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Effect of convexity & texture on the water entry of a cone; inspired by diving birds WILSON LLIVICHUZHCA, AMAN AGARWAL, YAO XIAO, ZACHARY OTTERPOHL, SUNGHWAN JUNG, Cornell University — Previous studies on water entry of a projectile have been focused on the angle effect mostly. In this study, we tested and analyzed how the surface texture and convexity of a cone-shaped projectile also affect the magnitude of the force experienced by the object upon water impact and subsequently upon submersion. While testing cones of different shapes we observed, for instance, that a concaved cone experiences greater impact force than a convexed one; whereas the convexed cone has a shorter pinch off time than the concaved cone. Furthermore, we analyzed how the texture of the surface of this shape affects the impact and submersion forces that act on the cone. We chose the cone shape that experiences the least impact force (ellipsoid) and experimented different surface textures; we learned that an engraved spiral on the surface of the cone reduces the impact force whereas a feather like texture increases it but reduces pinch off forces significantly.

Wilson Llivichuzhca
Cornell University

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