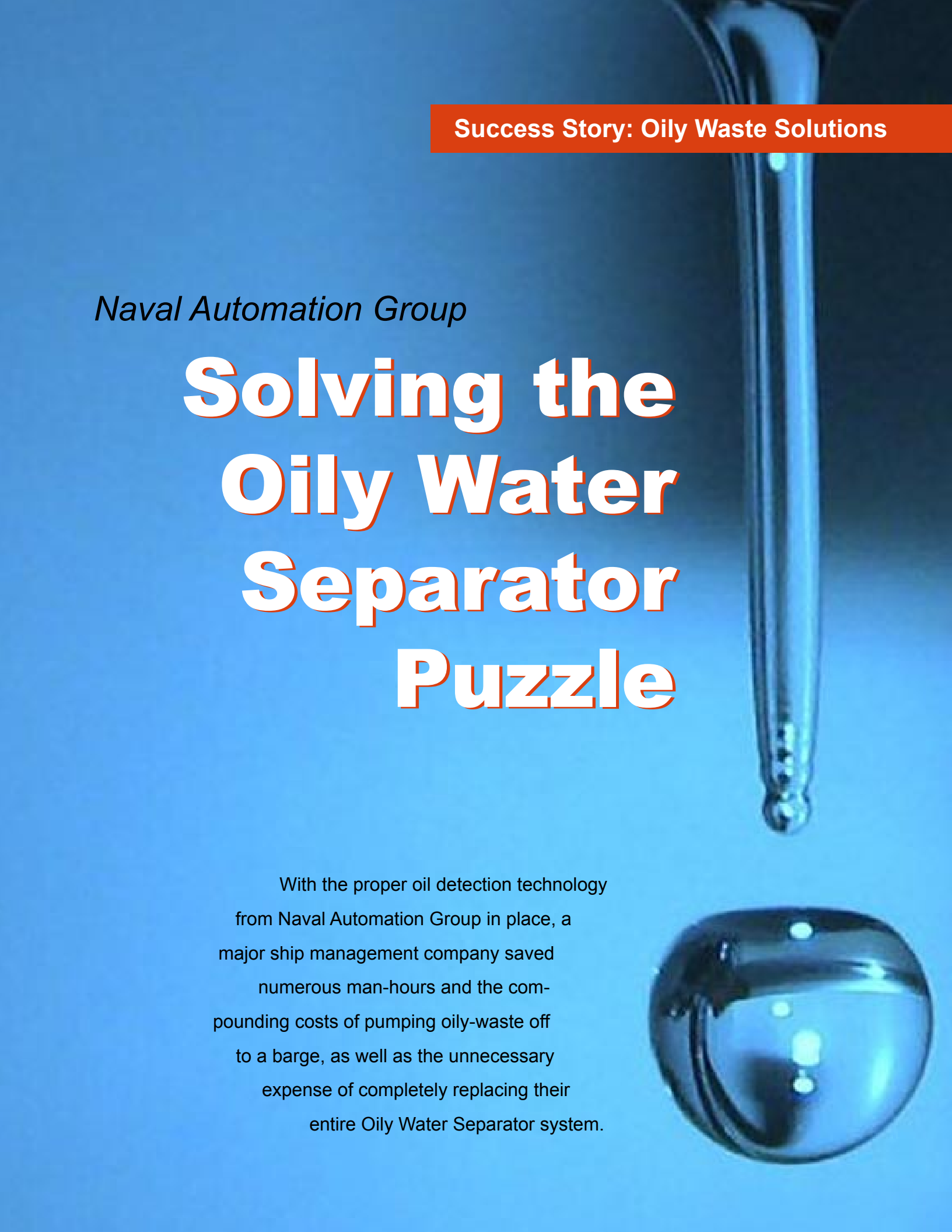
Success Story: Oily Waste Solutions

Naval Automation Group

Solving the Oily Water Separator Puzzle



With the proper oil detection technology from Naval Automation Group in place, a major ship management company saved numerous man-hours and the compounding costs of pumping oily-waste off to a barge, as well as the unnecessary expense of completely replacing their entire Oily Water Separator system.

JACKSONVILLE, FL, SEPTEMBER 5, 2006

The history of Oily Water Separators (OWS) and Oil Content Monitors (OCM) on board commercial vessels is frustrating, confusing, and more often than not, very expensive. One Chief Engineer of a major commercial carrier was experiencing first-hand just how confusing and expensive this equipment could be.

His ship, home-ported in Jacksonville, FL, and under contract with the Military Sealift Command, had been suffering from recurring Oily Water Separator problems over several frustrating months. In response, the Chief Engineer completely overhauled his OWS and replaced the existing Shimadzu Oil Content Monitor with a new monitor manufactured along the same principles of light-scatter detection technology. After numerous wasted man-hours of silencing alarms and re-circulating, the OWS still failed to deliver a reading below 15ppm. The Chief Engineer was forced to pump his oily waste to a discharge barge at $10,000 per visit.

Potentially adding to this expense was a new IMO ruling governing Oily Water Separators that requires a complete replacement of an inoperative OWS with one that is compliant with IMO MEPC 107(49). After researching the problem on the internet, the Chief Engineer contacted Naval Automation Group (NAG) to investigate costs of a new Oil Content Monitor based on a completely different type of oil detection technology.

