Abstract Submitted
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Measurement of flow fields and local pressures on a circular cylinder at the Reynolds numbers up to 10^6[1] JAE HWAN JUNG, SEOKKYU CHO, Korea Res Inst of Ships and Ocean Eng (KRISO), HYUNWOO JUNG, Seoul Natt Univ, JUN-HEE LEE, YONG-GUK LEE, HONG GUN SUNG, BU-GEUN PAIK, Korea Res Inst of Ships and Ocean Eng (KRISO) — The present study is aimed to measure the turbulent flow fields and local pressures on a circular cylinder at the Reynolds numbers of up to 10^6. Unlike the previous studies mainly focused on the subcritical flow regime, the supercritical flow regime, which is more realistic to the full-scale condition of engineering, is considered in the present study. The particle image velocimetry (PIV) and local pressure scanner systems are employed to measure local mean pressures and flow fields on the circular cylinder. The results show that the flow characteristics of the circular cylinder strongly depends on the Reynolds number. As the Re increases, this size and shape of wake structures become smaller and narrower with the dramatic reduction of the drag. This is due to the one and two bubble transition leading to the reattachment and delay of the separation point. Although the general flow and load characteristics of the circular cylinder are well documented in the literature, it is still hard to find the detailed information of flow fields and local pressure distributions on the circular cylinder, especially at the supercritical Reynolds number. Therefore, this study will be able to provide meaningful information to improve our understanding of the physical insight into the relationship between the loads and wake structures. Moreover, this will contribute to the validation of CFD codes.

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