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**Prediction and Impacts of Pile Driving
on Port Terminal Facilities**

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Abstract

Pile driving at port facilities causes vibrations and settlement that can have negative effects on adjacent facilities and their occupants. Humans can perceive vibrations at levels below what typically cause architectural or structural damage. However, some of the more advanced biotechnology or other research and development facilities have vibration requirements well below human tolerances. This paper presents the results of our evaluation of 201 vibration recordings from impact driving steel piles at five sites near the downtown Seattle waterfront. This paper presents a predictive relationship between hammer energy, distance, and peak vector sum velocity. In addition, we present measurements of the settlement trough produced by driving a single row of bulkhead H-piles 1.5 and 2 meters on-center for crane rail upgrades at two Port of Seattle terminals.