EXPERIMENTAL STUDY OF FLOW CHARACTERISTIC PASSING THROUGH FOUR TYPE-I 65° CYLINDERS WITH EQUISPACED ARRANGEMENT AND EQUISPACED DISTANCE L/D = 4 NEAR SIDE WALL
“Case Study for Gap Ratio Cylinder to Side Wall (G/D) = 0,267 ≤ G/D ≤ 0,467”

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ABSTRACT

The experiment of flow passing through cylinder have been developed. Some experiment was varying the geometry of cylinder such as type-D and type-I cylinder. Varying the geometry of cylinder gave some differences of flow characteristics. Those cylinders can be used at shell and tube heat exchanger and piping. Based on previous experiment, this experiment used four type-I cylinder with equispaced arrangement near side wall.

The experiment was conducted in a subsonic wind tunnel with a Reynolds Number \( Re = 5.4 \times 10^4 \) (based on cylinder diameter and freestream speed). Four type-I 65° cylinder were used as specimen with equispaced arrangement near side wall and equispaced distance (L/D) 4. The side wall was made from acrylic with 1200mm x 660 mm x 10 mm in dimensions and angle of side wall leading edge was 30°. The cylinder arrangement was lied at 430 mm from side wall’s leading edge and gap ratio 0,267; 0,333; 0,400; 0,467, respectively from side wall. The measurement of pressure distribution over cylinder and side wall surface used pressure transmitter and data analyzer. Pitot static
tube was located behind the cylinder arrangement to get velocity profile. Flow visualization used oil flow picture method.

Bubble separation occurred towards lower side cylinder upstream which is nearest the side wall. The increasing of gap ratio tends to eliminate bubble separation. The drag coefficient wasn’t affected by increasing gap ratio.

Keywords: Type-I cylinder, equispaced, side wall, pressure coefficient (Cp), bubble separation