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Engineer Research and
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Modeling of Harbor Resonance in Port of Long Beach

Description A three-dimensional physical model investigation was conducted to study the impact of several proposed landfill modifications to the Port of Long Beach, CA.

Issue The continuing growth of the Port of Long Beach (POLB) necessitates the creation of additional container terminal storage space. Landfills at Piers E, G, and J have been proposed as part of the POLB's Mega Terminal Development Program. Changes to the harbor geometry affect the harbor response to long waves and the resulting surge of moored vessels during loading and unloading operations. Thus, any changes to the harbor have to be studied to minimize any adverse impacts on the harbor operations.



Optimum configuration physical model layout and gage setup

Products In FY03, eight alternative configurations were tested in the Coastal and Hydraulics Laboratory's Los Angeles and Long Beach physical model facility in Vicksburg, MS. A total of 30 wave gages were placed at critical locations in the model to measure wave amplification factors for a range of incident long wave conditions. Both monochromatic and spectral waves were simulated in the physical model. Several new landfills in the East, West, Southeast, and Pier J Basins were investigated to determine the optimum configuration that maximizes productivity for the expected harbor growth while minimizing any adverse impacts of harbor resonance in the modified harbor.

Supporting Technology The CGWAVE numerical model can be used to predict harbor wave patterns.

Benefits The physical model has shown that it accurately predicts harbor oscillation patterns and has been applied to several projects. It will continue to be operated as a planning and design tool as expansion of the harbors continue.

Sponsors Port of Long Beach (POLB).

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