starting point for change should include pragmatic considerations, such as to take into account the existing working conditions, and to make interventions based on practical and economic conditions.

The selection of preventive measures is very important and these include:

- substitution of dangerous chemical agents by less toxic ones;
- decreasing exposure through the application of control technology, for example, local exhaust, general ventilation, good housekeeping;

- providing personal protective equipment (PPE).

It is advisable to start the process with low cost improvements, so that initial results may encourage all involved.

A key aspect is the education/information about risks, at different levels. Moreover, in all preventive actions, it is important to take into account national laws, regulations and directives.

Question: How could occupational hygiene practice be "unfair" to workers?

Reply: If occupational hygiene practice is well done, it cannot be unfair to workers. Occupational hygiene practice could be "unfair" to workers if the occupational hygienist is not well trained, which can result in wrong or worthless recommendations. The same might be true if the measuring instruments are not functioning well or are not adequately calibrated, giving wrong results, which could underestimate or overestimate the risk. Occupational hygiene practice is unfair if it is non-existent.

Question: What are the basic requirements for Occupational Hygiene to be fair and committed with equity concerns?

Reply: The basic requirements for Occupational Hygiene to be fair and committed with equity concerns include the following:

- the training of occupational hygienists must meet minimum standards everywhere;
- there must be the possibility for occupational hygienists to work at different levels (OHS, industry, research) and to have access to all workplaces;
- occupational hygienists must have the possibility to work together with other occupational health professionals, following a multidisciplinary occupational health approach.

It is important that occupational hygiene knowledge is spread worldwide, which means more hygienists in developing countries. A related and fundamental issue is the legal recognition of the profession; in order to be efficient, occupational hygiene must have legal status and be mentioned in laws and directives, so all workers may benefit from its practice.

Question: How can Occupational Hygiene be introduced close to the where workers work, in a universal perspective of "primary occupational hygiene intervention"?

Reply: Occupational Hygiene can be introduced close to the where workers work, in a universal perspective of "primary occupational hygiene intervention", if workers, employers and relevant professionals are all involved and work together in the preventive work. Collaboration with local governmental health officials is also important. Risk communication is also a key issue.

Efficient methods must be used for risk assessment (identification and assessment of risks), in order to prioritise preventive interventions and elaborate cost effective solutions.

Small and Medium Size Enterprises seldom have access to occupational hygiene expertise. Therefore approaches should be developed to make them aware of the risks, to give them access to simple, validated methods for risk assessment and control (e.g., the HSE Control Banding approach), and to be able to decide when it is necessary to involve occupational hygiene experts.

Question: How can occupational hygiene knowledge be increased in developing countries and who can do it?

Reply: Occupational hygiene knowledge can be spread to developing countries mainly through education and training, and exchanges of information. Such efforts should aim both at new professionals as well as to people already working in occupational hygiene services but who need to upgrade their knowledge. The education should be based on working conditions in the country and start with simple interventions

followed by more efficient and expensive prevention techniques. Institutions and agencies able and willing to help should focus on a few places and persons at a time, giving support during a period of time enough to produce results, e.g., 3 years.

Provisions for continuous access to information are very important. Information, as well as support and advice may be shared by building up network systems, for example through e-mail lists. Networking can be built regionally, nationally and globally. Professionals knowledgeable in OHS should educate the workers at the workplaces in their countries. There should be collaboration with local governmental and municipal health officials.

Occupational hygiene knowledge can be increased in developing countries through the work and incentive of international organisations and professional associations (such as the ILO, WHO, IOHA and ICOH), as well as national occupational hygiene associations, national occupational health institutions and others. Such organisations could support educational activities by giving courses and preparing and disseminating adequate training materials, including handbooks (which in fact is already being done in many places), as well as providing, whenever possible, economic support to occupational hygiene conferences and other events.

Question: What is your personal or institutional involvement with “Occupational Hygiene in equitable bases”?

Reply: I have been an active Board Member in international and national organisations, such as IOHA, ICOH and SYMF (Swedish Association of Occupational and Environmental Hygiene). I have been working with a Certification Scheme for Swedish Occupational Hygienists, which includes basic requirements in education/training and examination procedures. At my department, I have been involved in building up a pool of measuring instruments for occupational hygiene, which can be rented by occupational hygienists, safety engineers and others who carry out measurements. The instruments are calibrated by our own staff, who can also provide support concerning exposure assessment strategies, instruments handling and interpretation of results. I am also involved in giving courses on different topics, e.g., exposure assessment methodology, measurement strategies, education on health risks, risk assessment and research.

Question: How do you see the Trends and Perspectives of “Occupational Hygiene for All” ?

