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Experimental study of sloshing in rectangular tank under baffles and hydrophobic effects

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Liquid sloshing cause ship tanks surface damages and affects ship motions. This phenomenon has been analyzed by rectangular tank model experimentally. Partially filled tank have been experienced and excited various frequency range by direction of sway. Experiments have been carried out with ordinary tank and baffled tank which is placed middle of tank base. Four different water levels have been chosen for demonstrate sloshing effects on critical and non-critical cases. Wave path, reaching point of wave and shape of wave during flip-through are followed on high speed camera images. Pressures sensors are applied at lateral surface of tank to measure liquid induce pressure and also strain gages implemented to point reaction of structure during fluid structure interaction. Besides that, all experiments have been repeated by changed surface parameters on two contrast lateral sides on tanks. The surface parameter is modified by applying hydrophobic coat. The coated surface is proposes to increase contact angle between drop of water and surface. The coated, non-coated surface and baffled and non-baffled tank sloshing experiments comparison have been conducted by images and measured results. The results shows that the hydrophobic surface and baffle are decreased the sloshing force on lateral sides. Early wave separation occurs and water cannot reach maximum level of wave as non-coated surface. Also baffle is prevent wave goes through directly to the lateral surface.

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