

OVERVIEW OF HEALTH AND SAFETY IN CHINA

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Current status and future development regarding health and safety production and legislation in China has been reviewed and analyzed in this paper. Since economic reform and opening, the entire society has noticed the importance of health and safety, as this could be a big barrier for the further development. Significant progress has been made over last 25 years with respect to health & safety research and practices. Meanwhile, health & safety legislation and environmental protection law has been established and operated in a much more stringent manner; however, safety is still a major issue which damages China's reputation and has significant societal as well as economic impact.

The Chinese government is paying increased attention to the areas of health and safety, such as establishing new legislations and applying new techniques to actively tackle key problem areas. The health and safety issue in China is not only confined by the legislation and regulation but also greatly influenced by its social and culture background. Therefore, it is very much an inter-disciplinary science and should have integration with local society. In order to maintain sustainable social and economic development the government has defined health and safety as a key area with interim and long-term plans for national development.

1. INTRODUCTION

With the major economic development and social reform in China over the last 25 years there has been an associated increase in living standards. The people and their government have paid more and more attention to health and safety issues. Safety management has become a central focus for scientific research and regulatory attention. The entire society has come to recognize that health and safety problems are critical to the welfare of each individual as well as to the sustainable social and the economic development of the country. Meanwhile, new technologies and innovations have been applied to health and safety issues along with the systematic establishment of legislation and regulation by the government.^[1] It is a fundamental premise of conventional welfare economics for the public policy makers that public decisions should, as far as possible, reflect the preferences of those who will be affected by them. However, both technical and human errors are still seen, especially, in the field of safety management and accident prediction.^[2] Safety and health is still a major problem, which will continue to damage society and the economy.

This paper will give an overall review and analysis of Health and Safety related legislations in China, under the five following subjects:

- Current status
- Background and origination of safety accidents

- Health & safety management system
- Establishment and application of legislations and regulations
- Development of health and safety in the near future

2. CURRENT STATUS

At present, the concept of safety is being underpinned and significant transformation is occurring across the entire society. Major progresses are being made in terms of safety theory, safety technique, and constructive safety culture. Nevertheless, many fatal accidents are still taking place, and with them come the associated damage to society with respect to people's lives and health and the underlying damage to the countries reputation and economy.

Figure 1 shows the distribution of accidents in different industries from November to December, 2006. Accidents during transportation were by far the major contributor, but as a subset explosions and accidents during mining activities made up another major proportion thereafter.

Based on the statistical data from the State Administration Work Safety of China, there were 627,158 accidents during production activities in 2006. Human casualty in these accidents totaled 112,822. 7 severe accidents (>30 fatalities each) resulted in 263 people losing their lives. The number of major accidents (>10 fatalities each) was 95, giving a total loss of life of 1570. 2357 accidents resulted in between 3 and 9 deaths (9065 fatalities in total).^[3]

The analysis of major accidents in the last decades also calls for more systematic safety management systems (SMS) and regulatory frameworks governing systems applied in manufacturing facilities.

3. BACKGROUND AND CAUSATION OF SAFETY RELATED ACCIDENTS

Based on the survey of State Occupational Safety and Health Association (China), there are five main aspects with respect to the present background and causation of safety issues in China, illustrated as follows:^[1, 4, 5]

