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Reynolds number effects on flow over twisted cylinder with drag reduction and vortex suppression[1] JAE HWAN JUNG, HYUN SIK YOON, Pusan National University — We investigated the Reynolds number effects on the flow over a twisted cylinder in the range of $310^3 \leq \mathrm{Re} \leq 110^4$. To analyze the effect of the twisted cylinder, a large eddy simulation (LES) with a dynamic subgrid model was employed. A simulation of the smooth cylinder was also carried out to compare the results with those of the twisted cylinder. As Re increased, the mean drag and lift coefficient of the twisted cylinder increased with the same tendency as those of the smooth cylinder. However, the increases in the mean drag and lift coefficient of the twisted cylinder were much smaller than those of the smooth. Furthermore, elongated shear layer and suppressed vortex shedding from the twisted cylinder occurred compared to those of the smooth cylinder, resulting in a drag reduction and suppression of the vortex-induced vibration (VIV). In particular, the twisted cylinder achieved a significant reduction of over 96% in VIV compared with that of the smooth cylinder, regardless of increasing Re. As a result, we concluded that the twisted cylinder effectively controlled the flow structures with reductions in the drag and VIV compared with the smooth cylinder, irrespective of increasing Re.

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