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Study on dynamic numerical simulation of string damage rules in oil-gas well perforating job

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The technologies of high charge perforator and high density perforator are widely used in domestic and international oil-gas wells perforating job, which leads to the increase of the explosion load intensity, resulting in more string damage accidents and seriously affects the normal production of oil and gas. The software of LS-DYNA was used to measure the dynamic response of the perforating gun under four types of perforation conditions. It analyzes perforating gun head's forms and characteristics of output load under different working conditions and also analyze the impact on perforating gun's structural strength under different axial and radial load. These conclusions provide an important theoretical reference for reasonable arranging the perforating technology, improving perforation safety and reducing the well perforating accidents.

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Oil shale combustion under oxyfuel conditions

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Direct combustion of Jordanian oil shale under oxy-fuel conditions is the first of its kind. Unstaged and staged air-firing as well as combustion at 27% O_2/73% CO_2 (OF27) was conducted successfully. A 20 kW vertical reactor was used at a combustion temperature of 1200° C. Oil shale-N conversion rate to NO is higher during unstaged air-firing than oxyfuel combustion; they are 27% and 15% for air-firing and OF27 combustion, respectively. NOx emission can be reduced efficiently by adopting staged combustion technology under oxy-fuel conditions as well as air-firing. In addition, the reduction of simulated recycled NO has been investigated. The actual situation has been simulated by injecting NO in the reactor through the burner. The reduction of the injected NO is more efficient with staging compared to unstaged combustion mode for both air-firing and oxyfuel combustion; the reduction of the injected NO during staged air-firing and OF27 is 100%. During unstaged air-firing the reduction of the injected NO ranges from 61% to 66%, while for unstaged OF27 combustion it ranges from 57% to 65%. The high sulfur content in Jordanian oil shale is considered one of the biggest challenges for its utilization. The oil shale-S conversion rate to SO_2 is lower during unstaged oxyfuel combustion compared to air-firing; they are 69% and 49% for air-firing and OF27 combustion, respectively. Direct limestone injection at different molar Ca/S ratios has been investigated under unstaged oxyfuel conditions as well as air-firing. Significant reduction in SO_2 emissions is obtained by limestone injection in both combustion modes. At Ca/S molar ratio of 3, the desulfurization efficiencies are 95% and 100% for air-firing and OF27 combustion, respectively.

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