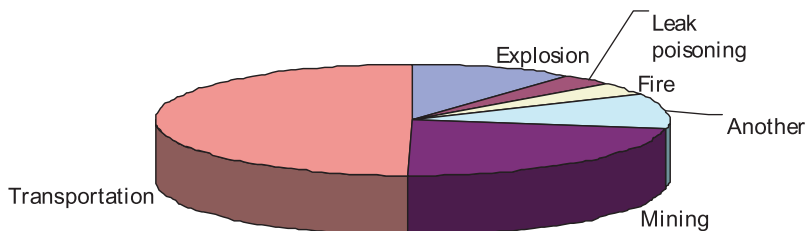


Figure 1. Accident Type Distribution from November to December, 2006

1. Limited resource is focused on safety during production. Inadequate supervision and management of safety is often tolerated in many production sites and limited finance/funding is applied directly to safety. These are obviously major causal factors. It is estimated that only a third of the total cost of implementing safety procedures is implemented in China against that of other industrialised countries.
2. The cultural background in China is not one given over to safety consciousness. Although Chinese civilization is over 5,000 years old, China has mainly been an agricultural country. Industrialization in real terms only started 30 years ago when China began its economic reform.
3. Compared with the rate of economic development, health protection and accident prevention systems have developed at a much slower pace, especially, in mining and the chemical industries.
4. Means and monitoring of implementing the Safety in Production Act are very weak.
5. There is reluctance to use new techniques or equipment that will provide or improve safety during production.

In fact, nearly all the accidents that occurred in the process industry were caused by improper process or equipment design or lack of the preventative control system. Nowadays safety management has become a fashionable term and the focus of study, but it could be dangerous to think it will solve all the safety issues.

Good engineering and behavioral safety (human factor analysis) are both equally important. One cannot simply substitute one for another in a developing economy. No matter how good safety management is, it cannot make up for poor design and lack of operating control. Safety and health effects are well studied and can be assessed according to science-based and commonly accepted methods of risk analysis.^[6] In risk analysis terms we can formulate the task of a safety management system as a “common mode” influence that is designed to keep all failure probabilities in the fault tree at the lower ends of their intrinsic bounds. It also anticipates all significant risk scenarios and design measures to eliminate them, or at least to reduce and provide robust control of them. The question of interest is whether we know enough about how safety management operates in order to design, assess, and improve the systems applied in practice.

4. HEALTH & SAFETY MANAGEMENT SYSTEM

The Chinese government has appointed institutions to manage Health & Safety. The uppermost institutions are State Administration Work Safety of China (SAWS) and State Administration of Coal Mine Safety under which there are many local subordinate organizations. The function of local organizations are to ensure the enterprise's approach to safety during production and employee's rights, supervise the performance of legislation and regulation, and report accidents etc.

Besides all the local organizations, SAWS also has some branches such as the China Academy of Safety Sciences and Technology (CASST) and the State Occupational Safety

and Health Association. The major roles of those branch organizations are: technological support to SAWS, promoting the development of safety science & technology, Health and Safety education, and trade, and providing services to enterprises related to safety technology, and information management.

CASST, as an example, is a research institute covering the areas of major accident prevention, major hazard identification, assessment and monitoring, risk assessment and management, building major accident & emergency systems and emergency planning, developing safety & hygiene engineering technology, work safety inspection and management systems, and basic theory of work safety and work safety economics.

5. ESTABLISHMENT AND APPLICATION OF LEGISLATION AND REGULATION

The Chinese government is seeking to establish new safety legislations revolutionarily to reduce the number of major accidents. Prescriptive laws and regulation aimed specially at technical preventive measures are to be implemented. There is an inevitability that these will potentially trail behind new developments in technology. The responsibility for devising the means of risk control will be taken not by the companies and industries that generated the technology, but by the regulator. The framework legislation requires companies to develop their own safety management system to specify, implement, and evaluate the detailed preventive measures. Therefore, more systematic management systems for safety are required to be further developed, structured, assessed, and improved. The Safety in Production Act was promulgated in 2002 in China. Consequently, it became a central task for 'safety' people to work on how to systematically and scientifically standardize the certification and accreditation of Occupational Safety and Health Management System, and how to establish an efficient and standardized mechanism. Objectivity and publicity in implementing the Safety in Production Act have also been given close attention by safety workers. In addition, the mechanism of market permission and inspection has been put forward in order to implement the Act effectively.

