

# Port of San Francisco

## A study conducted on Ship Motion

### Overview

Vessel motion measurements were carried out on 16 ships over 2 winters as well as modelling vessel motions and producing look up tables for operations. The development of hydrodynamic and forecasting models helped improve safety and efficiency, and has increased vessel drafts at the Port, including the tricky bar situated in the port.

### The Business Challenge

- All vessels have to cross the bar which at San Francisco Port which is a dangerous body of water exposed to pacific swells
- Port started receiving larger vessels as pilots desired a much safer and scientific approach to manage the vessels
- Pilots were operating on a static UKC rule, based on past experience on older and smaller vessels
- Pilots wanted some of the unknown channel specifications, known

### The Technical Challenge

- Needed to understand how vessels are behaving when crossing the San Francisco Bar
- Needed to measure over a dozen large vessels motions without mobilising expensive equipment or lots of people/shipments
- Needed to measure vessel motions during winter conditions and heavy storms

### The Solution

- Provided San Francisco Bar Pilots with an iHeave® for two winters
- Collected data, analyzed vessel motions and analyzed measured wave data from the NOAA wave buoy
- Built a vessel motion model from the collected data
- The vessel motion model created by OMC is based on San Francisco Bar measurements along with over 500 other ships around the world
- Validated model against the measured data
- Using the custom model, OMC then produced looked up tables to predict wave motions for operations
- Train pilots to use the look up tables for safe usage and planning

**Client:** San Francisco Bar Pilots

**Project Location:** San Francisco, USA

**Completion Date:** April 2018



Above: tanker in the San Francisco Bay.

### About the Client

For more than 160 years, the San Francisco Bar Pilots have been guiding the world's largest ships through some of North America's most difficult waterways. These highly skilled professionals are maritime experts who utilize navigational experience, ship-handling skills and local knowledge to perform a critical public service.

Every day, the state-licensed Bar Pilots navigate commercial ships to and from the nine ports within San Francisco Bay and the Port of Monterey.

## Port of San Francisco

A study conducted on Ship Motion

### The Outcomes

After collecting highly accurate data over two winters and 500 other vessels, OMC was able to create validated vessel motion model for San Francisco Bar. OMC delivered much needed scientific and accurate operational intelligence for Bar Pilots and provided the port with a safer operational tool.

### The Benefits

- **Safer** – omitting the guesswork of the static rule
- **Highly accurate data** collected over 2 winters to add to the database of over 500 ship measurements previously collected
- **Evidence based** decision making



The San Francisco Bar Pilots appreciate OMC's professional approach and technical skill in helping us to further our knowledge and understanding of the pilotage area we serve.

Specifically, by working with OMC on our dynamic UKC study we have been able to make significant improvements in navigational safety as well as efficiency on San Francisco Bay.

Captain Joseph Long, President,  
**San Francisco Bar Pilots**