Case Study

Confidence Assured

A network of real-time Senceive sensors has provided a reliable and cost-effective solution for monitoring a protected wall during refurbishment works at Greenore Port.

For over 140 years, Greenore Port in County Louth has played an important part in the area's maritime history thanks to its sheltered position and natural water depth. The port is currently undergoing refurbishment work which will see its capacity expanded to allow for safer access of both current and larger vessels. Scheduled for completion later this year, works include the construction of a 140m long new quay wall which will be built 5m beyond the existing wall which is a protected structure due to its Victorian heritage. Additionally, 20,000 cubic metres of material will be dredged from in front of the new quay wall.

Carrying out the work is maritime, civil engineering and building specialist, Keating, a company renowned for its experience in restorative projects, new constructions and dredging activities. One of the initial challenges that Keating faced on this project was the state of the existing quay wall. A section had collapsed previously and due to its protected nature, it was vital that it was closely monitored throughout the work. Under the guidance of Keating Project Manager, Steven Heaney, the company therefore approached KOREC to discuss the most suitable monitoring options.

Selecting Senceive

With KOREC on site, it took just 25 minutes to determine which system would meet all of Keating's monitoring requirements. From the outset, Steven was aware that an automated total station system would not be suitable for the job owing to the difficulty in obtaining a line of site between the instruments and any sensors placed on the sea facing wall. Having seen the site, KOREC therefore recommended a Senceive sensor system with the installation of 20 Nano Tri-axial Tilt Sensor Nodes each mounted on easy to install tilt beams to take into account any movement along the length of the beam.

These particular sensor nodes are designed to withstand harsh weather conditions whilst reporting three-way movement as frequently as every second. However for this project, in order to prolong battery life, Steven deemed once every 10 minutes to be adequate.

The wireless mesh network, formed by the sensors then transfers data to a single solar powered 3G gateway which in turn relays it to a secure cloud server. This information can be viewed and analysed by registered users of Senceive's WebMonitor software, in this case, both Keating and KOREC. This approach would provide the 'real-time' solution that Keating required as well as easy access to historical data and useful reporting tools such as charts and graphs.

Baseline period

For the system to be effective, it was vital that Keating had total confidence in its data. It was therefore tested for a week with no works on or around the quay wall to establish any usual movement under tidal influence. This baseline data was used to set the tolerances that would trigger automatic text alerts if they were exceeded. For the purpose of determining movement trigger levels after the baseline period, the project was split into three sections with different trigger levels for each section. Section one had a trigger level of $\pm$ 4.5mm, section two $\pm$ 3mm and section three $\pm$ 1.5mm. If any node transmitted a value greater than the trigger level for its section, a text and email was automatically sent to a list of pre-determined Keating employees associated with the Greenore project.

Confidence in alerts

Over a period of weeks there were a number of minor incidents that reassured

▲ The system was solar powered

Steven that the system was working effectively. In one case, a port operator dropped a grab on the wall from a crane and in another a tug boat hit one of the wall mounted sensors. In each case, the Keating team was alerted to minor movement in the wall and Steven was able to investigate the incidents immediately and ensure that it was safe for the team to continue working.

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>
> **Steven Heaney, Keating**

This confidence in the system proved particularly beneficial towards the end of 2019 when dredging work began along the bottom of the protected wall and an alert was triggered. The dredging was halted immediately and an alternative method was consequently adopted for the work. Steven states that without the Senceive system, the result of carrying on could have been drastic. "The earlier alerts meant that we already had total confidence in our monitoring methods even before the detection of the slight movement in the wall during the dredging process. We knew that it was vital to halt work immediately in order to avoid compromising the quay wall. This was exactly what we sought from the system, namely a belief in the reliability of the real-time data that it was generating which in turn provided the information we needed to make fast and informed decisions. Our confidence in the system has allowed us to maintain our works schedule without the need to wait for go-aheads and sign-offs. Although KOREC was always there to provide any back up and support we might need, the system pretty well ran itself in the background with no need for a dedicated person to look after it which also made it extremely cost-effective."

