

# Countermeasures of Hidden Safety Problems in Chemical Production in the New Era

Yinbing Zhang

Hubei University, Wuhan, Hubei 438400, China

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**Abstract:** with the continuous development of science and technology, the sustainability of industrial production is closely related to the safety of chemical production. Good safety in production is the basic premise for the development of chemical enterprises, and is also the embodiment of people-oriented. In the new era, people should think deeply about the safety in production of chemical industry once again. Considering the particularity of chemical industry, taking safety in production as the breakthrough point, people should seek an advanced and safe production mode to reduce the occurrence of safety accidents, thus effectively improving the economic benefits of enterprises. At present, the situation of safety production in china's chemical industry is grim. In order to reduce the incidence of safety accidents, this paper mainly introduces the current situation of safety production in chemical industry and the chemical safety problems easily caused in the new era background, and puts forward specific cause analysis and solutions, in order to put forward effective theoretical suggestions for safety production in chemical industry.

## 1. Introduction

Generally speaking, chemical production is a complex production process, usually containing the nature of posing a threat to the employees of the enterprise. Including explosive, flammable, corrosive, toxic gases, etc. Chemical enterprises based on the above characteristics are prone to explosion, fire and other accidents that cause certain losses to enterprises in the production process [1]. On the other hand, chemical industry occupies a very important position in the national economy. Therefore, it is necessary to pay special attention to the safe production and management of chemical enterprises. In the chemical industry, the vast majority of chemicals used, processed and produced are flammable, explosive, toxic and corrosive substances, and the process flow is relatively complex, which is prone to potential safety hazards [2]. The new era requires chemical producers not only to produce large quantities of high-quality products, but also to ensure social benefits, such as environmental benefits and continuous development ability, of which the most important is production safety. Good safety in production is the basic prerequisite for the development of chemical companies, and it is also a people-oriented embodiment [3].

With the rapid development of science and technology and the national economy, the production technology of chemical enterprises has also been developed rapidly. However, the safety production of china's chemical industry has not been effectively guaranteed, and many major safety accidents occur frequently, endangering personal safety and enterprise development [4]. In the new era, people should rethink the safety production of chemical industry. In view of the particularity of chemical industry, we should take safety production as the starting point, and seek an advanced and safe production mode to reduce the occurrence of safety accidents, so as to effectively improve the economic benefits of enterprises [5]. Strengthening the analysis of common problems in chemical safety production and using scientific countermeasures will help enhance its production safety, ensure the safe implementation of chemical production plans, and gradually achieve its goal of maximizing production benefits. Therefore, it is necessary to conduct in-depth discussions on the common problems and countermeasures in chemical safety production from multiple aspects [6].

## 2. Current Situation and Problems of Chemical Safety Production

### 2.1 Lack of Safe Production Management

The chemical industry itself is very risky, so extra care must be taken in the actual production process. However, relying solely on the preaching of safety systems and safety awareness is not feasible in actual production. At present, the lack of safety production management systems and professional safety management personnel are the main problems faced by some small and medium chemical companies in China. Enterprises pay more attention to economic benefits, not enough attention to operators who lack professional knowledge, we require safety first, but the actual situation is mostly production first. In view of this, we need a set of resolutely implemented, systematic safety production management systems to control the entire production process. A considerable part of the safety management of chemical companies depends on technology, but in practice many technologies fail to meet the standards. If there are fuel tanks and accident oil tanks, hydraulic safety valves and flammable and explosive materials are not equipped with flame arresters and safety valves in some equipment And the enterprise table has not been tested, etc. [7]. In addition, with the development of information technology, the application of computer information system is more and more extensive, which plays a more and more critical role in security work. However, the information technology and equipment system of chemical industry have some problems, such as slow update and low mastery of personnel. The characteristics of chemical enterprises determine that in the process of “production, operation, transportation and use”, a set of sound regulations and systems are needed to maintain development. However, in the process of production, many enterprises do not fully implement the rules and regulations, and the violation is serious. According to the statistics in recent years, the common accidents in chemical enterprises are due to the lack of safety awareness and the lack of implementation in the system. The composition diagram of hidden danger management of production safety accidents is shown in Figure 1 below.

