

Abstract Submitted  
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**Drag reduction of a circular cylinder using a slot and axially arranged holes** JIHEE KIM, SEOKBONG CHAE, JOOHA KIM, UNIST — In this study, a slot and axially arranged holes (AAH) with the same width or diameter are used to reduce the drag on a circular cylinder at a subcritical Reynolds number of  $Re = 32,000$ . We measure the drag force and velocity through wind tunnel experiments with varying  $\alpha$ , where  $\alpha$  is the angle between the slot or AAH and the freestream flow direction. The cylinder with the slot and AAH show similar variations in the drag coefficient with respect to  $\alpha$ : At low  $\alpha$ , both the slot and AAH generate self-issuing jet, which effectively push the near wake to far downstream, resulting in the drag reduction compared to a base cylinder. On the other hand, at high  $\alpha$ , the asymmetric flow separation is caused by blowing-and-suction through the slot and AAH. Thus, the alternate vortex shedding occurs in the very near wake, leading to the drag increase. As compared to the slot, AAH show less drag reduction but can reduce the drag on the cylinder in a wider range of  $\alpha$ . Some more details will be discussed in the presentation. Supported by NRF (NRF-2019R1F1A1064066) and Civil-Military Technology Cooperation Program (18-CM-AS-22).

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