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Dragging a floating horizontal cylinder DUCK-GYU LEE, HO-YOUNG KIM, Seoul National University — A cylinder immersed in a fluid stream experiences a drag, and it is well known that the drag coefficient is a function of the Reynolds number only. Here we study the force exerted on a long horizontal cylinder that is dragged perpendicular to its axis while floating on an air-water interface with a high Reynolds number. In addition to the flow-induced drag, the floating body is subjected to capillary forces along the contact line where the three phases of liquid/solid/gas meet. We first theoretically predict the meniscus profile around the horizontally moving cylinder assuming the potential flow, and show that the profile is in good agreement with that obtained experimentally. Then we compare our theoretical predictions and experimental measurement results for the drag coefficient of a floating horizontal cylinder that is given by a function of the Weber number and the Bond number. This study can help us to understand the horizontal motion of partially submerged objects at air-liquid interface, such as semi-aquatic insects and marine plants.

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