

## Success Stories.....

### MARINE PILING – MARINA SOUTH, SINGAPORE

**Customer :** TOA CORPORATION  
**Project :** CONSTRUCTION OF INTERNATIONAL CRUISE TERMINAL (ICT) – MARINE PILING  
**Project Date :** NOVEMBER 2009



Toa Corporation, in joint venture with Penta Ocean and McConnell Dowell South East Asia Pte Ltd, has been awarded the Singapore International Cruise Terminal by JTC on behalf of the Singapore Tourism Board. The works include design and construction of two new berths, terminal deck and car park deck. Toa's primary responsibility was to accurately position and placing more than 1800 piles. The initial challenge was to precisely position the piling barge onto their vertical and raked piling position throughout the operation.

HYDRONAV SERVICES has been approached to offer an off-the-shelf RTK GPS solution that met all the positioning needs for this piling project. Toa Corporation has enlisted the assistance of HYDRONAV SERVICES to install a Trimble SPS751 RTK GPS Base Station located at about 2km from the construction site which was used to provide differential correction to the Trimble SPS461 RTK GPS Heading Rover Receiver installed onboard Toa's Semangat Piling Barge. Trimble HYDRopro Construction Software was used in conjunction with the RTK GPS receiver. The required piling locations, in local datum Northing and Easting, were entered into the software along with the cut off level, raked angle, and the required orientation of each vertical and raked pile. The system can provide precise RTK position and high-precision heading information, and calculated all the offsets and pile positions from the GPS antennas in real-time.



Using the Trimble system allowed continuous piling operation without the usual delays associated with optical positioning methods, can be conducted much faster and in all weather conditions and less manpower is required. Furthermore, raked piles could be placed with the same speed as vertical piles for a saving of several hours per pile, helped complete the project quickly. The RTK GPS guided setup clearly shows an enormous increase in efficiency, productivity of both equipments and personnel and quality assurance with low risk to crews and machinery.

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