Research on Informatization of Hidden Danger Investigation and Management in Modern Cigarette Factory

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Abstract. As an important part of the development strategy of cigarette enterprises, safety production management is an important guarantee to realize the operation target of cigarette factory and improve the economic benefit of enterprises, among which, hidden danger investigation and management are the most important means and methods. Especially when the industry is striving to achieve “Implementing the New Concept of Development, Go Up to a New Level of Cigarettes”, hidden danger investigation is not tolerated in the slightest carelessness. This paper expounds the improvement of enterprise safety management efficiency and the role of security hidden danger analysis and decision-making by realizing informatization of hidden danger investigation and management in cigarette enterprises. This paper also discusses the infrastructure of system construction, the principles and promotion strategy to be noted in the process of implementation.

1. Introduction

With the rapid development of social economy, especially in the Opinions of the State Council of the CPC Central Committee on Promoting Reform and Development in the Field of Safety Production published at the end of 2016, safety in production has been raised to a new height in history, and new tasks and requirements are put forward for safe production in cigarette enterprises. Safety management has the characteristics of multi-point, wide-ranging and complex, and is a kind of highly demanding, responsible and stressful work. Hidden danger of enterprise safety means existing production safety risks and it has the characteristics of wide distribution and long span. It will lead to the difficulty of effective supervision in rectification and implementation and the lack of data base for later statistical analysis if the feedback of hidden danger investigation information lags behind[1]. At the same time, it will not be able to support high-level decision-making and it is difficult to share hidden danger information. All in all, it is not conducive to further improvement of the safety management level of modern enterprises by adopting the traditional hidden danger investigation and management mode.

It is helpful to solve the management bottleneck in the current safety management process, promote safety management to essentialize, improve the level of safety management by establishing an information system which is based on the criteria for evaluation and inspection (YC/T284-2011) in Standardization Standard for Safety Production in Enterprises, associated with regions of enterprise safety management category, and Covering the Closed-loop management in whole process of investigation of hidden dangers[2].
2. The important significance of hidden danger investigation and management
As the saying goes, hidden danger in the open fire, prevention is better than disaster relief, the responsibility of mount tai. The harmfulness of safety hidden danger has been gradually recognized by people. There are two main principles in safety management science. One is the Heinrich's Law, which states that there are 139 minor accidents, 300 signs of accidents and 1,000 potential safety hazards behind a major accident. The other law is Murphy's Law, which states that as long as there are conditions for accidents, accidents will happen sooner or later. With the characteristics of arbitrariness, contingency, repeatability and easy to be ignored, the hidden danger may be formed by the negligence of people, equipment, materials, environment or management and other factors. Therefore, to rectify the hidden dangers of safety we should start from investigation, focus on governance and aim at elimination. It will eliminate an accident, reduce one point of risk and ensure a safe life by rectifying a hidden danger. We have a long way to go, we must always keep a clear mind, and we have to firmly establish the “A hidden danger is an accident” thought for every hidden danger in the construction of intrinsically safe enterprises[3].

3. The necessity of informatization of hidden danger investigation and management
Every time when we find problems in the investigation of potential safety hazards, we should rectify and verify one by one according to the standards, which has to be done manually. It becomes a time-consuming and laborious job, since there are many safety standards and regulations, and the accuracy and timeliness of comparing standards work depend on the ability and quality of relevant personnel. There may be some inapplicable clauses in some standards, which need the safety management personnel to recognize and evaluate. The safety management personnel should organize safety standards into a standard library according to their categories, regions and facilities when they are using the safety standards. Otherwise it is difficult to control and deal with the standards accurately by checking book or checking electronic equipment in the actual management process.

It is helpful for enterprises to change from passive acceptance of safety supervision to initiative development of safety management, promote innovation and transformation of safety management, and make further innovation and development of safety production management concept, supervision mechanism and supervision means, by means of information technology; with the characteristics of multi-point and wide-area and multi-to-many relationship with safety standards in the hidden danger investigation process, to manage in a traditional way, it will be low efficiency, heavy workload and too much repetitive work, however, it is a good choice to make hidden danger investigation mobile, anytime, anywhere by using information technology combining with Internet + Technology; The whole closed-loop management process of recording, issuing, rectifying and acceptance of hidden danger inspection items can be solidified only by using information technology, which can ensure the integrity of records and achieve twice the result with half the effort; it can be the basis of large data analysis of hidden danger by accumulating hidden danger records to form experience base[4]. As an important stage in the development of safety management, hidden danger investigation and management informatization can integrate resources effectively, improving management efficiency and reducing management cost can realize rapid and accurate information transmission.

