

WSDOT's "Bridge Design Manual" states designing a bridge for deep liquefaction is not cost effective.

An immersed tunnel's neutral buoyancy makes it almost immune to liquefaction and makes it cost effective in soft soils.

## Designing a bridge for deep liquefaction is not cost effective



Washington State  
Department of Transportation

Bridge Design  
Manual September 2020

### 6-1.2.3 Maximum Considered Depth for Liquefaction

**Difficulties Mitigating for Deep Liquefaction** – The geotechnical engineering profession has limited experience with mitigation of liquefaction hazards at large depths, and **virtually no field case histories** on which to reliably verify the effectiveness of mitigation techniques for very deep liquefaction mitigation. In practicality, the costs to reliably mitigate liquefaction by either ground improvement or **designing the structure to tolerate the impacts of very deep liquefaction are excessive and not cost effective for most structures.**

Columbia River  
CROSSING



Project Overview

SEPTEMBER 30, 2011

**EARTHQUAKE RISK:** The Interstate Bridge pilings sit in sandy river soils which could behave like liquid during an earthquake, causing the bridge to fail.

Bob Ortblad MSCE, MBA