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REVIEW

Aviation Fuel System Safety Management Analysis

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ABSTRACT

The development of China's aviation industry is accelerating, especially in terms of national political protection, military security and economic security. In the aviation industry's aviation fuel system management, safety management is an important content. This paper focuses on the safety management of aviation fuel systems.

1. Introduction

The military aviation industry can protect the country's territory from foreign forces. The role played by the civil aviation industry is to transport passengers and various goods. The aviation industry has adopted high-tech achievements, not only with high technical accuracy, but also with cutting-edge technology. Airport fuel is frequently used in the process of receiving and refueling aircraft. In order to ensure the safety of fuel use, it will inevitably place high demands on management. This requires the timely and effective adoption of scientific and effective safety management measures to improve the management level of the airport's fuel safety and maintain the airport's operational safety.

2. Contents Needing Attention in Aviation Fuel Safety Management

2.1 Aviation Fuel Transportation

During the normal supply of aviation fuel and the execution of aviation missions, attention needs to be paid to the issue of oil distribution and transportation. For a long time, aviation fuel used in China has been handmade. The source, amount, supply and total inventory of fuel will have a certain impact on the transportation and distribution of fuel, which not only affects work efficiency, but also leads to a large waste of time and a large consumption of human and material resources. When performing work tasks, pay attention to progress, time cannot be guaranteed, personnel cannot be flexibly scheduled, and various resource allocations are not reasonable, as a result, the economic benefits are poor. When an emergency occurs at the airport, the staff often cannot respond flexibly and cannot adjust their work in time. Fuel allocation and transportation still need to be adjusted and continuously improved, but some new problems will emerge. For example, increasing the quantity of imported oil, annual maintenance of refineries, and taking into account aviation petroleum engineering issues in daily work, which requires effective

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grasp of the transportation situation, rational distribution of oil, and actively seeking sources of oil supply, which will help improve the utilization of resources, and operating costs will also be greatly reduced, which will not only promote the better development of airlines, but also improve the competitiveness of the industry.

The management of aviation fuel projects needs to be carried out in accordance with prescribed principles, so that inventory becomes a new profit point. In the specific work, the fuel supply must be guaranteed, and the flight can run normally; ensuring that the fuel quality is qualified, which is the key to ensuring the safe operation of the aircraft, and also to maintain passenger traffic safety; from the perspective of oil supply and demand, since jet fuel is a very scarce resource, airlines need to develop transportation plans for the use of fuel. When transportation is inconvenient, it is a special period. At this time, inventory work must be done according to the plan. The maintenance time of the refinery should be considered, and the plan should be adjusted after clearing the space distance. Domestic and international oil prices are not fixed, but need to be constantly adjusted. After considering the relationship between supply and demand, it is necessary to do a good job of oil reserve, which will help improve economic benefits. Work started in accordance with the plan, transportation efficiency has improved, and fuel oil inventory turnover will also increase accordingly. At the same time, the improvement of transportation efficiency requires continuous innovation in management, which is the key to improving economic efficiency.

2.2 Aviation Control Equipment

Fuel is very important, so it is also very important to choose the right aviation fuel equipment. There are various types of aviation automatic control equipment on the market. Therefore, airlines should choose suitable equipment based on their own conditions and implement quality management work, which is essential to ensure the safe and reliable operation of the equipment. The performance of the equipment directly affects the transportation of aviation fuel, the storage and supply of fuel, and therefore requires great attention.

Nowadays, the level of science and technology continues to improve, technical results continue to emerge, and information technology is used in equipment management. When the equipment is running, information technology can be used for real-time monitoring, regular technical maintenance and maintenance, and it can effectively perform faults caused by the equipment and accidents and scraps during operation. In this series of work, the application of information technology can be dynamically tracked and monitored, and various kinds of information can be obtained in a short time to ensure the safe operation of the equipment. In the management of equipment, we must recognize that the effective management of equipment is closely related to the life cycle. Equipment management is related to production safety and oil quality. The flight safety of aircraft is directly related to the quality of equipment management and is closely related to the efficiency of airlines. Therefore, in the selection of equipment to ensure good performance and suitable equipment, can improve the management level of the enterprise, and the economic efficiency of the enterprise has also improved.