The constitution of national and international standards for safety management is in progress, modelled on the ISO 9000 series for quality management and the ISO 14000 series for environmental management systems.^[7] Meanwhile, health & safety legislation and environmental protection law have been established and operated in a much more vigorous manner. The effective management system is identified as Occupational Health and Safety (OHS) Management System, which is a method of going about your business whilst reducing risks to your staff. An effective OHS Management System can also help establish the framework of compliance with the two fundamental elements of OHS legislation, that is:

- Employers providing and maintaining a working environment that is safe.
- Employees taking reasonable care for the health and safety of themselves and others.

6. SAFETY PRACTICES IN THE CHEMICAL INDUSTRY

China has been the manufacture centre for the world. The Chemical industry has also blossomed over the last 10 years; therefore, health and safety issue have become the major challenge for this industry. Although the chemical industry in China has far better performance in terms of safety than other industries, such as mining and transportation, there are still many problems that need to be solved. The main causes for chemical accidents are:

- Speed of the development without serious consideration of safety;
- Budget saving and cost reducing;
- Improper design and engineering work;
- Lack of technologies to control hazards;
- Mismanagement;
- Awareness for safety due to the culture background;

The good news is that the best practice of safety management system for the oil, petrochemical and coal chemical industries have been developed by the State Administration of Work Safety, aiming at establishing control systems for different safety classes, such as explosion-isolation or safety spark type, which ensures the production safety for chemical processes.

Current trends show that more and more chemical enterprises have taken initiatives to conduct Safety and Environment impact studies for their intended investment in China. Ecological consideration is becoming vital to the industry's sustainable development. Besides implementing novel technologies in chemical plants, 'Safe & Green Concept' for designing and engineering are widely applied in many middle size and large chemical companies. 'Responsible' chemical enterprises, which offer the moral, legal and financial necessities to ensure safety, are welcome by employees and the whole society.

Great effort has been successfully put on introducing advanced and safer chemical technologies from overseas during the periods of the "Tenth Five-Year Plan" (2001–2005), the "Eleventh Five-Year Plan" (2006–2010). Importing of technologies with emphasis on safety and environment has continued. There is also more opportunity for international collaborations in SHE areas.

Alongside safer technology implementations, an advanced management system for the chemical industry has been introduced. It consists of nine aspects:

1) Safety policy: Written safety policies for each factory shall be established and maintained with emphasis on protecting the safety, health and the general well being of every personnel working in the factory. This spells out management's commitment towards safety and the principles that govern safety and health decisions in the factory. Senior management shall ensure that the safety policy is communicated to all employees and relevant contractors and, shall establish a culture that safety and health are valued as basic and fundamental prerequisites for the business of the factory.

2) Safe work practices: Safe work practices shall be carried out in the factory through procedural and administrative control of work, critical operating steps and parameters,

pre-start up safety reviews for new and modified plant equipment and facilities, and management of change of plant equipment and process.

3) Training: Employees and contractors at all levels shall be equipped with the knowledge, skills and attitudes relating to the operation or maintenance of facilities so as to work in a safe and reliable manner. An effective training program shall be established to train employees at all levels. A scheme shall be devised to identify the safety and health training needs for each level of employees and contractors.

4) In-house safety rules and regulations: Written safety rules and regulations for all personnel in the factory shall be established to instill a common understanding of their safety and health obligations and responsibilities. A set of basic safety rules and regulations shall be formulated in the factory to regulate safety and health behaviour at the workplace. The rules shall cover the main work operation or process in the factory.

5) Safety promotion: The management's commitment and leadership shall be clearly demonstrated in promoting good safety and health behaviors and practices in the factory. Promotional programs shall be developed and conducted. Safety and health awareness shall be raised and maintained among all employees and contractors.

6) Safety inspection: A system shall be established to verify compliance with the relevant regulatory requirements, in-house safety rules and regulations and safe work practices. The factory shall develop and implement a written program for formal and planned safety inspections to be carried out in the factory. The program shall include safety committee inspection, routine safety inspection, plant and equipment inspection and other special or surprise inspection.