*All information kindly supplied by Keating Project Manager, Steven Heaney.*

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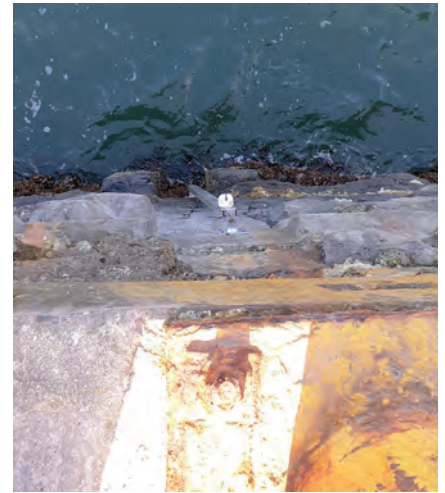
▲ Sensor nodes designed for harsh weather conditions

System Highlights

■ Total confidence that the generated data was accurate and entirely reliable

■ Ability to set how often the sensors reported, in this case every 10 minutes in order to prolong battery life

■ "Always good" advice, support and back-up from KOREC

■ Ease of use – the system ran in the background with very little input from Keating required

▲ Graph showing 3 days (72 hours) worth of data from the Senceive sensors at Greenore
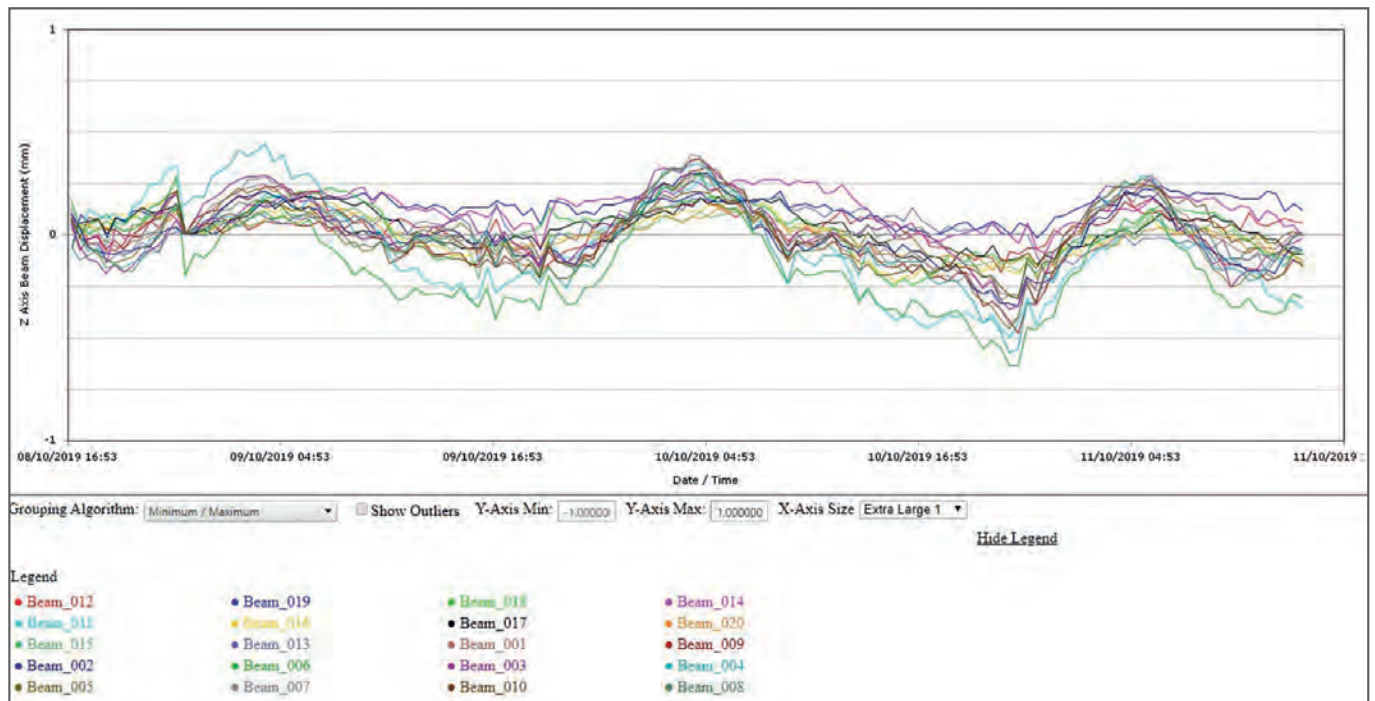
Contact us:

Please do get in touch for further information on any of the products or services mentioned in this case study, a demonstration, support or just a chat about your requirements.

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