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**Generation of Pulsating Supercavities in a Rigid Wall Water Tunnel** GRANT SKIDMORE, TIMOTHY BRUNGART, JULES LINDAU, The Pennsylvania State University Applied Research Laboratory — The use of ventilated supercavities for underwater travel has many potential benefits, but before they can be fully exploited, obstacles in safe generation of a supercavitating body must first be overcome. The principle obstacle in this is determining the closure regime of the supercavity (re-entrant jet, twin vortex, or pulsating) from a given set of testing conditions. The re-entrant jet and twin vortex closure regimes are stable and should not create problems for the supercavitating body. Supercavity pulsation, however, is a self-excited resonance phenomenon that destabilizes the supercavity and leads to the periodic release of gas pockets at the tail of the cavity. Thus the phenomenon needs to be fully studied in a controlled environment. However, there are unanswered questions as to whether the pulsatory phenomenon may be properly obtained in a rigid-walled, closed-circuit water tunnel. Utilizing the 0.305 m and 1.219 m diameter water tunnels at ARL Penn State, an experimental study on both the pulsation phenomenon and the effects of tunnel blockage has been conducted. Here, we detail the findings of this study and discuss possible ways to mitigate the pulsation phenomenon.

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