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International Dredging Review

Steelhead Installs Trimble System

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The Quileute River dredging project

Steelhead Constructors Incorporated contracted Measutronics Corporation to install a positioning and guidance system for the 14-inch cutterhead dredge Circle Hill during a three-month maintenance dredging project in the Quileute River. The project was completed the last week of February.

 Dredge Circle Hill

The dredge Circle Hill tied up along the Quileute River. The tree-topped hill in the background is said to have been a burial ground of the Indian tribe.

The site was on the Quileute Indian Reservation at La Push, Washington, next to Olympia National Park and Hoh rain forest.

The two-phase project included the Quileute River delta channel and an adjacent marina. It was an extremely dynamic environment, with large rainfall amounts (average annual rainfall of 135 inches), poor visibility due to fog, strong currents and 10-foot daily tide ranges. The schedule was around the clock, seven days a week, with two shifts per day.

The material: ranged from sand to football-sized rock. In a 12-hour period, the river flow can range from 600cfs to 20,000cfs, flushing large trees down the river.

Measutronics installed a system that aided the dredge operators in positioning the dredge, showed real-time cutterhead elevation and cut and fill depths, and provided daily real-time report data for the cutterhead position and depths.

Two Trimble MS132 submeter GPS receivers along with two integrated beacon GPS antennae provided vessel heading and sub-meter positioning. An AGI MD900 Clinometer was installed on the ladder to provide the change in position of the cutterhead relative to water surface elevation. A Valeport 740 tide gauge was installed to record the water surface elevation at five-minute intervals. Two Freewave radio transceivers provided telemetry from the tide gauge to the dredge.

Trimble's HydroPro Navigation software was installed on the client's laptop on the dredge to provide the operators the plan view, profile view and text displays of the dredge and cutterhead in relation to design alignments, design cross sections and actual elevation. Daily digital reports were created to log cutterhead position, time, tide and other data.

HYDROpro allowed the dredge operators to create a custom display on their PC screen comprising multiple view windows. A plan view map allowed the dredge to be displayed at scale and properly oriented with design CADD files (DXF format) displayed in the background. An offline bar showing horizontal distance of the cutterhead from design centerline aided the operator in swinging the ladder within design limits. A vertical profile view also showed the cutterhead relative to the design depth. A text view was configured to display parameters such as cutterhead station and offset, current water surface elevation (tide), and cut / fill information relative to design.

With a stand-alone power supply installed, the system performed flawlessly for the three month period, said Lou Nash, president of Measutronics. After using the system for the duration of this project the dredge operators were reported that "they couldn't imagine performing another dredging project without this type of system in place".

This is one of the most dangerous rivers to dredge, said Andy Anderson, vice president of Steelhead Constructors' Marine Division. The current is incredibly fast – eight to nine knots. It has claimed a lot of equipment," he said.

The river will go from a slow, lazy river to a raging torrent in 12 hours, said Anderson. You watch the Olympic Mountains, and if there is snow or rain there, the river will soon rise, he said. At that time you have to drop everything, disconnect the pipeline and go into a safe place, said Anderson. When the river goes down, you have to be able to go right back to the same spot, which is where GPS comes in, he said.

A big advantage of the navigation and positioning system was the reduction in leverman fatigue, especially toward the end of a shift, said Anderson. The HYDROPro system made it easy for the leverman to know where he is and what he is doing, even in conditions of poor visibility. The equipment is user friendly, allowing novice computer operators to become familiar with it in a short time.

"The system allowed us to work under any weather conditions, virtually like having an IFR rating. You could have painted the windows black and we still could have operated efficiently," he

said.

Steelhead Constructors is a dredging contractor headquartered in Redding, California. The dredge Circle Hill is a 14x12 DSC Shark model. The dredge tender was Steelhead's 26-foot 420hp twin jet boat Sarge, which can operate in as little as two feet of water.

Measutronics, located in Lakeland, Florida, provides system installation and startup, training and technical support of for positioning and guidance systems for dredging and other marine applications.

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