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Bubble baths: just splashing around? WESLEY ROBINSON, NATHAN SPEIRS, SABERUL ISLAM SHARKER, RANDY HURD, BJ WILLIAMS, TADD TRUSCOTT, Utah State University — Soap Bubbles on the water surface would seem to be an intuitive means for splash suppression, but their presence appears to be a double edged sword. We present on the water entry of hydrophilic spheres where the liquid surface is augmented by the presence of a bubble layer, similar to a bubble bath. While the presence of a bubble layer can diminish splashing upon impact at low Weber numbers, it also induces cavity formation at speeds below the critical velocity. The formation of a cavity generally results in larger Worthington jets and thus, larger amounts of ejected liquid. Bubble layers induce cavity formation by wetting the sphere prior to liquid impact, causing them to form cavities similar to those created by hydrophobic spheres. Droplets present on a pre-wetted sphere disrupt the flow of the advancing liquid during entry, pushing it away from the impacting body to form an entrained air cavity. This phenomena was noted by Worthington with pre-wetted stone marbles, and suggests that the application of a bubble layer is generally ineffective as a means of splash suppression.

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