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Hydrodynamic characteristics of sailfish and swordfish¹ WOONG SAGONG, WOO-PYUNG JEON, HAECHEON CHOI, Seoul National University — The sailfish and swordfish are known as fastest sea animals, reaching their maximum speeds of more than 100km/h. Recently, Sagong *et al.* (2008, Phys. Fluids) investigated the role of V- shaped protrusions existing on the sailfish skin in the skin-friction reduction but those protrusions did not make a direct role in reducing drag. On the other hand, the long bill has been regarded as a device of reducing drag by separation delay through turbulence generation. In the present study, we investigate the hydrodynamic characteristics of sailfish and swordfish by installing the stuffed ones in a wind tunnel and measuring the drag on their bodies and boundary-layer velocities above the body surfaces. The drag coefficients of sailfish and swordfish are 0.0075 and 0.009 based on the free-stream velocity and wetted area, respectively. They are comparable to or smaller than those of other kinds of fish such as the dogfish, tuna and trout. Next, the role of bill on the drag is studied. The drag without bill or with an artificial short bill is lower than that with the original long bill, indicating that the bill does not reduce the drag at all. From the velocity measurement near the body surfaces, we found that flow separation does not occur even without bill, and thus the conjecture that the flow separation is delayed through turbulence generation by the bill is not valid.

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