

## The wake structure of grooved cylinders in tandem

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### ABSTRACT

This paper reports a series of 2D numerical study on the instabilities of the flow around two tandem circular cylinders, each of a diameter  $D$ , for Reynolds number  $Re = 20 - 200$ . The upstream cylinder having square a groove is separated from the downstream cylinder by a centre-to-centre spacing ratio  $L^* = L/D = 4$ . The groove was located at  $\theta = 0^\circ$  (front stagnation point),  $45^\circ$ , and  $90^\circ$ , respectively. The influences of the grooved upstream cylinder on the wake structure, and lift and drag forces are examined. Besides, the variations in the Strouhal numbers for the upstream and downstream cylinders are presented as functions of  $Re$  and  $\theta$ . It is found that the presence and location of the square groove significantly influence the wake structure and pressure on the downstream cylinder. The Strouhal number increases with increasing  $\theta$ , reaching a maximum at  $\theta = 90^\circ$ .

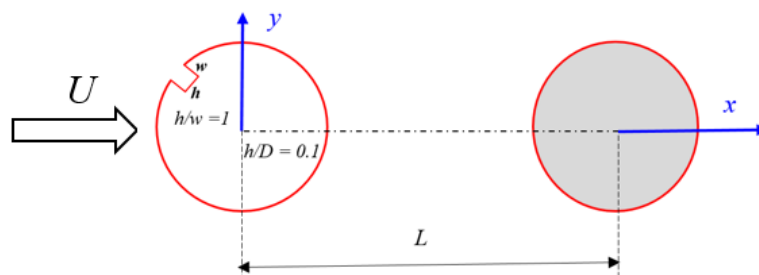


Fig. 1 Cylinder arrangement and groove

### REFERENCES

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