4. Suggestions on establishment of hidden trouble identification and management information system
With the rapid development of information technology, combined with "Internet +" thinking, it can further strengthen and improve the hidden danger investigation and management process, and better improve the efficiency of safety management, with the help of information platform. It has become an inevitable trend of safety management in the field of safety production and tobacco industry by using information technology to assist safety management and supervision.
4.1. Principles of system construction
System construction can neither be separated from the actual needs and environment of enterprises, no clear goal, seeking perfection blindly, want to "catch up" in all respects, nor copy the path others have taken. What should be done for system construction is based on the enterprise's own situation, make full use of favorable opportunities, and make a comprehensive plan. Otherwise it will certainly lead to delays in the construction of the whole system. When setting goals, it should be adapted to the development goals of enterprises and the level of safety management modernization. We should work hard in some areas and take the lead in breakthroughs when having certain conditions.

4.2. Establishment of hidden danger investigation and management database
Hidden danger investigation and management database is mainly composed of one center and three important related dimensions. One center refers to the database of hidden danger investigation and record, which is the core data and supporting foundation of the whole system management process; Three important dimensions consist of three databases. The first one is a safety assessment standard database (including hazard source standard database). The effective use of safety standards is a very important key link in the process of hidden danger investigation and treatment. It is difficult to accurately control and respond to the traditional way of written access, electronic document access or publicity in the process of implementation, which is inconvenient to use. In order to use the management safety standard more effectively, the tree data structure is used to format the safety standard, and the description information of the assessment and the assessment score are taken as the attributes of the standard to form the safety assessment and inspection standard database. The second one is regional management database for security management. The final foothold of hidden danger investigation is the equipment and facilities in each region and region of the enterprise. As the object and focus of our investigation, all the hidden points in each region must be identified, so it is necessary to layered encoding all the areas involved to form a regional management database. The last one is departmental and post management database. In order to effectively implement a whole management process of hidden danger investigation and let the idea of safety management grid really fall to the ground, it is certainly not enough to rely solely on the security department or several security personnel to carry out safety management[5]. The hidden danger points must be connected with positions and personnel, with the principles of "Who's in charge, who is responsible" and “horizontal to side, vertical to the end”, so that all staff can participate in safety management and pay attention to the hidden danger. Only in this way can we cultivate the habit of supervision through the implementation of responsibilities and ultimately improve the safety literacy of employees.

4.3. Solidify the risk detection management process
Only in a closed-loop management mode can the hidden danger investigation and management block work vulnerabilities, improve work efficiency, improve the implementation capability better and really implement the security responsibility. However, in the actual management process, closed-loop management is often difficult to implement in place, so that the results are far from the expected goals. Solidification process of management system through hidden danger investigation, which is solidify the safety management method, can avoid deviations in employees' understanding of safety management and avoid fluctuations in management level due to job changes and staff turnover. It can also provide a good grasp for business managers, reduce the preparatory work in the early stage of hidden danger investigation and promote the fast landing of safety production standardization by use the hidden danger investigation and management system.

4.4. Application of Hidden Danger Database
Hidden danger investigation is a thorough and meticulous investigation and study of places, operations, machinery, equipment, processes, etc., to find unsafe factors, in order to eliminate hidden dangers, eliminate all kinds of accidents that may occur in the bud, so as to prevent them in the bud[6]. Systematic analysis and research are also needed to identify the hidden dangers. We should give full
play to the role of hidden danger database and establish models from multi-dimension, multi-type and multi-region for statistical analysis. With the help of intelligent analysis tools, drill down and analyze, find out the inherent causes of various hidden dangers, classify and deal with them, give one example to another, promote the sustainable and healthy development of hidden danger management work, so as to achieve the goal of eliminating hidden dangers. From the analysis of hidden danger data, new similar hidden dangers can be found in time, the regions and types of hidden dangers which are treated and recurred repeatedly can be found out, targeted investigation and analysis can be carried out, corrective and preventive measures can be worked out, key monitoring, key prevention and key management can be carried out, which can provide guidance and reference for the next safety management decision-making.