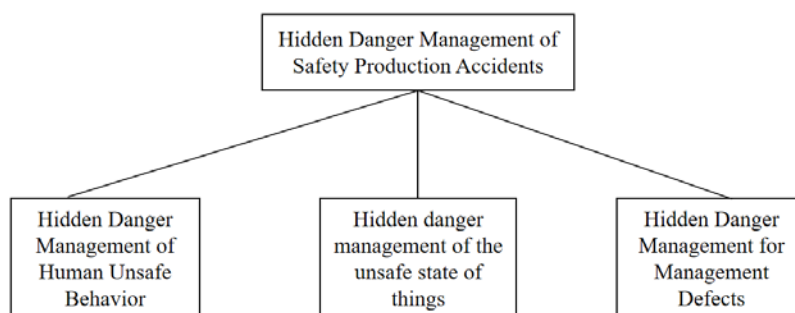


Fig.1 Composition of Hidden Danger Management of Work Safety Accidents

### 2.2 Chemical Industry Itself Ignores Safety Awareness

According to relevant investigation and statistics, up to now, the proportion of accidents caused by human factors in the total accidents of chemical enterprises is about 70% to 80%. This figure shows that most accidents are caused by people's negligence in the process of work. On the one hand, from the perspective of employees, due to the low quality of employees and unsafe behaviors, there are often problems in charge such as failure to act in accordance with the articles of association, illegal operation, or lack of attention in the process of work. On the other hand, from the perspective of management, although the enterprise has formulated a detailed safety management system, it has also carried out safety knowledge training. But under the pressure of enterprise economic benefits, many managers ignore some details in the production process, and the implementation of safety management system is not in place, which leads to the occurrence of safety production accidents. China's chemical enterprises are characterized by a large number of small and old enterprises, more than 90% of which are small and medium-sized enterprises. In some provinces, small chemical enterprises with less than 20 people account for about 40% of the total number of chemical enterprises in the province, and some are close to 50%. Small chemical

enterprises are backward in technology, equipment, automation level, safety investment, personnel quality and safety management. Although many old enterprises have a certain management foundation, their technology is relatively backward, their equipment is outdated, their maintenance and updating are not timely, and their automation level is not high. Enterprises have heavy burdens and many security debts. Brain drain is serious, safety management is declining, and safety assurance capability is declining [8]. Production personnel lack necessary safety awareness. Through an in-depth analysis of the status of chemical safety production, it can be seen that the problem of weak safety awareness of production personnel is widespread. Although chemical enterprises have carried out various safety production training activities, the lack of evaluation on the professional ability and safety knowledge of production personnel has led to the lack of effective safety awareness of production personnel in specific jobs, which may lead to misoperation, affect the realization of chemical safety production objectives and also hinder the implementation of subsequent production plans. The overall quality training of production personnel is insufficient. During the implementation of the chemical safety production operation plan, the improvement of the overall quality of production personnel is conducive to enhancing the safety of chemical production and maintaining good production and social benefits of the enterprise. However, due to the special nature of chemical production operations, the overall quality of the production personnel recruited during the production process is insufficient, and the number of chemical production personnel with outstanding professional capabilities and rich practical experience is small. Enterprises need to increase their overall quality training efforts.

### 2.3 Inadequate Implementation of Safety Management System

In order to ensure the safe operation of chemical production, enterprises will formulate corresponding safety production management systems, stipulate various operating processes in production, and standardize the operation behavior of personnel. However, in the process of actual operation, some enterprises did not attach importance to the safety management system, and the supervision work was not in place. In actual operation, the safety management system is ineffective and is not conducive to the safe operation of production. At present, the grass-roots security supervision department lacks professionals, the depth and breadth of safety inspections are not enough, hidden dangers cannot be found in time, and the supervision and rectification of hidden dangers in enterprises is not enough. Township government's safety supervision is even weaker. In addition, when formulating the management mechanism of chemical safety production, there are no detailed regulations on all aspects of production. For example, the specific personnel responsibilities in the whole production process will lead to problems such as accountability, accountability, unclear responsibilities, difficulty in accountability, etc. Serious threats to the safe production of chemicals may be caused by seemingly minor omissions and defects [9]. Select the one-year accident account of the chemical company to analyze the essential causes of production safety accidents, as shown in Table 1 below.

