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Flow induced vibrations from two circular cylinders in close proximity CHRISTOPHER O'NEILL, APRIL JANG, BRANDON MCNEELY, ROBERT MARTINUZZI, CHRIS MORTON, University of Calgary — The present study is focused on investigating flow induced vibrations (FIV) of two circular cylinders (of diameter D and D/8) in proximity. The smaller diameter cylinder (referred to as the 'control' cylinder) is controlled via a two degree of freedom (x,y) traverse system. The system uses a genetic algorithm in an effort to maximize the amplitude response of the FIV of the larger diameter cylinder (referred to as the 'main' cylinder). Due to the difference in cylinder diameters and corresponding natural frequencies, at flow velocities where FIV begins to occur for the main cylinder, the control cylinder vibrates with a significant amplitude. To combat this issue, passive flow control methods are employed (i.e., helical strakes). The amplitude response of the main cylinder is investigated in detail in the present study using a combination of time-resolved planar PIV measurements and displacement measurements. The results show that the amplitude response and corresponding wake dynamics of the main cylinder are impacted significantly by the control rod and its positioning relative to the main cylinder.

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