

Advances in petroleum storage and transportation engineering

Advances in Mechanical Engineering
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DOI: 10.1177/1687814014568490

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Petroleum storage and transportation (PST) engineering is an important department connecting upstream and downstream departments in petroleum industry. It plays a crucial role in energy supply for the development of regional economy. This special issue focuses on the up-to-date progress in this field. A total of 13 research articles have been accepted after a strict peer review process. Among them, nine articles distribute in the topics relating safety problems, reflecting the main concerns in PST currently. Economy and instruments are also concerned with two articles, respectively.

In the area of safety, J Gong et al. simulate flow characteristics for hybrid riser using the one-dimensional and quasi-equilibrium model to simulate not only the riser-base pressure, severe slugging period, and the liquid slug length of the whole system but also base-pressure in the flexible pipe section, to deal with the major threat to production, in the article "Severe Slugging in Air-Water Hybrid Riser System." The calculated results match well with the experiment data. J Park et al. present a new line-heater for prevention of hydrate plug formation in subsea pipelines in the article "Numerical Analysis of Thermal Mixing in a Swirler-Embedded Line-Heater for Flow Assurance in Subsea Pipelines." Flow and heat transfer characteristics of the line-heater are investigated numerically, with a particular emphasis on the mixing effect due to the swirl generator. A new method to analyze the importance of the influencing factors is proposed which considers the factors' fluctuations in heated oil pipelines by Z Duan et al. in the article "Analysis Method Research on the Importance of the Factors Influencing the Flow Safety of Heated Crude Pipelines." The results show that this method can combine the pipeline actual operating conditions and the influencing factors' actual fluctuation, reflecting the effect on the results' importance in different values of each factor and different fluctuation. This method can make comprehensive analysis on the importance of the influencing factors effectively. The article "Safety Control on the Chocking Process of Supercritical Carbon Dioxide Pipeline" by Q Zhao et al. studies issues about transportation safety of supercritical CO₂ pipeline. A chocking pipe can be designed

for buffering between different chocking orifices according to the length of turbulence area produced by jetting momentum. The higher initial temperature can prevent the dry ice formation at the outlet of vent pipe when the multistage chocking is applied. The models and the accumulation characteristics of positioning errors of odometer wheel, which is important to internal pipeline defect detection, are investigated in the article "Error Factor and Mathematical Model of Positioning with Odometer Wheel" by Z Wang et al. Diameter calibration and detection in sections are proposed to improve the positioning accuracy. The article "Research on the Influence of Excitation Frequency on the Sensitivity in Metal Debris Detection with Inductor Sensor" by B Liu et al. is aimed at finding a range of excitation frequency that fits both ferromagnetic metal debris detection and nonferromagnetic metal debris detection by both simulation and experimental methods. The studies indicate that the relationship between the excitation frequency and the changing rate of sensor inductance can be described by the fitting formulae, having reference value for the design of inductor sensor and the parameters setting in the experimental test. In the article "Synthesis of 3-Fourteen Alkoxy-2-Hydroxypropyl Triethyl Ammonium Chlorides and Inhibiting Corrosion Performance" by Y Hao et al., 3-fourteen alkoxy-2-hydroxypropyl triethyl ammonium chloride (TPAC) is synthesized by using tetradecyl alcohol, triethylamine, epichlorohydrin, and so on. The corrosion inhibition performance of product to A3 carbon steel was tested. The results show that TPAC has good surface activity and capacity in inhibiting corrosion. The article "Hydrodynamic Study of Oil Leakage in Pipeline via CFD" by M Araújo et al. describes the transient dynamics behavior of oil flow in a pipe with the presence of one or two leaks through fluid dynamics simulations using the Ansys CFX commercial software to evaluate the influence of the flow velocity, and the number and position of leaks on the transient pressure behavior. These new data may provide support for more efficient detection systems. Thus, this work intends to contribute to the development of tools of operations in oil and gas industry. The article "The Influence of



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further permission provided the original work is attributed as specified on the SAGE and Open Access pages (<http://www.uk.sagepub.com/aboutus/openaccess.htm>).

Operation Pressure on the Long-Term Stability of Salt-Cavern Gas Storage” by J Liu and Q Xiao analyzes the effect of gas storage pressure changing on its long-term stability for underground salt-cavern gas storage; considering the salt rock creep, a three-dimensional finite element model was built using the software Abaqus. The low pressure and excessive high pressure must be avoided during the operation of gas storage. The results have an important significance on determining the reasonable pressure of gas storage operation and ensure the long-term stability of gas storage.

In the area of economy, X Liu et al. propose the idea of hydraulic suspension transport of the gelled crude oil to perform the unheated transportation, in the article “Experimental Study on Characteristics of Oil Particle Distribution in Water-Gelled Crude Oil Two-Phase Flow System.” The results show that the gelled crude oil hydraulic suspension transport could be achieved without any chemical reagent when the gelled crude oil was transformed into particles and dispersedly suspended in water. The article “Numerical Study on Improved Baffle in Compact Test Separator” by Y Wei et al. shows the design of two improved baffles to solve the injection problem caused by traditional baffle in compact test separator. Anti-injection baffle can make compact test separator with high separation efficiency and a relatively low pressure loss. Also, the diameter of anti-injection plate which makes the compact test separator at its highest separation efficiency is slightly smaller than that which makes the lowest pressure loss.

In the area of instruments, the article “Influence of Partitioning Process on the Microstructure and Mechanical Properties of High Deformability Oil-Gas Pipeline” by J Ma et al. researches the effects of partitioning temperature on the microstructure and mechanical properties of the experimental steels by means of

mechanical properties test, microscopic analysis, and x-ray diffraction. The decrease of the volume content and stability of retained austenite is the key factor, which leads to the increase of strength and the decrease of plasticity in a high range of partitioning temperature. In the article “The Wear Analysis Model of Drill Bit Cutting Element with Torsion Vibration,” J Tian et al. use the geometry knowledge of polycrystalline diamond compact (PDC) drill bit and establish the torsion vibration model of PDC drill bit, then solve and analyze the model, and at last analyze the effect of tooth-distributing angle on the rule of cutting element wear by using the wear theory.

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