2.3 Aviation Fuel Safety Management

In the development of enterprises, safety production is an important driving force. Enterprises must continue to develop steadily. Safety is the first element. Aviation fuel is a chemical product, which is easy to burn and explosive. In the process of fuel production and operation, safety is an issue that needs to be considered. Therefore, the following issues need to be addressed in oil safety management:

First, workers must be regularly educated on safety in production, so that employees have a higher awareness of safety in production. The first consideration in work is safety, and "safe production" is the first priority, so that every Chinese person is serious. Perform security duties.

Second, in the daily management work, it is necessary to rationally plan the aviation fuel operation, and all the hidden dangers in the work must be eliminated in time to avoid risks in subsequent work.

Third, formulate and implement safety management principles into specific work, and work in accordance with relevant rules and regulations[1].

Fourth, preventive measures and resolution measures should be formulated for common dangers so that dangerous problems can be solved in time when dangers arise. Enterprises should organize employees to conduct safety drills to increase their awareness of potential safety hazards. Strictly control the quality of aviation fuel. If there is a problem with fuel, it will inevitably have different degrees of impact on air transportation, and it may even cause business problems. In serious cases, it will cause property damage and even pay the price of life.

2.4 Aviation Fuel Cost Management

Since the beginning of the 21st century, international oil prices have risen steadily, causing aviation fuel costs to increase by 20% to 30% per year. During the operation of domestic airlines, an important task is to control the cost

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of aviation fuel, and strict cost management is necessary. Of the total cost of Chinese airlines, the proportion of aviation fuel costs is very large. From the current situation of aviation fuel cost management, there are still some problems. Therefore, it is very difficult to fundamentally change the cost of air transportation. The cost of each part must be fully considered, and it must be combined with the daily management plan. Make adjustments to aviation fuel management measures and optimize management solutions in conjunction with changes in international oil prices, so that the cost of aviation fuel is effectively controlled[2].

3. Strengthen Aviation Fuel Safety Emergency Management System

3.1 Establish the Concept of Safety Development Management

Safety is related to the self-interest of the employees of the civil aviation fuel system, as well as aviation fuel supply. Aviation fuel companies need to implement safety management in place, in addition to the management and fulfillment of safety management responsibilities, also need technical personnel to take responsibility. To implement the safety responsibility system in place, all work must be carried out around safety, build a safety management system, and improve the safety awareness of employees. It is necessary to rationally plan security management work, optimize resource allocation, and make organization management more stringent.

At present, civil aviation companies are entering the stage of rapid development, which is also a stage where accidents are prone to occur. To ensure the safe development of the company, all employees need to establish a sense of safety. Recognize that safety is the primary condition. Without safety, the company cannot Sustainable development. In the operation and management of an enterprise, safety must be infiltrated into the production and operation process, and various management tasks should be combined with safety management. Establish a safety management system to ensure the realization of safe production. In the development of the aviation petroleum industry, attention to safety can ensure the stable and reliable development of the enterprise, and the production capacity can be enhanced, which plays a certain role in promoting the development of the aviation fuel industry[3].

3.2 Build a Security Emergency Management System

In work safety, safety emergency management plays a supportive role. The safety emergency management work is in place. It is necessary to establish an emergency management system in the management of aviation fuel. Implement systematic management so that emergency work is carried out in accordance with rules and a standard management model is implemented. The emergency planning system must be continuously improved, so that the emergency planning has strong operability in application. The emergency work support system will be established, the emergency management work will be continuously strengthened, and its basic role will be exerted, so that the emergency handling capacity of the staff will be improved and the quality of work will be improved. Strengthen emergency response capabilities and continuously improve emergency rescue plans from the perspective of work needs. It is also necessary to cooperate with the social emergency rescue forces and establish close communication channels to cope with emergencies, so as to improve the ability to handle accidents. Establish and continuously improve the emergency watch system, formulate accident information reports, improve emergency handling procedures, achieve comprehensive management of the watch system, do a good job of horizontal coordination, and also implement vertical implementation. Improve existing plans and run emergency response procedures. The exercise should be done well and carried out in practice, and the acceptance of emergency exercise standards should be done well[4].

3.3 Standardization of Aviation Fuel Safety Management

Aviation fuel safety management should change from a singular management model to compliance and adaptive management model to improve the effectiveness of management, at the same time, adjustments must be made to the security management model. Require safety management behavior to be in place, so that safety management work is standardized. In aviation fuel safety management, the main work direction is to fully cover the hazard sources, develop scientific management procedures and actively implement them, and also establish hazard source files. For the continuous improvement of the hidden danger analysis system, corresponding control measures need to be formulated. With the system evaluation team as the support, the construction of the safety management system is continuously improved[5]. The system files must be improved so that the grassroots managers have the ability to make overall plans. Establish the authority of the system manual, so that the adaptability of operating procedures is constantly strengthened. Real-time supervision of the operation status of the safety management system makes the

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system run effectively. Strict authenticity safety rules and regulations, process control of the implementation of the oil safety system, and ensure the effective implementation of the safety management system.

