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Contents and Abstracts

STORAGE TECHNOLOGY

1 Influence Analysis on Oil Vapor Diffusion Law of Floating Plate of Inner Floating Roof Tank. Xu Zhenning, Li Zhe, Ma Songhao, Liu Jiajia, Jia Kun, Fu Shibo, Qi Hanbing.

Abstract: It is of great significance to study the law of oil vapor diffusion and migration in the gas space above the floating plate of inner floating roof oil tank. Based on computational fluid dynamics (CFD) and Realizable $k - \epsilon$ turbulence model, the estimation models of oil vapor diffusion, wide leakage circularity and velocity flow rate of inner floating roof gasoline storage tank are established, and the oil vapor diffusion mechanism in the tank when the floating plate is located at low, medium and high liquid levels in the tank is investigated and analyzed. The results show that the diffusion rate of leaked oil vapor increases with the elevation of floating plate, and the average oil vapor concentration in the tank decreases. The oil vapor volume fractions at low, medium and high liquid levels in the inner floating roof tank are 0.0154%, 0.0136% and 0.0107% respectively. The elevation of the height of the floating plate increases the influence of the vent and speeds up the diffusion of oil vapor near the vent. At low liquid level, with the increase of oil vapor leakage, the average oil vapor concentration in the gas space above the floating plate increases. The oil vapor volume fractions at 5 times, 10 times and 100 times of leakage at low liquid level are 0.046%, 0.069% and 0.368% respectively. After expanding the leakage rate by 100 times, the explosion limit will be reached, and corresponding measures should be taken to control in time.

Key words: oil depot, inner floating roof tank, floating plate, oil vapor, diffusion, law, research.

OIL AND GAS PIPELINE

6 Method for Setting Liquid Level Alarm and Interlock Value of Storage Tank in Oil Station of Long - Distance Pipeline. Hu Yi, Wang Yunfeng, He Yuzhuo, He Xuan, Zeng Weiwen.

Abstract: According to the standards, "Design specification for tank farms of storage and transportation system in petrochemical industry (SH/T 3007—2014)" "Code for design of oil depot (GB 50074—2014)" and "Technical requirements of acceptance for safety monitoring, controlling and early warning system of flammable and explosive tank farm (GB 17681—1999)", the principles and methods of setting liquid level alarm and three - level gradient alarm of interlock value of pressure relief tank and mixed tank in oil station of long - distance oil product pipeline

are systematically introduced. Taking an oil product pipeline station as an example, the method is verified and the result shows that the method can meet the requirements of on-site safe production, and can provide a reference for similar oil stations to set up and calculate the tank alarm gradient.

Key words: oil product, pipeline, storage tank, liquid level, alarm, interlock value, setting, method.

SAFETY TECHNOLOGY

10 Research on Safety Distance between Firefighting Equipment and Oil Unloading Port in Gas Station Based on Leakage and Pool Fire Calculation Model.

Wang Wenming, Wang Ziwen.

Abstract: The combined layout of fire equipment box and oil unloading port in oil tank farm commonly used in gas stations is introduced. Based on the leakage calculation model, pool fire calculation model and heat radiation damage criterion, the threshold of pool fire damage distance with different equivalent circle radius when gasoline is received and unloaded in gas stations is calculated and analyzed. The results show that there are some safety defects in the combined arrangement of fire equipment box and oil unloading port in tank farm. In order to prevent the loss of firefighting opportunity at the beginning of the fire due to the "failure to pull out" of firefighting equipment in case of fire due to oil unloading leakage, the firefighting equipment box should be kept at least 4.5 m away from the centralized oil unloading port, the firefighting equipment box should be set at the dominant upwind position all year round, and the door opening of firefighting equipment should be turned 90° rather than opposite to the front of the oil unloading operation area. During the safety monitoring of oil unloading operation, the emergency firefighting equipment should also be arranged at the upwind position 4.5 m away from the centralized oil unloading port.

Key words: gas station, leakage model, pool fire model, heat radiation, firefighting equipment, oil unloading port, safety distance.