7) Hazard analysis: Hazards shall be methodically identified, evaluated and controlled in processes in a factory. The process of Hazard Analysis shall be documented and shall include measures over serious scenarios that could occur in a factory. Necessary corrective or control measures shall be incorporated to mitigate the frequency or severity of the risks associated with the scenario event.

8) Occupational health programs: Occupational health hazards shall be identified, evaluated and controlled to protect all personnel from developing occupational diseases or illnesses arising from their exposure. The program is to specific occupational health hazards presented in the work environment and establish policies and plans to protect all workers from them.

9) Emergency preparedness: A program of drills and exercises shall be established to assess the preparedness of the factory for prompt and effective response to emergency situations. Factories shall establish effective first-aid programs to provide first-aid and emergency treatment to victims of an accident, which include provision of adequate first-aid facilities and trained first-aiders.

People in the chemical industry start to understand that SHE challenges cannot be overlooked as we strive for a better life and a favourable economic achievement for the country while keeping in line with the goal of the global sustainable development. The effort on SHE issues has enabled us to make this industry a safe place to work despite the misperception by many that associate 'chemicals' with 'fear'. The chemical industry in

China will continue to push forth its efforts on SHE to manage the life-cycle of chemicals through collaborating closely with the world.

7. DEVELOPMENT OF HEALTH AND SAFETY IN THE NEAR FUTURE

The Chinese government has recently made high-profile efforts to build a harmonious society on an all-round, well-off basis, a goal which has given full expression to the people-oriented development perspective. To regulate industrial practices, in a sense to truly protect workers' safety and health, is a logical step amid efforts to build a harmonious society. That is a society built on the foundations of democracy, the rule of law, justice, sincerity, amity, vitality, and stability, harmony between man and nature, and coordinated economic and social development. These continuous improvements can benefit society as a whole. By taking major measures such as institutional reform, embedding safety mechanisms/techniques into production, increasing funding on safety issues, etc., then continuous improvement of workplace safety and working conditions nationwide will follow. This will drive improvements in the current rising trend of total accidents, whilst maintaining the sustainable and rapid growth of the Chinese economy.

Whilst China, the world's largest developing country, is going through a major industrialisation process, the work safety infrastructure remains weak, indicated by the reoccurrence of major accidents in certain industries (and in certain areas of the country). The economy of the country is relatively unbalanced and of relatively low productivity when looked upon as a whole. China's work safety status is so far incompatible with what a 'well-off' harmonious society demands, and in this connection there is still a lot of work to be done to improve it.

The Government needs to continue to give top priority to safety issues, promoting a preventive safety culture within workplaces and overseeing that the primary responsibility of enterprises is given to workplace safety. Government regulators need to fulfil their role in ensuring this is rigorously enforced and audited effectively. Sustained efforts have to be made in promoting safety culture, building a sound legal framework governing work safety, implementing the safety responsibility system, advancing safety science and technology, and increasing the funding of safety measures.

It is the Chinese government's aim to enhance safety management at source, eliminate hazards that stand in the way of improved safety conditions, and ensure safety at an intrinsic level. To better fulfil this mission, the Chinese government ought to broaden their horizons and continue to further embrace the outside world in the field of health and safety. The Chinese government is eager to enhance cooperation with the relevant intergovernmental organizations, foreign governments, intermediaries, multinational companies and enterprises of different categories, to examine and learn safety philosophies, sciences, technologies and management approaches that originate in other countries and regions.^[8] Hopefully, assisted with international wisdom, China will blaze a new trail to put work safety on a solid basis and achieve steady and rapid improvement of its work safety situation. As a responsible player in the international community, China can make due

contributions in implementing the Global Strategy on Occupational Safety and Health and creating for mankind a safe, harmonious environment with less potential for major accidents.

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