MARY KAY O'CONNOR PROCESS SAFETY CENTER
TEXAS A&M ENGINEERING EXPERIMENT STATION

20th Annual International Symposium
October 24-26, 2017 • College Station, Texas

Tsunami as a credible hazard – A case for safety

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Seismic sea wave, commonly called a Tsunami is caused due to large scale displacement of water column. The stored energy due to the wave impacting the plant equipment on the shoreline is enormous. In the recent past tsunamis, have impacted countries like Thailand, Japan, Chile and many more places resulting in catastrophic loss of human life and significant property damages. Traditionally tsunamis have been considered as natural calamities.

Tsunami waves are classed as P waves with large wavelength followed by S waves with a shorter wavelength. The time difference between these two waves is used for calculating epicentre. Tsunami waves have enormous stored energy and is a function of wavelength and velocity.

This paper systematically reviews the frequency of the occurrence of tsunami through frequency estimation, potential impacts on the heavy industries due to destructive stored energy (TNT equivalence), adequacy of current engineering standards to address inventory management and safe depressurising upon Tsunami warning utilising concept of lead time, coverage in safety reports, guidance materials have focused in earthquakes and less on stored energy hazards.

Risk acceptance criteria internationally have a band width of $1x10^{-2}$ to $1x10^{-7}$, anything outside of this band is generally intolerable risk or acceptable risk with no further controls needed.

However, Tsunami's destructive forces have a higher likelihood of event frequency and also very high consequence, yet preparedness and risk is not factored in any major standards like NFPA 59 (A) or API 521.

This paper presents a case for safety on demonstrating a need for including tsunami hazards on par with other general hazards applied for onshore hazardous industries along the coastal areas.

Keywords: Hazard identification, Likelihood estimation, Facility Siting, Consequence assessment, Occupied building studies, Risk assessment, Safety report, Engineering standard, Awareness