Reply: In my opinion, trends and perspectives of Occupational Hygiene for All include:

- data bases on exposure levels in different occupations and work tasks;
- better exposure assessment investigations in all studies (including epidemiological studies), hence more reliable results (e.g., more samples should be taken during different working conditions for the same workers and work tasks);
- better experience on cost-effectiveness of preventive interventions;
- increased pressure to provide research data quickly.

In some multinational companies there is already awareness and knowledge about good strategies for exposure assessment and risk management; if this is applied wherever they are located, there will be more safe workplaces around the world. This knowledge should also be shared with smaller companies.

New technologies will create new risks and new challenges, which must be met by the profession as they appear, or better, before they appear.

Note from the Editor: Readers are invited to comment on these questions and replies, presenting their own views; this may lead to a fruitful exchange of ideas.

Recommendations from the meeting “Training in Occupational Hygiene, and, Prevention and Control Programmes: international vision and status in Brazil”, SENAC - Center for Environmental Training, São Paulo, Brazil, 4-6 December 2002

These Recommendations were prepared by a working group of national and international participants, based on presentations and discussions during the meeting. This is an example of an activity, whose outcome may contribute to the further development of occupational hygiene and which is particularly important in countries where colleagues are still striving for due recognition of our profession. The Recommendations were the following:

1. Much has already been achieved in Brazil concerning the protection of workers' health; nevertheless, this area still needs further development.
2. Decision makers, at different levels (e.g., government, enterprises, unions) must give greater importance and attention to the problem of occupational diseases, and must have a better knowledge of the possibilities available for, and the benefits resulting from their prevention.
3. There is a need for better statistics on occupational diseases. It should be compulsory to notify any ill health due to occupational exposure, through a nationwide monitoring-information system, able to identify the nature and circumstances of each injury (accident or disease) and to define epidemiological indices of prevalence and incidence.
4. There should be greater awareness and appreciation of the importance of primary prevention of occupational risk factors.
5. There must be a greater understanding that, in order to have effective prevention of occupational risk factors, there is a need for in-depth knowledge and sound experience as to their anticipation, recognition, evaluation (qualitative and quantitative), prevention and control, which means “competence in occupational hygiene”.
6. For the protection of workers' health, there must be a greater emphasis on multidisciplinary work involving occupational physicians and nurses, occupational hygienists, ergonomists, safety engineers, work psychologists, epidemiologists, and toxicologists, among others.
7. Despite the fact that (in Brazil) hazard prevention and control programmes in workplaces are required by law (e.g., the PPRA, that is, Programme for the Prevention of Ambient Risks [*Programa de Prevenção de Riscos Ambientais*]), established by the Brazilian standard NR-9), in practice, such programmes do not always exist, and even less often, with the desired quality. Even when implemented, the PPRA's are not always as comprehensive and efficient as they should be; this situation must be improved. Many of the existing PPRA's do not fulfil their objective; this is largely due to lack of specialized knowledge both on the part of the professionals who elaborate and implement them and on the part of those who inspect (enforce) them.
8. There must be better access to the available theoretical and practical knowledge on hazard anticipation, recognition and evaluation, and on the technologies and strategies for their prevention and control, as well as on how to apply them integrated into well-managed and sustainable programmes. This means that a “greater availability” of competence in occupational hygiene is necessary, which can be attained through the adequate training of larger numbers of occupational hygienists and the establishment of mechanisms to demonstrate quality in their professional performance.
9. Training in Occupational Hygiene should be further developed in Brazil, in an appropriate manner; this requires:

- periodic evaluation of the already ongoing courses aiming at continued improvement (some of the existing courses fulfil their objectives well; nevertheless, greater communication among them would be important so that they may share their strengths and help each other to overcome their eventual difficulties);
- the creation of new and well planned courses;
- the elaboration of models, based on the areas of knowledge required for the good practice of occupational hygiene and on minimum requirements for high-level courses.

10. The proposal by PAHO/WHO (“*Occupational Hygiene in Latin America: Guidelines for its Development*”) should serve as guidance as to the areas of knowledge required to educate and train competent occupational hygienists.

11. It is important that all training activities meet minimum requirements concerning the quality of their curriculum, faculty and infrastructure. The Brazilian Association of Occupational Hygienists (ABHO) is preparing a suggestion for a minimum curriculum for training in occupational hygiene; it is recommended that this suggestion considers the PAHO/WHO orientation and involves discussions with occupational hygienists with experience on the subject.

N.B. - An example of a curriculum, covering the required areas of knowledge, according to PAHO/WHO, was prepared at the SENAC-SP meeting, and is available upon request, both in Portuguese and in English.

12. Alongside an increased development in occupational hygiene training, it is necessary to take steps to create more “space” for the professional practice of occupational hygienists; in fact, the profession should be further promoted and recognized.

13. Enterprises should strive for a more effective implementation of the PPRA; one important step would be to always involve professionals with recognized competence in Occupational Hygiene (either as their staff, or as outside consultants).

