Researchers at Oregon State University have been awarded $1.1 million from the National Science Foundation Major Research Instrumentation program (CMMI-0723277) to install a two dimensional piston wavemaker at the O. H. Hinsdale Wave Research Laboratory on campus. The new piston wavemaker will replace the existing hinged-flap style wavemaker currently installed in the 342ft Large Wave Flume.

The high performance piston wavemaker significantly improves the capability to simulate tsunami type waves generated by earthquakes as well as extreme hurricane storms, an important step in
understanding the impact these waves have on coastal infrastructure. The large-stroke, piston wavemaker will be installed in late 2008 in North America’s largest wave flume providing a national asset for precision, large-scale studies enabling safer and more cost effective design of offshore as well as coastal infrastructure including platforms, bridges, levees, buildings and lifelines.

With the NEES funded three-dimensional Tsunami Wave Basin constructed and operational since 2004, the addition of this wavemaker will provide researchers with complementary capabilities due to the significantly wider range of the scales available for testing at the facility. This will lead to better practices for the repair and retrofit of existing structures and improved design codes for new construction. The facility will also improve education and outreach to people living in areas susceptible to tsunamis and coastal storms.

Theoretical performance curve comparing existing (dashed, blue) and proposed (solid, red) wavemakers at design water depth $d = 3.3$ m. Figure shows increased maximum wave heights for lower frequencies (larger wave periods) and the ability to simulate large-scale coastal models under tsunami and hurricane wave conditions (red dot).