

The effect of passive-active interaction method on Drag Reduction performance in Rotating Disk Apparatus

ABSTRACT

Objectives: Turbulent Drag Reduction (DR) efficacy of diesel fuel in a Rotating Disk Apparatus (RDA) using anionic surfactant of Sodium Lauryl Ether Sulfate (SLES) was investigated with smooth and SV-groove disks (riblets height of 900 and 3100 μm). **Methods:** The DR efficacy indicates how the torque is being reduced with a tiny amount of additives under a turbulent flow at a Reynolds number (Re) range of 302227 to 453341. The effects of different variables such as rotary disk type (smooth or structured), surfactant concentration, and Reynolds number were also studied. **Findings:** SLES shows a good ability to reduce the frictional drag forces with smooth and SV-groove of height 3100 μm . In contrast, there is no drag reduction can be observed by using this surfactant with SV-groove of height 900 μm . **Application/Improvements:** The passive-active interaction method can be used to improve petroleum liquid flow in pipelines.

Keyword: Drag Reduction; Rotating Disk Apparatus; Passive-active interaction; Surfactant