14. The main Recommendations from this SENAC meeting should be widely disseminated among participating organizations, including to the relevant governmental sectors/services, and to the scientific/professional community in general. It would be desirable that IOHA also disseminated these recommendations, which may help other countries in the quest for recognition of Occupational Hygiene as a profession.

15. In view of the importance of primary prevention and of the fundamental role of Occupational Hygiene in this respect, it would be timely and advisable that organizations, such as ABHO (Brazilian Association of Occupational Hygienists), FUNDACENTRO (National Occupational Health and Safety Institute in Brazil) and SENAC (an NGO that deals, among other matters, with Occupational and Environmental Health), prepared a document to be presented to the competent national authorities, containing Specific Recommendations, demonstrating and emphasizing both the need for a greater development of the profession and the importance of the legal recognition of the Occupational Hygienist in Brazil.

AIHCE 2003, Dallas

There are so many important events during this outstanding Conference (which, in fact, is more than national) that it is very difficult to mention a few. Nevertheless, I would like to point out the **Jeffrey S. Lee Lectureship**, not only because of what Jeff was for IOHA but because the 2003 Lecturer was (then) IOHA President: David M. Zalk.

In his lecture, entitled “*ACGIH® & IOHA: Jeff Lee’s Legacy to the Profession*”, David evoked the great contribution that Jeff, who was a co-founder and first President of IOHA, made to our profession. David also emphasized the growth and increasing scope of action of IOHA today, as well as its close links with

international organizations such as the ILO and WHO, particularly concerning Hazard Prevention, as is the case of IOHA participation in relevant WHO Task Forces and in the ILO Toolkit. David foresees a bright future for IOHA and he closed by quoting a very inspiring sentence by Jeff Lee: “Find something you love in life and use it to make the world a better place.” More details on this lecture can be found at: <https://www.fohs.org/zalk.htm>

Also note that a wealth of information on the AIHCE 2003, including *Electronic Proceedings*, is available online at the AIHA site and a direct link is: <http://www.aiha.org/aihce03/aihce.htm>

News from the ILO and WHO

The 13th Session of the ILO/WHO Joint Committee on Occupational Health will meet at the ILO, Geneva, 9-12 December 2003. The main items in the Agenda will be:

- Integrated approach for occupational safety and health;
- Occupational safety and health management systems;
- Advice on priority fields in occupational health (including child labour, country profiles in occupational safety and health, control banding, workplace TB guidelines, informal sector workers, silicosis and the African Joint Effort).

The meeting will be supported by a number of background papers, including one on the history of WHO activities in occupational health since 1995.

The last meeting (12th Session) of the Joint ILO/WHO Committee on Occupational Health was held in Geneva, 5-7 April 1995. The Report of this Committee meeting is available from the *ILO InFocus Programme on Safety and Health at Work and the Environment (SafeWork)*.

News from the European Agency for Safety and Health at Work (provided by Kurt Lechnitz)

Information on Risk Prevention for the Health Care Sector

The largest single employment sector in Europe is probably the health care sector, where a large range of very different tasks is carried out and where many hazards and risks may occur.

New information on this topic, provided by the European Agency for Safety and Health at Work, can be found at: http://europe.osha.eu.int/good_practice/sector/healthcare/ This website, which is intended to assist those who are seeking information on risk prevention for the Health Care Sector, contains a series of Hyperlinks. The information listed there is, as much as possible, free of charge; there are however some links to sites with priced documentation.

The site aims at providing links to information specific to the health care sector. However, links to general information (e.g., about identified priority risks, risk groups, etc.) are also given. Information is provided on issues, which have been identified in European reports (such as the European Foundation report on Working Conditions in Hospitals in the European Union), for example: manual handling; strains and poor postures; chemicals; biological hazards; stress and violence; work organisation; working hours, shift work and night work; problems of maintenance and support staff, such as cleaners and kitchen staff.

There are some links to information in the form of guidance or “good practice”. However, before any “good practice” is implemented, it is most important to carry out a suitable and sufficient assessment of the hazards and risks occurring in the workplace in question. This assessment should consider all the

risks and hazards in the workplace to ensure that there is a real reduction in harmful exposures of workers and others, rather than merely replacing one risk with another.

EU-Commission and the REACH System (Registration, Evaluation, Authorisation of Chemicals)

The EU-Commission has presented new proposals to modernise the EU's regulatory system for chemicals.

The new draft legislation, which will replace over 40 existing directives and regulations, will implement the proposals set out in the Commission's February 2001 White Paper on the "Strategy for a Future Chemicals Policy". **REACH** is a single, integrated system for the **R**egistration, **E**valuation, and **A**uthorisation of **C**hemicals.

