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**Coherent structures in the wake of a large depth-ratio wall-mounted rectangular cylinder at high incidence angles** ARASH ZARGAR, AHMET GUNGOR, ARMAN HEMMATI, Dept. of Mechanical Engineering, University of Alberta, Alberta, Canada — Coherent structures in the wake of a long wall-mounted rectangular cylinder is examined by changing the incidence angle using Large Eddy Simulations at  $Re=250-1000$ . The rectangular cylinder has a depth-ratio of  $DR=4.15$  and an aspect-ratio of  $AR=0.83$ , which is placed in a uniform boundary flow at 10 different incidence (yaw) angles between  $0^\circ \leq i \leq 45^\circ$  with  $5^\circ$  increments. Initially, the numerical results are validated and verified using similar studies in literature. Preliminary results show that changes in the incidence angle alters the distribution of surface pressure on the body, and vorticity in the wake. Furthermore, the strength of the upwash and downwash flow, which can alter the cylinder wake structures and their orientation, considerably changes as the incidence angle is increased. Moreover, the wake starts to experience weak unsteadiness as the incident angle approaches  $40^\circ$ . This unsteadiness strengthens at  $45^\circ$  with the flow acting fully unsteadily at  $90^\circ$ . At  $i=45^\circ$ , there are several dominant frequencies including a low frequency that leads to transitioning periods between steady and unsteady wake. Moreover, the results show that the projected width of cylinder can adequately scale the integral flow parameters of the cylinder.

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