3.4 Implement the Investigation and Management of Hidden Safety Hazards

Safety precautions must be strengthened for all aspects of aviation fuel supply to ensure that there are no problems with aviation fuel supply. The specific supply work needs to combine the special climate and environmental characteristics and geographical environmental conditions, strengthen the inspection of facilities and equipment, focus on inspection and refueling, and also require regular maintenance to ensure the safe operation of pipelines and important facilities[6]. It is necessary to do a good job of monitoring the key parts, including valve wells, pipelines, oil tank farms and oil depots. The video surveillance equipment must be intact, and safety measures must be taken for the equipment to ensure its normal work. Inspections must be done for people entering and leaving, as well as vehicles, especially in important places. You must be strictly rigged, and personnel in key areas and vehicles entering and leaving must be strictly inspected.

The patrol system should be formulated for key posts, necessary control measures should be taken for oil depots, transformer distribution rooms, automatic control rooms and other places, and the work of patrolling key posts should be done. For important facilities and equipment, such as refueling vehicles, oil pipelines, etc. We must do a good job of security precautions and monitoring[7]. It is necessary to do a good job of coordinating the fuel transportation station's aviation fuel road transportation contractor, and communicate in all aspects. In the process of jet fuel distribution, we must attach importance to safety management, infiltrate safety management into specific work, and attach great importance to ground traffic safety management to avoid causing property damage and personnel safety accidents. We must like to identify the risk factors of the dangerous sources in the workplace. According to the identified risks, compare the control procedures, sort out the current operation records, and control the risk points. To do a good job of assessing the hidden risks, it is also necessary to implement hierarchical management, to carry out safety self-inspection work, to discover hidden dangers in a timely manner, and to take effective measures to eliminate them in a timely manner. If the hidden dangers found during the investigation are serious, leaders need to enter the site for supervision, and follow-up management should be done during the rectification to make the rectification effective. The operation and management of equipment must be gradually improved, the detection system must be continuously improved, regular inspections, and technical maintenance must be institutionalized. If abnormalities are found, they must be dealt with in a timely manner. For the implementation of dynamic management, the probability of failure can be effectively reduced[8].

3.5 Strengthen the Construction of Security Technology Teams

Strengthening the construction of safety technical teams has played an important role in improving the quality of safety management. The basic work of safety management is human management. It is necessary to attach great importance to the construction of the talent team and organize staff to receive training on a regular basis. The main training content is industry standards. All safety managers are required to actively learn business knowledge, and constantly update the knowledge structure to absorb new knowledge in a timely manner. My professional level has improved. In the field work, safety management personnel can make accurate judgments on issues, earnestly perform their responsibilities, and ensure the quality of safety management work. In safety performance management, performance should be used as an important measure of the remuneration of safety technicians, so as to mobilize the staff's positive awareness. By strengthening security management, the team's ability to perform its duties has been improved[9]. Enterprises can organize safety management lectures on a regular basis. The training method should not be based on preaching alone. Instead, it must be diverse in form and mobilize the positive awareness of professional learning of staff. Some safety managers also need to receive experiential training, and can also hold job skills competitions to improve the safety awareness of safety managers.

Enterprises can carry out activities such as "Safety Production Month". Each month has a fixed number of days to carry out safety production publicity and education, popularize safety knowledge to each employee, and help employees establish safety awareness. For the personnel of the supply station, emergency capacity training shall be conducted so that they can deal with emergencies during work and avoid serious consequences[10]. By strengthening safety management training, employees can correct their work attitude, fulfill their duties seriously, and establish the concept of safety development. In the work, we can unify our thinking and have a clear management goal, which is to promote the healthy and sustainable development of the aviation fuel industry.

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4. Management Strategy for Airport Tanker Fueling Safety

In the airport tanker fueling safety management, it is necessary to avoid the top splash during the loading process, the grounding device must have high safety and reliability, the oil pressure and loading and unloading control, and the fuel loading speed after the filter element replacement is slower,

Establish safety standards and laws and regulations. Details are as follows.

