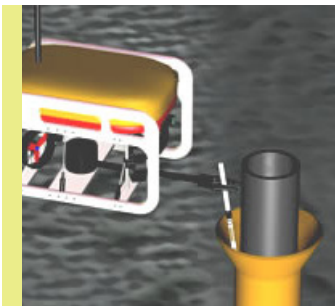
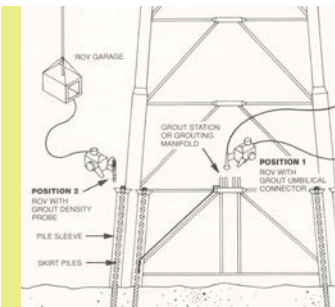


*GDM probe on the ROV*



*Monitoring grout*



*GDM diagram*

Grout Density Monitoring (GDM) provides a means of quality assurance of subsea grout.

The density of the mixed pumped grout is measured remotely using a system first developed by FoundOcean as part of a UK Joint Industry program with the Atomic Energy Research Establishment in the 1970s (now UKAEA). The density can then be compared and authenticated against the measured value at the surface prior to pumping.

Grout density at the skirt pile is measured by an ROV deployed densitometer (density probe) which is inserted into the grout overflowing at the top of the sleeve.

The ROV deployed system is mounted on the manipulator arm of an ROV. The subsea probe communicates with a computer on the surface via the ROV umbilical. The system is highly flexible because it is not fixed to any specific vehicle.

This system was first used in the North Sea and Gulf of Mexico and is now industry-standard worldwide, where quality assurance is required.

The ROV based system operates on the principle that the radiation emitted by a source and received by a detector is attenuated by the material flowing in the space between the two. The relationship between the degree of attenuation and the material density may be established by calibration of the density probes.

FoundOcean provides advice on all types of grout monitoring systems and also designs and constructs the necessary monitoring equipment to suit all types of platforms and templates according to client requirements.

## GOOD TO KNOW

### Corroboration

GDM monitors slurry density from the top of the overflowing sleeve to corroborate density reading at the surface