Identification and local impact analysis of projectile hazard in the LNG industry

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Abstract

With a strong growth in natural gas production in the United States, a number of liquefied natural gas (LNG) facilities have been proposed and authorized. These LNG facilities have sufficient safety, security, risk assessment and mitigation plans developed in close coordination with the local, state, and federal authorities. However, to continue to ensure safer operations, it is vital to continue to improve the scope of risk assessment strategies. Recent incidents have highlighted the need to consider the potential hazard and risk from projectiles. The main objectives of this study were to determine projectile parameters such as source, type, and characteristics (mass, diameter, velocity) and conduct a local impact analysis for identified potential projectile hazard scenarios. The paper concludes that the five different calculated thicknesses for concrete penetration, concrete scabbing, concrete perforation, and steel penetration and perforation depend directly on the kinetic energy and diameter of the projectile. Furthermore, the authors recommend that operators conduct a projectile hazard analyses for LNG facility projects, which would be useful in making recommendations for the thickness and type of storage tanks and other equipment, and for other appropriate mitigation measures.

Keywords: projectile hazard, risk assessment, process safety, liquefied natural gas (LNG), local impact

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