Residual liquefaction of seabed under standing waves

This paper presents the results of an experimental study of the seabed liquefaction beneath standing waves. Silt (with $d_{50} = 0.070\text{mm}$) was used in the experiments. Two kinds of measurements were carried out: pore water pressure measurements and water surface elevation measurements. These measurements were synchronized with video recording of the liquefaction process from the side. The ranges of the various quantities in the experiments were wave height $H = 5.9-12.0\text{ cm}$, wave period $T = 1.09\text{s}$, and water depth $h = 30\text{ cm}$. The experiments show that the seabed liquefaction under standing waves, although qualitatively similar, show features different from that caused by progressive waves. The pore water pressure builds up (or accumulated) in the areas around the node and subsequently spreads out toward the antinodes. The experimental results imply that this transport is caused by a diffusion mechanism with a diffusion coefficient equal to the coefficient of consolidation. The experiments further show that the number of waves to cause liquefaction at the nodal section appears to be equal to that experienced in progressive waves for the same wave height.

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