Rapid Post-hurricane Survey of Long Beach Breakwaters

The Long Beach Police Department (LBPD) in the USA employed its underwater inspection system (UIS) with Echoscope 3D imaging system from Coda Octopus to provide rapid, real-time damage assessment after Hurricane Marie impacted Long Beach Breakwaters in August 2014.

The Port of Long Beach and the Port of Los Angeles are two of the busiest seaports in the United States. Any disruption to vessel traffic transiting the approaches to these sister ports can have a significant economic impact in the magnitude of billions of dollars.

In late August 2014, the remnants of Hurricane Marie created large swells and waves that relentlessly pounded the Southern California Coast. Twenty-foot waves disrupted operations at the ports and caused damage to coastal infrastructure. According to the Long Beach Press Telegram, two cargo terminals at the Port of Long Beach were forced to halt operations late on Tuesday 26 August, due to concern for worker safety in the face of 3-4.5m (10-15 foot) waves. Additionally, these waves caused extensive damage to two of the three breakwaters in San Pedro Bay that are designed to protect the harbour and ports from storms. Damage was sustained primarily to the middle breakwater.

The U.S. Army Corps of Engineers (USACE) Los Angeles District maintains the three breakwaters and began assessing damage in the days after the Hurricane Marie intensity subsided.

Faced with a priority to repair the breakwaters quickly, USACE opted, in this instance, to ask LBPD to assess the breakwater using its UIS. LBPD purchased the UIS using port security grant funds primarily for its security mission but also for response to man-made or natural disasters.

LBPD conducted a dynamic survey of the breakwater to assist the USACE engineers and provided detailed high-resolution mosaic images that clearly showed the overall extent of damage. This information enabled the USACE to quickly ascertain what repairs were required and to accurately define repair requirements, potentially reducing repairs costs.

The Coda Octopus UIS is a turnkey solution that provides a complete underwater and above-water georeferenced image in real time. At the core of the UIS is the Echoscope real-time 3D imaging system. This sonar system displays 3D underwater objects as they are scanned, whether they are static structures or moving objects. The image supplied by the Echoscope can be rotated in all three dimensions and measurements can be taken while bringing in data.