4.1 Avoid Splashing from the Top during Filling

Because fuel is injected into the top of the airport tanker, it is easy to form a flammable mixture, and it is also easy to generate electricity. Therefore, the bottom refueling method should be the main choice for refueling. In the actual operation process, if the bottom of the tank cannot be refilled with oil, the nozzle of the crane should go to a position about 200 mm deep in the bottom of the tank, and use the underflow refueling method to refuel. If it is a large tank truck, if the electrical conductivity of the jet fuel is relatively low, the top injection method can be used. The fuel tank of the tank truck cannot be refueled with the pump's dual-pipe pump[11].

4.2 The Grounding Device Must Have High Safety and Reliability

Considering the disadvantages of static electricity, we must take targeted measures to solve them. Among them, there is a requirement for the grounding resistance value. At the same time, ensure that the crossover between the loading and unloading pipes and the tanker and the connection between the grounding are safe and reliable, and ensure the system. It is safe during operation. It should be noted that there is no fixation of the grounding device settings on the ground of cement roads, gas stations, etc. The grounding pin is thrown on the ground and cannot be effectively grounded. When metal fires on the ground, when the voltage reaches 300 to 500 volts, the gas mixture will be ignited. Therefore, great attention must be paid to the installation of grounding devices [12].

4.3 Oil Pressure & Loading and Unloading Control

When loading and unloading equipment maintains normal pressure and normal flow, accidents generally do not occur, however, due to the influence of various unexpected factors or the subjective operating measures of the staff, the pressure will increase, the flow will also increase, and the risk factor will increase. At the same time, try to avoid turning the pump on or off suddenly, as this will cause excessive instantaneous shock pressure and excessive flow, which will cause the static voltage to surge instantly and cause serious consequences.

4.4 The Oil Filling Speed Is Slower after the Filter Element Is Replaced

The oil filling speed of the filter element is relatively slow after replacement. This is because the new filter has high electrification characteristics. The use of the new filter is likely to cause electrostatic discharge problems and steam explosion problems. If the exhaust speed and refueling speed are relatively high, the problem of static electricity generation in the water tank filtration is likely to occur, and even the phenomenon of electrostatic explosion may occur[13].

At the airport, fuel storage and transportation equipment is inspected in consideration of natural factors such as special climate and geographical environment. Regular inspections of tanker trucks and other important equipment, as well as technical maintenance work in daily work, to ensure that the equipment has a high safety and stability[14]. It is necessary to strictly inspect the personnel of oil tank farms, oil depots, and vehicles, and conduct strict inspections, and do a good job of equipment management and control. Develop a safety patrol system, patrol the airport according to requirements, regularly patrol oil depots, oil garages and important places, take necessary safety precautions, and strengthen monitoring work. Real-time monitoring of tanker vehicles and other important equipment all risks and hidden dangers must be eliminated in time. The safety management of the fuel system must be in place. The airport should do a good job of inspecting the equipment and combine regular inspections with random inspections to detect abnormalities in equipment in a timely manner.

4.5 Establish Safety Standards & Laws and Regulations

In the safety management and monitoring of the pipelines used for transportation and storage of aviation fuel tanks in airports, developed countries have to monitor the whole process of pipeline design, equipment installation and use to achieve real-time management. For example, the United States has formulated standards for liquid management systems. In particular, in the design of pipelines, detailed technical requirements have been put forward for the design of pipelines, the use of materials, and the manufacture, installation, and maintenance of pipelines.

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The fuel pipeline will be damaged in use and the necessary protection measures need to be implemented. The technical requirements proposed here are very clear. In order to ensure the safety of pipelines, the United States has also issued industry standards for the safety management of hazardous liquid management systems. The issues involved include the improvement of pipeline safety, requiring precautionary measures in the process of pipeline design, and the use of risk assessments. The index enables the pipeline to be used safely and the accident rate during pipeline use is effectively controlled[15].

Technical standards will be formulated in the construction of oil pipelines, and relevant national safety supervision authorities will work on this basis. For example, the US government agency has issued a countermeasure to the safety of natural gas pipelines, which is used to ensure the safety of pipeline use and also plays a role in maintaining the safety of workers.

5. Conclusion

Through the research on the above content, it is clear that in view of the high danger of fuel oil, it is necessary to attach great importance to safety management. Any link must be strictly implemented in accordance with relevant safety standards and comply with relevant laws and regulations. The safety management of the aviation fuel system of the airport cannot be stagnant, but must be constantly improved to ensure that there will be no problems in fuel transportation and use, and to promote the healthy development of the civil aviation industry.

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