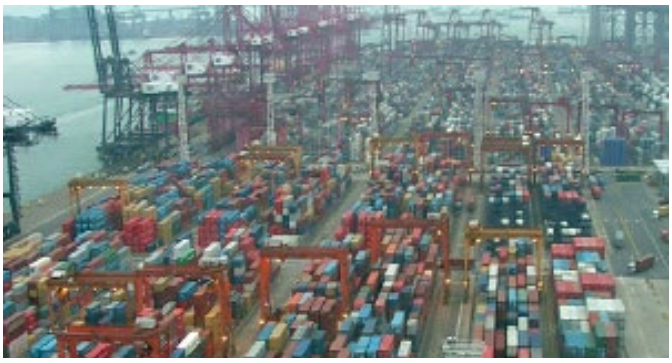
Application Note

WindSonic & WindObserver used for Container Terminal Operational Safety

Reference: AN0020



Introduction

Container terminals are busy, 24/7 working environments that present many hazards. The multitude of equipment in motion creates a high risk environment.

An additional challenge that can affect both the safety and efficiency of the quayside is high wind. From docking the ships, handling of the containers and their storage, strong winds and their direction can have a serious impact on the operation and hazards at container terminals.

Requirement

Reliable wind speed and direction measurements are essential. For safety, crane operations most stop when wind gusts reach 25 m/s, and sustained wind speeds reach a continuous 20 m/s.

Main Technology

Most crane installations currently use mechanical wind speed sensors to provide this critical safety information for the crane operators.

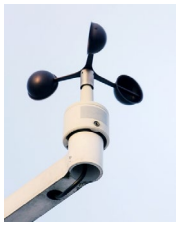
These mechanical sensors inherently have maintenance issues as they contain moving parts that suffer wear whilst in use.

These mechanical sensors also have an initial inertia to change the speed of rotation, which means they do not react to wind changes fast enough and so can miss read vital gust data.

Mechanical sensors use bearings, and it's this wear or seizing of these bearings especially in marine environments due to salt that can cause operators not to see the true sustained wind speed or gust data, which could leave a crane operator working in unsafe conditions.

Maintenance

Mechanical sensor:



Mechanical sensors provide a low cost initial purchase price, however, as mentioned before during use the bearing wear and any physical damage due to high wind speeds can cause incorrect wind data to be used by the crane operator as the cup / vane starts to drift outside of its calibration.

Once an operator eventually "realizes" this is possibly happening then the only option is to replace and/or repair the anemometer, which requires the operator to hire trained / certified personnel to climb the cranes. These type of personnel are an expensive option for the operator and so they will need to factor this expense into their ongoing operational costs versus shutting down operations.

Also a crane being shutdown due to maintenance of a failed wind sensor or suspected incorrect reading will have a knock on affect in reducing the efficiency of operations in the port with regard to loading/unloading vessels, which in turn drives up operating costs for the port owner / operator.

Ultrasonic / solid-state sensor:

Ultrasonic sensors like **WindSonic** and **WindObserver** have no moving parts, no maintenance and no re-calibration requirements along with a permanently available status output that provides the operator with the confidence that the sensor is providing good accurate wind data. If the sensor is unable to obtain a valid wind read then they do not provide invalid wind data and raise an error in the status code

Sensors like **WindSonic** are also extremely robust and able to survive extremely high wind speeds without any physical damage.

These benefits of ultrasonic technology means that the operator does not have the same ongoing expensive costs that the mechanical sensors suffer.

Installations

Gills' **WindSonic and WindObserver** ultrasonic anemometers are installed in a number of international container terminals including Southampton, Valencia, Melbourne, Auckland, Buenos Aries, Felixstowe and Hong Kong.

Why Gill?

Gills range of 2-axis anemometers provide wind speed (**WindSonic** to 75m/s and **WindObserver** up to 100m/s) and direction (360°) measurements in robust, polycarbonate, aluminium or stainless steel housings giving high quality, reliable and maintenance free fit-and-forget installations. Having no moving parts with high, long-term accuracy they offer clear advantages over conventional cup-and-vane instruments, particularly in such exposed, salt laden environments.