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Flow Behavior Around a Fast-Starting Robotic Fish GANZHONG MA, TODD CURRIER, YAHYA MODARRES-SADEGHI, Univ of Mass - Amherst — A robotic fish is used to study the flow behavior around the body of a fast-starting fish as it experiences a fast-start. The robotic fish is designed and built emulating a Northern Pike, Esox Lucius, which can accelerate at up to 245 m/s^2. In previous studies, we had focused on the flow around the tail during the fast-start, by using a tail which acted flexibly in the preparatory stage and rigidly in the propulsive stage. We have extended that study by including the fish body in the experimental setup, where the body can bend into a C-shape, so that the influence of the body motion on the resulting flow around the structure can be understood as well. In the tests, the fish can rotate about a vertical axis, where a multi-axis force sensor measures flow forces acting on the body. Synchronized with the force measurement, flow visualizations using bubble image velocimetry are conducted, and the observed shed vortices are related to the peak forces observed during the maneuver.

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