15 Calculation of Tank Venting Volume under Fire Condition. Yang Mei.

Abstract: When the storage tank encounters a fire, it will cause the violent expansion of gas phase volume and liquid boiling in the storage tank, and the required venting amount will exceed the venting volume of normal breather valve. Based on API 2000, the wet area of storage tank under fire condition and the additional venting amount required in case of fire are defined, the calculation formula and simplified formula of tank venting amount under fire condition are given, and the emergency venting measures under fire condition are put forward, which can provide a reference for tank fire fighting.

Key words: fire, working condition, storage tank, venting volume, calculation.

ENVIRONMENTAL PROTECTION

18 Analysis and Prevention Measures of Water Pollution in Flood Season of Oil Depot. Yan Donghui.

Abstract: Based on the brief introduction of the main types and hazards of water pollution in oil depots, the water pollution in flood season of oil depots is analyzed,

and the prevention and control measures are put forward from the aspects of management, technology and emergency. In terms of management measures, the employees' environmental awareness and pollution prevention and control ability should be improved, the daily management of drainage system should be strengthened, the management of process system should be perfected, and the regulations on hazardous waste management should be strictly implement. In terms of technical measures, the construction of oil depots must build pollution prevention and control facilities in accordance with relevant specifications, a three-stage filter should be added at the rainwater outlet of the oil depot, the construction of grid VOCs online monitoring system should be promoted in oil depot, concealed pipe drainage should be adopted for rainwater drainage of oil depot, oil depot should speed up the automatic transformation of drainage system, and the progress of water quality detection technology should be promoted. In terms of emergency measures, the first is to allocate sufficient emergency materials; the second is to clean up the sewage tank in time; the third is to strengthen cooperation with surrounding units.

Key words: oil depot, flood season, water pollution, risk, analysis, prevention and control, measures.

QUANTITY AND QUALITY MANAGEMENT

20 Effect of Detergent in Ordinary Gasoline or Ethanol Gasoline on Engine Performance and Emission.

Zhang Yuan, Zhao Yang.

Abstract: Using the engine from an automobile company in Beijing as test engine, the national V standard 95 # vehicle gasoline and 95 # ethanol gasoline (E10) produced by a company as testing fuel, according to the standard "Performance test code for road vehicle engines (GB/T 18297—2001)" and "Limits and measurement methods for exhaust pollutants from vehicles equipped ignition engine under two-speed idle conditions and simple driving mode conditions (GB/T 18285—2005)", the power, economy and pollutants emission of ordinary gasoline and ethanol gasoline under two-speed idle conditions are tested after adding the gasoline detergent A. The test results show that after adding gasoline detergent A to ordinary gasoline and ethanol gasoline, the power and economy of automobile engine are improved compared with those without gasoline detergent, and the pollutants emission is further reduced. It is suggested that gasoline detergent should be added to ordinary gasoline and ethanol gasoline.

Key words: ordinary gasoline, ethanol gasoline, automobile, engine, addition, gasoline detergent, influence.

24 Comprehensive Application of Remote Inventory Mode in Gas Stations. Yang Zhengbin, Chen Wei, Liu Ke, Yang Yi.

Abstract: In view of the problems of long time, long journey, high cost and manual measurement in the on-site inventory of oil products in gas stations, which are difficult to ensure the accuracy of measurement data due to personnel operation and environmental factors, a remote inventory mode of oil products in gas stations is established by using the automatic measurement system

of liquid level meter in an oil sales enterprise, which has been comprehensively applied, and satisfactory results have been achieved. It can be used to ensure the authenticity and accuracy of oil inventory data, prevent measurement risks, and realize the goal of reducing fees and increasing efficiency.

Key words: gas station, oil products, inventory, mode, innovation, application.