REACH will place a duty on companies, which produce, import and use chemicals, to assess the risks arising from their use (requiring new test data to be generated in justified cases) and to take the necessary measures to manage any identified risks. This will reverse the burden of proof for putting safe chemicals on the market, from public authorities to industry. Test results have to be shared to reduce any likely animal testing. Registration of information on the properties, uses and safe use of chemical substances will be an integral part of the new system.

The **registration** requirements will vary depending on the volume in which a substance is produced, and on the likelihood of exposure, both for humans and the environment. A phased-in system lasting up to 11 years is foreseen. Higher tonnage substances would require the most data, and would have to be registered first; lower tonnage substances would require less data and could be registered later. These provisions will reduce the regulatory burden, particularly on small and medium sized enterprises.

Tighter controls will be introduced for chemicals of highest concern. Thus, certain types of substances, such as carcinogens, mutagens and reproductive toxicants (CMRs), persistent, bioaccumulative and toxic substances (PBTs) and very persistent and very bioaccumulative substances (vPvBs), will be subjected to an authorisation regimen and would be registered early. In certain cases, other substances (for example, with endocrine disruption effects) could also be included within the authorisation system, on a case-by-case basis, should it be shown that they give rise to the same level of concern.

Each use of such substances will have to be specifically authorised. Decisions will be based on risk assessment and consideration of socio-economic factors.

Other substances, such as polymers (chemicals used as raw materials for plastics, detergents and a wide variety of other products) and intermediates (chemicals used to make other chemical substances or other products) will be subject to substantially lighter registration requirements. In many cases, where there is little risk of exposure, polymers and intermediates will be exempted from registration.

The Member States will be responsible for the **evaluation** of substances by examining certain registration dossiers, as well as by checking the application of REACH within their own territories.

Member States will also be able to suggest further restrictions on the use of substances, based on a structured risk assessment (where they consider that EU legislative action is necessary); however, the final decision on such restrictions would be taken by the Commission.

The Commission would grant **authorisations** after taking into account the views of the new European Chemical Agency, on the risk and on the socio-economic aspects. Authorisation decisions will take into account the guarantees provided by the applicant firms and the available information on alternative substances and processes that may reduce the risk posed. In order to simplify the system and reduce costs, an authorisation will be valid for enterprises further down the supply chain, as long as they abide by the conditions of the authorisation for the intended use and keep the Agency informed.

Request to Readers

Hidden Hazards, by B. Goelzer

In some cases, it is simple to determine which chemical agents to expect in a certain workplace, for example, solvent vapours around degreasing tanks, chromic acid mist in electroplating or free silica dust in sand blasting. However, it may happen that a hazardous chemical, which is not used as such, is accidentally formed by chemical reaction or by decomposition of materials, results from the combustion of fuels, or appears as an impurity. The objective of this notice is to ask readers to kindly **contribute** with more examples of such possible occurrences, so that colleagues may be alerted.

Some classical examples of these “hidden hazards” are hereby presented:

- nitrogen oxides and ozone in electric welding, particularly if performed in confined areas;
- nitrogen oxides, whenever there is contact of nitric acid with organic matter (e.g. wood);
- hydrogen sulfide, ammonia and methane, whenever there is decomposition of organic matter, as may happen in old wells, cisterns, sewage pits, etc.;
- arsine, whenever there is contact of strong acids with an ore or a metal containing arsenic;
- phosphine, in machining of nodular iron;
- phosgene and hydrogen chloride, resulting from the action of heat, flame or ultra-violet radiation on chlorinated hydrocarbons (such as carbon tetrachloride and trichloroethylene);
- carbon monoxide, hydrogen cyanide, hydrochloric acid, isocyanates, styrene oxide, as result from the pyrolysis of certain plastics.

The question of impurities cannot be overlooked, as it may happen that certain chemical products contain contaminant(s), which is(are) more toxic than the basic chemical itself, thus creating the possibility of an appreciable “hidden hazard” (even in small amounts). For example, the highly toxic arsine and phosphine can be present as impurities in the much less toxic acetylene. Another example is that of benzene, highly toxic and carcinogenic, which can be found as an impurity in gasoline, toluene, xylene and other solvents (often not as highly toxic). In this connection, it should be kept in mind that, when dealing with mixtures of liquid chemicals with different vapour pressures, the proportions in the liquid and in the gaseous phases are different. This is particularly important when the liquid with higher vapour pressure (hence vaporizing more readily) is much more toxic than the other constituents of the mixture. This would be the case for example, of a liquid mixture of benzene (higher vapour pressure) and xylene (lower vapour pressure). If such a liquid mixture were constituted of 10% benzene and 90% xylene (by volume), the resulting vapour (at the saturation zone) would contain 65% benzene and 35% xylene, hence a much higher proportion of the more toxic substance. Therefore, very toxic impurities with a high vapour pressure may pose an inhalation hazard, even if they are found in small percentages in a liquid mixture.