5. Promotion Strategy of Information System for Hidden Danger Investigation and Management

5.1. Strengthening Top-level Design
In the early stage of the construction of hidden danger investigation and management system, it is necessary to determine the overall planning, expected objectives and technical route of the system through top-level design. The construction process needs the attention and support of senior leaders, the rational allocation of resources, and the formulation of a management system that can be implemented and seen in detail. It is necessary to consider the adaptability of the system to the internal and external environment, which is consistent with the requirements of the security system construction of the superior units, and interoperable with the system in superior units. And the system should be scalable and predictable for future development. The "blueprint" of the system construction should be described from the perspective of the overall situation of the enterprise. It is necessary to clarify the starting point and the end-point of system construction. In addition, the system should have specific operability and be able to operate sustainably. In short, the quality of top-level design affects the success or failure of system construction and application directly.

5.2. Strengthen the study and training of personnel at all levels and strengthen team building
The construction process of the system is the process of gradually solidifying the management thought, and standardizing and supervising the execution of the management thought through the system. In the process of construction, the training of decision-making, management and operation levels on the concept and mode of system management should be done synchronously, so that they can understand and identify with the idea of system construction earlier [7]. At the same time, they can identify and confirm the feedback received in the training process as the motivation of system optimization. Learning and training are also the key means to strengthen the construction of talent team. Safety management involves many points, a wide range and a strong professionalism. It is necessary to carry out talent selection and training at different levels in a planned way. More importantly, it emphasizes to think about hidden danger management from the perspective of informationization, so as to gradually enhance the awareness of the deep integration of safety management and informationization, and create a good atmosphere for the implementation and promotion of the system.

5.3. Introducing Mobile Applications to Improve the Survey Accuracy, Pull the whole linkage of hidden danger investigation
Popularization of mobile applications provides new means and models for hidden danger investigation and management. Firstly, mobile location checking can be realized by scanning the two-dimensional code of the area where the mobile terminal is located. In this way, APP can interact with the service platform through the network, intelligently display the current regional hidden danger points and corresponding evaluation standards, and solve the problems of what to check, how to check and how to evaluate for the investigators. The inspection results are saved and uploaded to the service management platform in real time. It can transfer the main energy of inspectors from copying records and referring standards to on-site analysis and problem judgment, reduce the dependence on
experience, improves the efficiency of inspections, ensure that inspections are comprehensive and hidden dangers are not "hidden", and avoid missing inspections and mis-judgements.

In addition, through the function of safety hidden danger photograph casually the whole staff can be pulled to find hidden danger, the whole staff can supervise hidden danger, the safety consciousness of employees can be strengthened, and a good atmosphere for safety production can be created. Graphic and text information submitted by casual photography is correlated by hidden danger management system. It will be associated with the corresponding evaluation criteria, involving regional and responsible posts, and integrated into the closed-loop management process, which will become an effective supplement to the hidden danger investigation database.

6. conclusion
Internet technology and computer technology have brought tremendous changes to the world and unprecedented changes and promotion to the production, operation and management of the tobacco industry. However, there is no better effect to integrate Internet technology and computer technology into the management of hidden dangers in tobacco enterprises. In this paper, the cigarette factory is listed as a pilot, through the combination of practice and exploration of innovative ways, systematic integration of standardization and standardization of tobacco enterprise safety management with information technology and internet technology. A systematic model and constructive scheme for improving the accuracy, efficiency and standardization of the investigation and management of hidden dangers in Cigarette Enterprises has been explored. In addition, a preliminary design is made for the role played in the statistical analysis and decision-making of hidden dangers and the related processes are sorted out and perfected. In this way, a new mode of investigation and management of hidden dangers in modern cigarette enterprises has been explored. It is of great practical significance to carry out and improve the safety management of tobacco enterprises efficiently for the investigation and management of hidden dangers in the whole tobacco industry. More innovative ideas and new methods will be explored to ensure the safe production of enterprises and the harmonious and orderly development of the industry.

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