

Monitoring Ocean Floor Levels During Oil Drilling

An Application Note

Background

To meet the long-term global demand for oil, drilling companies have been exploring in the deep and ultra-deep water for reserves at great expense. It's vital for the drilling companies to know where to drill and the type of environment they are entering, as well as leave the ocean floor unchanged after drilling. To accurately assess these critical facts, they utilize a reservoir monitoring system that provides seismic topography data in order to both monitor the reservoir and react to changes over time – measuring both pre-oil extraction and post-oil extraction (for as long as five years after a well has been completed).

This system maps the ocean floor pre-drilling. Once the reservoirs of oil have been drilled and extracted, the system again maps the ocean floor. They analyze how the reservoir responded over time to production with high quality images and measurements. The goal is to leave the area in the same state and level that it was prior to oil extraction.

Ultra-deep water is an extremely harsh environment, so measurement systems must stand up to and thrive in the deep water pressure and terrain. The reservoir monitoring system consists of multiple containers placed in a pattern on the bottom of the ocean. Wired together, the system relays measurements to-and-from a data acquisition system on the surface nearby to continually monitor the ocean floor pressure. The system monitors the elevation of the ocean floor so when measured pressure starts to change (i.e., a container starts sinking), the drilling company pumps sand back into the ground/ocean floor (ground/soil) so that it will expand and push back upward. If this is not done, there could be potential climate effects as a result of changing the surface of the ocean floor.

Solution

To reliably measure the pressure in these harsh conditions, Honeywell's Model A-105 pressure transducer with its small size, flush-mounted sensing diaphragm, and enhanced accuracy measures the head pressure at, and the condition of, the ocean floor. Its repeatability and long-term stability over time and ability to function in very harsh environments made it a logical choice for inclusion in this critical oil drilling/monitoring system. The transducer is part of the system sealed into the water-tight containers that relays pressure measurements back to the data acquisition system.



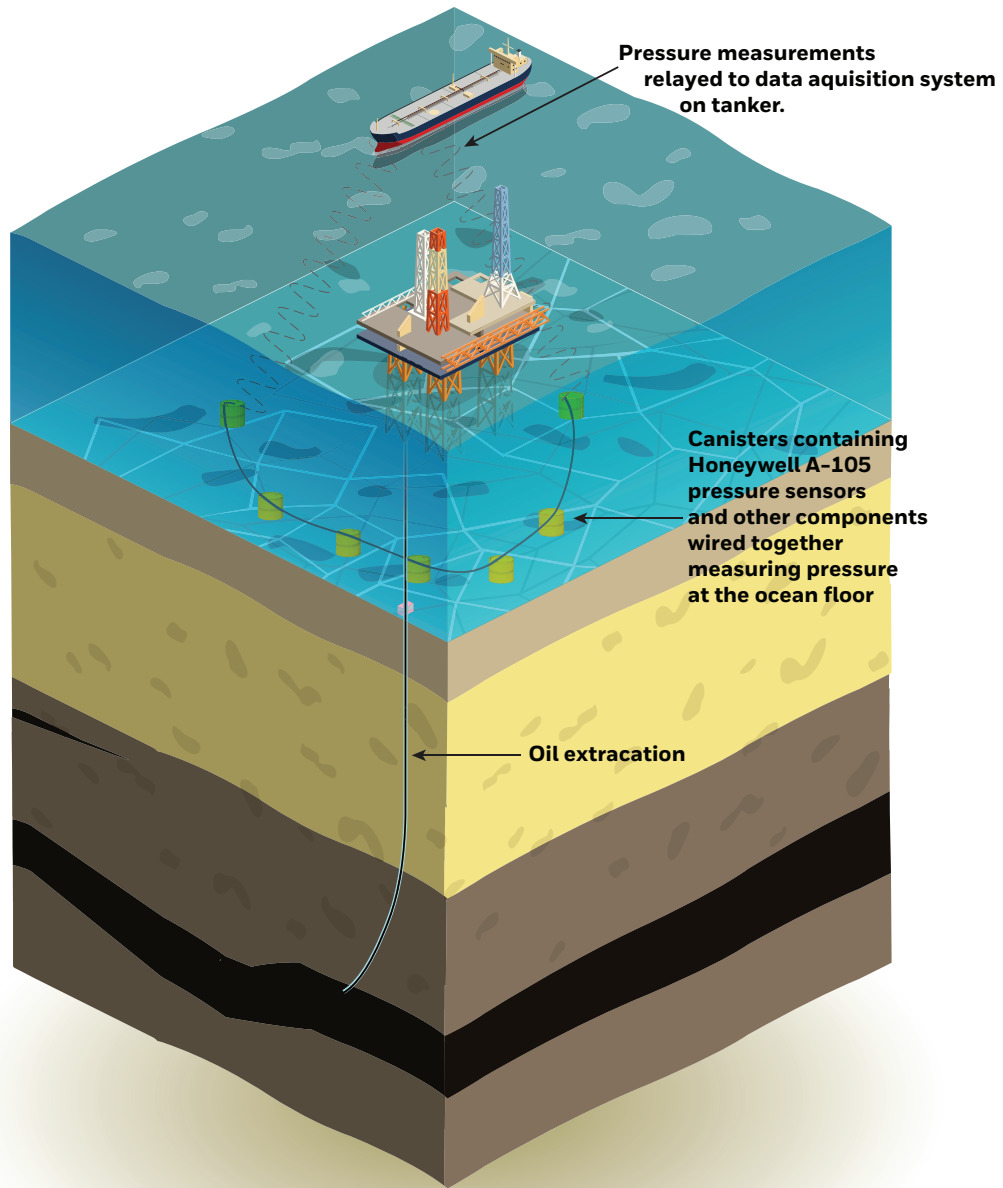
Model A-105 pressure transducers are manufactured with a unitized stainless steel diaphragm. The advantage of this type of design is that a thin diaphragm and heavy sidewalls are made from one piece of stainless steel. This unitized diaphragm is rugged, but at the same time can be made thin enough to measure low pressures. Available pressure ranges span from 100 psig to 15,000 psig. These models can also be used in corrosive fluid environments. The Model A-105 has welded electrical connectors as an integral part of the transducer body and are recommended for applications involving rough handling or where an all-welded stainless steel transducer is required.

All units have four (4) active bonded strain gages arranged in a Wheatstone-bridge configuration. All of this amounts to another rugged and reliable solution from Honeywell.

Features and Benefits

- 100 psig to 15,000 psig range
- 0.5 % accuracy FS
- Flush mount design
- No dead volume
- Miniature footprint
- Stainless steel
- CE approved

Figure 2. Monitoring Levels on the Ocean Floor



**⚠️ WARNING
IMPROPER INSTALLATION**

- Consult with local safety agencies and their requirements when designing a machine control link, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

Failure to comply with these instructions could result in death or serious injury.

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While Honeywell may provide application assistance personally, through our literature and the Honeywell web site, it is customer's sole responsibility to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this writing. However, Honeywell assumes no responsibility for its use.

For more information

To learn more about Honeywell's sensing and switching products, call 1.800.537.6945, visit sensing.honeywell.com, or e-mail inquiries to info.sc@honeywell.com

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