



## Bogazici Shipyard

Altinova, Turkey

**A total of 48,000 Rammed Aggregate Pier® elements were installed for this 250,000 square meters shipyard to provide superior total and differential settlement control**

**Description:** Construction of a new State-of-the-Art shipyard with a total area of 250,000 square meters and a uniform floor slab pressure of 150 kN/m<sup>2</sup>. A total area of 160,000 square meters of open sea will be filled up to 12 meters high. The ground improvement solution was required to resist a peak ground acceleration of 0.4 g and be designed to preclude ground liquefaction.

**Subsurface Conditions:** The soil profile consisted of up to 20 meters of very soft to stiff clays with intermittent sand lenses and soft silty sands.

**Geopier Solution:** The Geopier Impact® ground improvement solution for this project involved the installation of 48,000 Rammed Aggregate Pier® (RAP) elements. The RAP elements were arranged in a pattern of 2 meters by 2 meters on center and extended to depths ranging from 8 meters to 18 meters below ground. Several modulus load tests have been performed and the results suggest consistent behavior of the RAP elements.



### PROJECT TEAM

**Owner:**

Tersan Shipyard, Turkey

**Geotechnical Engineer:**

Professor K. Onder Cetin,  
METU

**Geopier Installer:**

Sentez - Geopier Turkey

**Reference:**

Mr. Ferhat Kemaloglu, Sentez