SAFETY MANAGEMENT

26 Safety Risk and Prevention of Distributed Photovoltaic Power Generation System in Gas Station. Xiong Nan.

Abstract: Based on the brief introduction of the principle and composition of the gas station distributed photovoltaic power generation system, the corresponding preventive measures are put forward for the safety risks such as falling from height, fire and electric shock during the construction and operation of the gas station distributed photovoltaic power generation system. At the same time, some measures are emphasized, such as establishing and improving the safety management system, strengthening staff safety training, improving risk identification, hidden danger investigation and treatment, and improving the emergency management system, so as to provide safety guarantee for the construction and operation of photovoltaic power generation system in gas stations.

Key words: gas station, distributed photovoltaic power generation, system, construction, operation, safety, risk, prevention.

30 Problems and Countermeasures in Safety Management of Contractors and Direct Operation Links. Wang Deyang.

Abstract: In view of the problems existing in the project construction and daily inspection and maintenance of oil sales enterprises, such as uneven contractor capacity, careless education and training, insufficient professional and technical level, lack of operation process control and formality of performance appraisal, the corresponding countermeasures are put forward. The first is to focus on safety responsibility, strengthen legal compliance, and clarify the subject, supervision and territorial responsibility. The second is to focus on safety performance and strengthen the management of design, construction and supervision units. The third is to focus on safety training, strengthen ability improvement, and solidly carry out the training of supervision, technology and construction personnel. The fourth is to focus on safety risks, strengthen process control, and strengthen the JSA risk analysis, work permit issuance and special operation management. The fifth is to focus on safety inspection, strengthen intelligent supervision, actively build a smart construction site, strive to solve repetitive problems, and continuously strengthen safety supervision. The sixth is to focus on safety assessment, strengthen rigid implementation, continue to implement quantitative assessment, promote and implement positive incentives, and strictly implement the elimination mechanism. It can provide a reference for the safety management of contractors and direct operation links.

Key words: oil sales enterprise, engineering, construction, maintenance, contractor, direct operation, safety, management.

33 Thoughts on Safety Management of Gas Station Equipment. Xu Fanyi.

Abstract: Based on the brief introduction of the particularity of the safety management of the gas station, the four equipment management units specified for the equipment management of the gas station, namely, the oil tank and related equipment and facilities, the fuel dispenser and related equipment and facilities, the emergency rescue supporting materials, and the electrical and power supply equipment and facilities, are introduced, some problems existing in each unit are pointed out, and some thoughts on the safety management of gas station equipment are put forward, such as deepening the cognition of gas station staff on equipment management and standardizing operation behavior, establishing a complete life cycle file of equipment, improving the handover of equipment data, and accelerating the digital and intelligent application of gas station equipment management.

Key words: gas station, equipment, safety, management, thoughts.

OPERATION MANAGEMENT

37 Research on Management Strategy of Direct Distribution of Oil Product. Zhang Gang.

Abstract: Under the background of briefly describing the current situation of domestic and foreign oil product market, the significance of oil product direct distribution decision-making and the main factors affecting the changes of oil product market is pointed out, such as international oil price, market supply and demand, relevant policies and market competition situation, the main factors affecting the benefits of oil product direct distribution are analyzed, and an oil product purchase and sales decision-making model is established. The principles, ideas and thoughts of the operation decision-making of the direct distribution of oil product are put forward, which can provide a basis for scientifically predicting the changes of the oil product market, accurately implementing the corresponding marketing strategies and improving the operation effectiveness of the enterprise.

Key words: oil product, market, direct distribution, operation, strategy, research.

42 Practice of Implementing Large Team Operation Mode in Oil Depot. Hu Zhuocheng

Abstract: In view of the problems existing in the traditional small team operation mode of oil depot in the business links of oil depot receipt, delivery and storage, such as single work process, poor connection, large amount of labor and high operation cost, in order to adapt to the development of the oil depot, the large team operation mode is explored and implemented by optimizing the business process, which improves the operation efficiency of the oil depot and ensures the normal development in receipt, delivery and storage of the oil depot and normal supply of oil products. The concept and task of large team, the difficulties and solutions of implementing large team operation, and the results of implementing large team operation are introduced.

Key words: oil depot, large team, operation, mode, practice.