Steve Ketchum, Director of Business Development for NAG, recalls their initial conversation.

“We’ve come across numerous ship engineers who contact us to replace their Oily Water Separator because they are stuck with constant 15ppm alarms. However, we find that their problems are usually misdiagnosed to the OWS, when the real culprit is their Oil Content Monitors.”

The majority of commercial Oily Water Separator equipment is supplied

with Oil Content Monitors that utilize *light-scattering* detection technology. These OCMs shine a laser light into an oily waste sample cell. As the light travels through the sample cell, it is reflected off of various molecules in the water so that it's energy is attenuated. At the other end of the cell are photo detectors that can measure the amount of light energy coming out of the cell. This ratio of "light in" to "light out" correlates to a concentration level of oil in parts per million.

"For most oily water applications, this type of light-scattering device will work just fine," notes Mr. Ketchum. "However, in circumstances where there may be a lot of turbidity or where the OWS and associated piping is old or in poor material condition, two major problems can occur. One is that the laser is not discriminating, or in other words, it cannot tell if a molecule is oil, particulate, or sediment. The laser light is going to reflect and attenuate regardless of what type of molecule it hits. For example, if particles of rust are running through your OWS (which isn't unusual for an older OWS), the light in/light out ratio of a light-scatter Oil Content Monitor will interpret this as a high concentration of oil. You'll constantly be getting false positive high alarms, and after wasting a lot of man-hours trying to fix it, you'll mistakenly assume that your OWS is broken."

"The second problem," continued Mr. Ketchum, "is that many ships use surfactants and detergents to clean their bilges. These chemicals are designed to breakdown oil particles into very tiny ultra-emulsified molecules to assist in cleaning. In many cases, the photo detectors in light scattering OCMs are usually not sensitive enough to detect ultra-emulsified oil molecules of less than 10 microns in size, i.e. these molecules are so small that the laser light isn't scattered enough to be noticed. So now you could have an even bigger problem – a false negative that could potentially allow ultra-emulsified oils to be discharged over the side of the ship and which could put a tell-tale oil sheen on the water."

UV Fluorescence detection is based on the physical properties of oil molecules that allow it to absorb energy of one specific wavelength and emit light energy at a longer wavelength

In comparison, NAG supplies a line of Oil Content Monitors that are based on *UV Fluorescence* detection technology.

Fluorescence occurs when a molecule absorbs light energy of one specific wavelength and emits light energy of a longer wavelength. Oil compounds each have a unique “wavelength signature”, and these signatures can be displayed as an actual concentration of oil in water. Fluorescence makes the NAG Oil Content Monitors resistant to interferences by turbidity or particles/sediments in the bilge, which adversely impact light-scatter OCMs. If a substance does not fluoresce at the specific wavelengths for the monitored oil molecule, it will not interfere as a ‘false positive’. Fluorescence is also able to detect ultra-emulsified oil molecules to the parts per *BILLION* level, far greater than competing light scatter OCMs.

To solve the Chief Engineer’s problem, engineers from NAG and their partner, Turner Designs Hydrocarbon Instruments, travelled to the ship to properly diagnose the problem. Samples were taken from the OWS and measured for oil content with the TD500 hand held fluorescence meter. This device provides *lab quality* oil in water analysis results in a matter of minutes.

While the existing light scattering OCM was indicating 38 ppm, the hand held fluorescence meter indicated only 7 ppm, far below the IMO MEPC regulation of 15ppm. The TD500 verified that the OWS was operating properly, and that it was the light scattering OCM that was causing the false error. Visual inspection of the oily water sample showed that it had molecules of iron oxide from the ship’s piping that was “fooling” the light scatter OCM into indicating a higher concentration of oil than was actually present.

With the problem properly diagnosed, NAG supplied the ship with a TD-4100 bilge Oil Content Monitor from Turner Designs Hydrocarbon Instruments. This OCM is a non-contact, non-fouling, low maintenance oil-in-water monitor based on fluorescence detection technology. With the proper oil detection technology in place, the Chief Engineer not only saved himself the wasted man-hours and enormous costs of pumping oily-waste off to a barge, but also the unnecessary expense of completely replacing his entire Oily Water Separator system.

Naval Automation Group has a complete offering of products, services and support designed to simplify Oily Water Separator requirements. For additional information on the hardware product drawings or any other NAG product or service, please contact a customer service representative at 1-800-830-5186, toll free in the United States, or (+1) 757-852-3998, international, or visit the Web site at www.nagllc.com.

NAG installed a TD-4100 UV Fluorescence Oil Content Monitor on the OWS of SS Stephen W Pless

About Naval Automation Group

Naval Automation Group (www.nagllc.com) is a systems integration technology company focusing on oil pollution abatement products. Products and services supplied by NAG include IMO MEPC 107(49) certified Oily Water Separators, IMO MEPC 107(49) certified Oil Content Monitors, and OWS survey and calibration services. NAG is headquartered in Norfolk, VA with operations in San Diego, Philadelphia, and Washington DC.

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