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RM CASE STUDY // 001



CLIENT: ORANGEPIT
APPLICATION: DREDGING
LOCATION: GLESSEN, NETHERLANDS
WWW.ORANGEPIT.NL

SOLUTION USED: 355MM (14") RM2
RM2 REPLACED: NONE
TEMPERATURE 18-21C (65-70F)

DESCRIPTION:

OrangePit BV is a partnership of dredging specialists based in the Netherlands. Having realised hundreds of dredging projects, the inherent problem of density measurement is something they had grown accustomed to. Upon discovering the RM2, Orange Pit were eager to determine if it was the measurement and operations solution they had been searching for.



− PROBLEM

Profit margins are being severely squeezed due to escalating energy costs which cannibalize a greater proportion of the total expenditure of operating a dredge system. In order for projects to remain in the black, it has become even more important to keep the cost per unit mass of dredged solids to a minimum.

The slurry flowing in the dredge pipeline is, of necessity, primarily water (>60%.) However, pumping excess water can prove to be extremely costly and inefficient. The end goal is to minimize the amount of water and maximize the amount of solids passing through the pipeline as close to the optimum levels that can be practically maintained. The primary function of the dredge and its operator is to produce a slurry with the maximum practical density to flow continuously through the discharge pipeline at the target velocity.

Presently the most common way that the specific gravity of a dredging slurry is estimated is by the human eye, often from several meters away. This instinct based estimation has historically been acceptable but is certainly not accurate enough to obtain realistic production figures. Modern dredging operators, such as OrangePit, require an accurate measurement of density with near real time latencies in order to run their dredge operations efficiently and profitably.

+ SOLUTION

The Red Meters RM2 takes 3,000 interrogations of a slurry every second, relaying measurement data back to a PLC. This raw data from multiple sensors within the cartridge, is then processed using a patented algorithm resulting in the output of 33 highly accurate readings of density measurement per second. This continuous measurement of density thus solves one of OrangePit's ongoing problems of understanding, in real time, exactly what is happening within the slurry. Armed with this information, the operator can make immediate decisions in order to maintain consistent production.

The RM2 is made to withstand highly abrasive slurries that are ubiquitous throughout all dredging applications, and also can adjust for the tilt and roll that occurs on working dredges.

Using Laser Interferometry, a highly precise measurement technique, a displacement laser below the cartridge is used to measure minute deflections caused by changes in density. Larger deflections correlate with a heavier sample inside the flexible section. The RM2 is also in-line and non-invasive. This ensures that abrasive slurries have a minimal impact on the functionality of the unit.

- − Increased Energy Cost
- − Excess Water: Extremely Costly and Inefficient
- − Inaccurate Data Gathering Leads to Unrealistic Production Figures

- + Real-Time Exact Density Measurements
- + 33 Highly Accurate Density Readings
- + 3000 Slurry Interrogations per second
- + In-Line / Non-Invasive
- + Adaptable On Working Dredges
- + Laser Interferometry



CONCLUSION

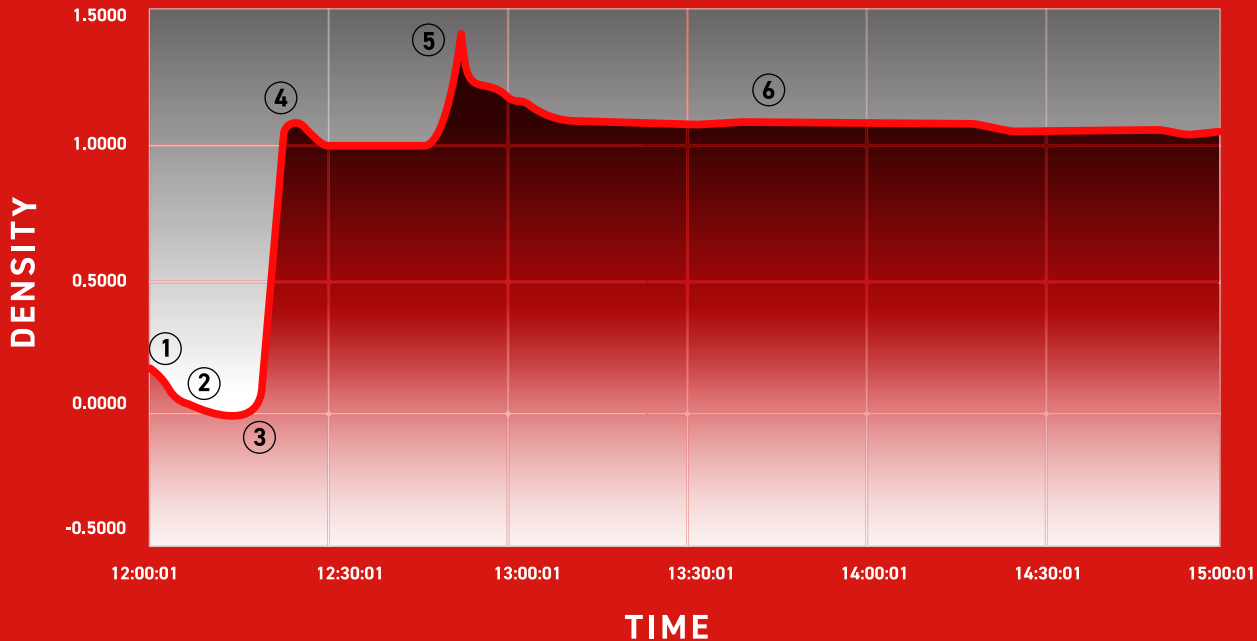
The RM2's Ability to quantify the production amount has proven to be invaluable to the operation. This small change has given a significant amount of operational data to OrangePit. This data has key benefits, the first being real-time visibility of operations in order to dredge more efficiently saving both energy and wear on equipment. The second benefit is the ability to review and analyse, with detailed accuracy, for billing and auditing. Perhaps even more valuable, the RM2 allows dredge operators to maneuver the dredge with a level of efficiency that was previously impossible. The data chart on the following page is a rendering of the dataset from OrangePit's operation. OrangePit is now able to visualize exactly what was happening during dredge operations and when.

 **40% INCREASED PRODUCTION**



DATA

DREDGING EFFICIENCY AVAILABILITY



The chart above shows a snapshot of the dredging operation which gives an indication of the level of efficiency available to the dredge operator. Numbers on the chart highlight important events.

○ DENSITY READING

- 1 PUMP STARTED
- 2 DREDGE TRAVELS OUT TO BANK
- 3 SLIGHT VACCUUM AS SUCTION IS ENGAGED
- 4 DREDGING BEGINS
- 5 BANK COLLAPSES INCREASING MATERIALS PROCESSED
- 6 SUSTAINED OPERATION