Table 1 Essential Causes of Work Safety Accidents

Serial number	Accident time	Accident passing	Direct cause	Essential reason
1	2016.1.5	The power of water source line is cut off, and the total speed change is cut off. The electrician on duty found that the high-voltage motor of main fan of autogenous mill is in fault, the stator winding is grounded, the insulation is seriously damaged, and the short circuit causes the power cut accident	The equipment runs, runs, drips and leaks seriously, and the dust content of the post is too high	The safety awareness of relevant personnel is weak and the safety production management system is not implemented
2	2017.5.5	The maintenance worker was poisoned due to the failure of gas mask when replacing the heat exchanger	The diaphragm valve of the equipment blanking pipeline is not tight, and the blind plate is not added in	Poor safety awareness and safety training of the person responsible for the accident

			time after the flange is untied	
3	2018.8.5	The dry aspirator in the workshop was sprayed on his face and upper body by the leakage of sulfuric acid from the nearby acid pipeline during the on-the-job production operation, resulting in multiple burns	Failed to control the original leakage point in time	The person responsible for the accident does not have a strong sense of safety prevention and does not implement the safety production management system
4	2019.8.9	When the maintenance worker is welding the pipeline in the sewage post, the falling pipeline hits the toe of the left foot big mother	Insufficient estimation of potential safety hazards	Poor sense of self safety of responsible person
5	2019.11.2	When the sieve operator of the second shift of raw material arrives at the sieve post to clean the sanitation of the separator, he falls into the sieve reflux bucket, which slides into the raw material warehouse, causing neck injury	The operator did not stand on the platform as required to clean up, resulting in injury.	Illegal operation and insufficient safety training

### 3. Measures and Countermeasures to Solve Safety Problems

#### 3.1 Establish and Improve the Safety Production Management Mechanism

According to their own characteristics and actual development, chemical production enterprises should establish and improve the safety production management mechanism, so that the production responsibility system can be effectively implemented. Improve the sense of responsibility of safety management personnel in chemical enterprises. In the safety management of chemical enterprises, it is helpful to strengthen the sense of responsibility of relevant personnel. Improve the sense of responsibility of safety management personnel in chemical enterprises. In the safety management of chemical enterprises, it is helpful to strengthen the sense of responsibility of relevant personnel. On the establishment of the system, it is strictly implemented and formulated in accordance with national laws and regulations, and constantly improves the level of safety management. On the other hand, it is necessary to organize industry associations and related experts to teach production safety knowledge, and regularly inspect chemical production sites, strengthen management, find hidden safety hazards, and discover problems in a timely manner. In addition to solving problems, rely on science. Technology, we must vigorously develop advanced technology, strengthen safety devices, adopt more reliable and stable technologies, improve our own safe operating practices, and strengthen and reform the production environment. The construction of safety culture for chemical companies is a systematic project, which includes the aspects of publicity and education for safe production, business management, system construction, and emergency rescue. For chemical production, it is necessary to strengthen on-site safety management. In practice, timely detection and elimination of hidden dangers is the core of the work, correct various violations, and deal with the offenders to maintain a good management status at the production site. All departments work together to deal with safety accidents, realize on-site safety management and carry out mutual supervision so as to complete the task of safe production. The function relationship type is determined by drawing scatter diagram, and finally the statistical regression analysis is conducted according to the relevant cost data, and the dynamic change model of relevant management hidden danger cost is proposed to be consolidated and determined, as shown in Figure 2 below.

