Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Simplistic Approach to Characterize Sloshing Phenomena using CFD Simulation MD MAHMUD, Lamar University, RAFIQUL KHAN, Cameron Corporation, QIANG XU, Lamar University — Liquid sloshing in vessels caused by forced acceleration has been the subject of intense investigations for last several decades both by experiments and numerical simulations. Many studies are done to minimize the sloshing induced forces on the vessel internals and some studies focused on different ways to describe the sloshing patterns. Most of the sloshing characterization methods are done using complex mathematical manipulation and more simplified method may be useful for better practical understanding. In this study, simple/easily understandable methods are explored to describe sloshing phenomenon through Computation Fluid Dynamics (CFD) simulation. Several parameters were varied including liquid level/tank length ratio, wave induced vessel motions, motion frequency, amplitudes in various sea state conditions. Parameters such as hydrodynamic force, pressure, moments, turbulent kinetic energy, height of the free surface, vorticity are used to quantify the sloshing intensity. In addition, visual inspections of sloshing motion are done through gas-liquid/oil-water interface fluctuation, streamlines, vector profiles. An equation connecting independent variables to resultant quantities will be established that will make it easier to describe the sloshing.

Md Mahmud
Lamar University

Date submitted: 14 Nov 2014 Electronic form version 1.4