

HYDRONAV

Dredging / Rock protection using TRIMBLE MS750 RTK GPS & Excavator Position Monitoring (XPM) System

Location : Sentosa Island, Singapore
Client : Yeng Tong Construction Pte Ltd, Singapore
Date : February 2000

The Task: To perform marine dredging and rock placement to an accuracy better than 10 centimeters for position and depth using a Caterpillar 345 hydraulic excavator.

The Solution: The new Trimble MS750 RTK GPS receiver with high update rates of 20Hz and low latency of 20ms was chosen to supply accurate position and height data to centimeter level. Two RTK antennas were located on a frame work on the rear of the caterpillar 345 excavator to elevate the antennas above any interference to a clear view to the sky. The RTK receivers were located on a mount behind the drivers seat inside the cabin of the excavator. The receivers were programmed to output local site coordinates to the XPM system. The receivers were programmed to output local site coordinates to the XPM system



Two TFT flatbed monitors were located at the feet of the driver. One monitor displayed a plan view map of the work area dredged and colour coding to differentiate between areas of over/under dredging continually being updated real time as work progressed. The second monitor displayed the design profile and the real time movement of the excavator in relation to the design to centimeter level on the tip of the bucket.

An RTK base station was established on the roof of the site office approximately 1 kilometer from the work area of the excavator. Several local survey control points were surveyed using one MS750 in a backpack to determine the local site calibration values to match the local site coordinates exactly.

IHC systems of HOLLAND provided and installed the XPM system. The XPM system consists of angle transmitters at each rotating point on the hydraulic arms, angle tilt and swing sensors, processor unit and flat bed TFT monitors. All sensors and cabling are heavily armoured for such demanding marine construction work.

Results: The combination of TRIMBLE RTK GPS and the XPM system from IHC SYSTEMS provided a universal centimeter accurate 3D position, data monitoring and presentation system for the caterpillar 345 excavator.

The managing director of YENG TONG CONSTRUCTION, Mr Goh Hong Soon, had the following comments: " YENG TONG CONSTRUCTION are very satisfied with the high accuracy and quality control provided by the TRIMBLE MS750 RTK GPS combined with the Excavator Position Monitoring system(XPM) from IHC SYSTEMS and would not hesitate in contacting Allan Hosking of HYDRONAV SERVICES for additional systems on future suitable projects."