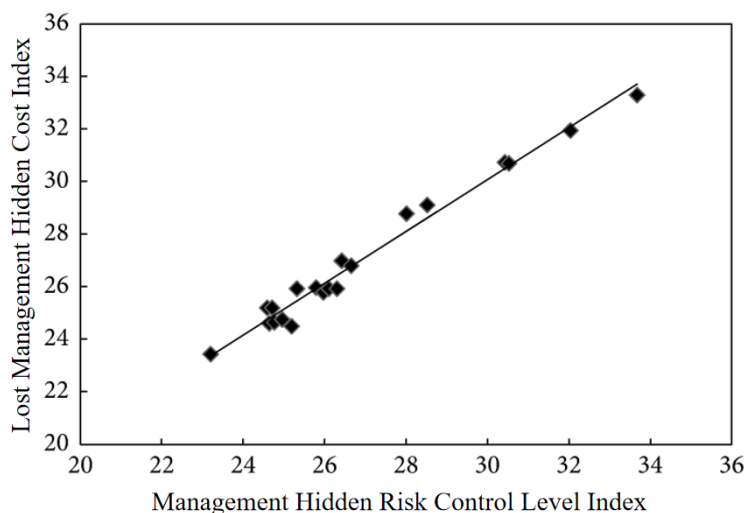


Fig.2 Potential Cost Trend of Loss Management

### 3.2 Raise the Staff's Awareness of Safe Production

The most important factor in the production process of chemical companies is people. Therefore, enterprises should make full use of operational technicians to mobilize their subjective initiative and enthusiasm in the process of safety production. In the production process of chemical companies, strict implementation of human resources has improved employees' safety awareness and capabilities. Strengthen the awareness of safety management. Due to China's implementation of the planned economy for many years, safety management has not yet received the due attention of chemical companies. Therefore, the personnel of chemical companies, especially the leadership, must change the traditional management concept and strengthen their understanding and emphasis on safety management. For the lack of safety awareness of chemical production personnel, it is necessary for chemical enterprises to carry out various safety education activities, strengthen the publicity of safety production, improve the correct understanding of the importance of chemical safety production of production personnel, and constantly strengthen their own safety awareness in the long-term practical production. Pay attention to the continuous improvement of the overall quality of production personnel. In the process of practice, we should strengthen the overall quality training of production personnel by carrying out various professional training activities of chemical safety production, and scientifically evaluate their professional ability and safety knowledge in the production process to ensure the full play of the actual role of production personnel. At the same time, we should implement the responsibility system, establish an efficient incentive mechanism, and standardize the operation of chemical production personnel. Firstly, in the production process, the unsafe behaviors of employees are found in time, and corrective measures are taken in time to ensure the safety and reliability of chemical production. Secondly, arrange every employee to carefully study the safety production knowledge and relevant laws and regulations, so that they are familiar with the professional knowledge of the post and master the practical operation skills and skills. Finally, chemical enterprises must actively cooperate with the inspection work of safety personnel, arrange employees to participate in various chemical safety production activities on a regular basis, and continuously strengthen their safety aware.

### 4. Conclusion

The chemical production process is relatively complicated, and the safety standards for production are high. Because chemical production materials have high dangers, once a safety production accident occurs, it will cause serious economic loss and personal injury and death. It will be a safety belt for society. Influence, so we must strengthen the safety management of chemical production. Hidden safety hazards exist in the production process of every enterprise, especially in high-risk industries such as chemical companies. Safety production is the primary criterion for the

survival and development of chemical companies. The construction of chemical safety production management is a wide-ranging and systematic project. This is related to the improvement of the company's production safety level and the sustainable development of chemical companies. Through introducing the present situation of chemical safety production in our country and deeply understanding it, we can lay a good foundation for finding out the problems existing in chemical safety production in our country and putting forward corresponding countermeasures for these problems. According to the analysis of the existing problems in the chemical industry safety in our country at present, the corresponding countermeasures are put forward, and the enterprise responsibility and government supervision and management mechanism are gradually implemented to avoid the occurrence of safety accidents. The coordination and cooperation of various departments in the chemical industry production process should be emphasized to complete the safe production of the affairs of various departments. While requiring chemical enterprises to produce safely, efforts should be made to reduce potential accidents and effectively prevent and control potential accidents.

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