

Special Research Study Title	Seismic Evaluation of Underground Steel Pipes for Different Levels of Seismic Hazards in Thailand
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Candidate	Mr. Chayaphon Chomsuwan
Special Research Study Advisor	Assoc. Prof. Dr. Sutat Leelataviwat
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Abstract

This study focuses on a seismic evaluation of underground water pipes with diameters of 600, 800, 1,000, and 1,500 mm constructed by the Metropolitan Waterworks by using ALA-ASCE 2005 standard. The evaluation was performed out for three levels of seismic hazards found in Thailand. The evaluation was based on calculating the operating strain combined with the earthquake induced strain including the effects of permanent ground deformation, buoyancy force due to liquefaction, and seismic wave propagation. It was found that a steel pipes with a diameter of 600 mm. at a depth of 2.50 m was unsafe from seismic wave propagation at PGA values of 0.65g values, while the calculated of strain values of steel pipes with diameters of 800, 1,000 and 1,500 mm, were larger than the allowable values if there were transverse permanent ground deformation, liquefaction, or seismic wave propagation at PGA values of 0.40g and 0.65g. It is recommended that, in the future, underground water pipes be designed considering the effects of earthquake loading, particularly in areas of moderate-to-high seismic risk, even though it is not currently required by the prevailing standards in Thailand.

Keywords: Allowable strain in pipe / Operation strain in pipe Seismic Evaluation / Permanent ground deformation / Strain in pipe due to seismic action / Underground steel pipe / Underground water pipe