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## Cavitation Enhancement of Silt Erosion: Numerical Studies

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Cavitation and silt erosion often co-exist causing severe damage. The effect that the silt erosion is worsened by the presence of cavitation is here referred as cavitation enhancement of silt erosion. A micro-model proposed by Li (2003, 2006) describes how the silt particles gain extra-damaging potential from the collapsing bubbles. In order to verify this envisaged model, as suggested in Li (2006) we have performed initial numerical studies by employing a simplified model which considers a single silt particle entrained in the micro-jet of a collapsing cavitation bubble. Initial CFD simulations have been conducted by using both commercial software STAR-CCM+ and our simplified analytical approach (written in MATLAB). Results from both methods support the mechanism of the micro-model that the silt particle damage potential to nearby solid boundary is largely enhanced through the acceleration of particle by the micro-jet of collapsing bubble in which the particle entrained. Our calculations further show that given the size of bubble the enhancement is mainly correlating with the mass (Its shape also plays an important role in gaining the drag force from the micro-jet flow, which will be discussed in detail later.) of particle and the ratio between the distance from the collapsing bubble to a solid boundary and its radius upon collapse. Though there are more attributions of the enhancement need to be further investigated such as the influence of presence of the particle on the micro-jet flow, etc. (by using a real coupled calculation approach) these initial results do reveal the major features of this phenomenon quantitatively for the first time.

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