Passionate about ...

ROVs

Remotely Operated Vehicles

Andrew Beveridge, former MD of Fugro-Rovtech, describes his passion for working with ROVs and actively encourages more people to take up the challenge.

When I am asked what I do for a living my reply that I run a company which operates remotely controlled submarines all around the world always arouses interest.

Let's admit it – it does sound rather more interesting than working in an office, as a car mechanic, electrical contractor or in fact most civvy-street activities. And it is!



The submarines in question are specialised devices called ROVs – remotely-operated vehicles. In essence, these are small submarines which are tethered to the surface by an umbilical through which electrical power is passed down to the vehicle. The same umbilical also allows telemetry control, video and other sensor data to pass to and fro and enables the ROV pilot to 'fly' their mini-submarine through a huge – and ever increasing – variety of tasks.

ROVs can be described as underwater robots. They can weigh up to five tonnes in air and measure up to 2m x 3m x 2m high. Together with their array of monitoring and control equipment, launch and recovery systems, umbilical controls and winches they are a complex – and fascinating – mix of electrical, electronic, hydraulic and mechanical systems.

They're in increasing demand around the globe as more and more of the world's mineral resources are extracted from under the sea – so we are not just talking about oil – although currently 95% of ROV activity is associated with oil and gas extraction, the other 5% being undersea cable maintenance and diamond mining.

Currently there are about 500 workclass (i.e. with manipulators) ROVs (WROVs) in commercial use and probably about 1,000 observation class vehicles (OBSROVs), employing between 5,000 and 8,000 people around the world in their operation and perhaps a further 500 people in their manufacture.

The North Sea represents about 35% of the use of ROVs world-wide, but this percentage is declining and ROVs are working in Australia, Brazil, the Caspian, China, the Far East, the Gulf of Mexico, India, the Mediterranean, the Persian Gulf, Russia, South America and, of course, West Africa. Depth-wise ROVs are working to 3,000m (yes 10,000 ft) regularly where the water pressure is no less than 300bar, 2 tonnes per sq in, 4500psi, or 31N per sq mm – whichever is your favourite unit!

What do ROVs do? Well just about all underwater tasks that divers do but they do it deeper, more safely and in most cases more cheaply too. Divers are still used for dextrous (i.e. non-observation) underwater activities in shallow water, where they can compete on price and effectiveness, but they cannot be used below about 200m (in the UK and Norway anyway this is the legal limit) and an increasing percentage of oil and gas exploration activity around the world is happening in deep water of over 200m. Construction of production facilities and their maintenance obviously follows.

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ROVs' role in the exploration mode

During exploration work for oil and gas ROVs do all the subsea work required to support a drilling programme off floating drilling rigs. Much of this is observation work, but the vehicles may be required to install equipment that the drillers have to put on the seabed (like blowout preventer stacks), or to recover debris, so WROVs are used as well.

On jack-ups (drilling rigs which sit on the seabed), there is little requirement for any underwater intervention so ROVs are not generally used except in strong current areas like the southern North Sea where the jack-ups' legs and cylindrical steel foundations known as 'spud cans' are subject to scour, so they have to be regularly inspected.

ROVs' role in the development mode

If oil or gas is discovered, the drilling rig will often go into development mode where more wells are drilled. These are frequently tied into a production manifold to be used at some future date for subsea production either via an export pipeline or connected locally to another platform. Here, the ROV is used with torque and other tools to pull in flowlines or control umbilicals and operate valves. This is needed both on floating and non-floating assets – and saves huge sums of money for the field developer compared with the alternative of diver support vessels (DSVs) or pipelay barges doing the same work later.

ROVs' role prior to and after installation

When the production facilities are installed, be they platforms, subsea manifolds, pipelines or floating production, storage and offloading (FPSO) vessels, again there is a substantial requirement for ROVs to assist – the whole seabed area needs to be surveyed prior to and after installation, pipeline touchdown needs monitoring, lift wires/ropes need attaching or detaching, valves need turning, and pipelines need burial or another form of protection. It is a demanding workplace where dual large WROVs have really come into their own in recent years.

ROVs' role in the production phase

Finally we get to the production phase – and here again there is both inspection and maintenance to do, which is increasingly the preserve of ROVs of all shapes and sizes.

For example, WROVs fitted with various sensors, such as pipetrackers and multibeam sonars, are used to inspect pipelines. For platforms or subsea production facilities, OBSROVs fitted with cameras, cathodic protection probes and other sensors including probes designed to detect flooding inside structural members, provide a complete analysis to owners and the classification societies regarding the requirement for preventative or other maintenance.

For maintenance, both types of ROV have their role – it is amazing what small ROVs fitted with proprietary tooling can do to assist with the replacement of subsea modules and other types of repair and maintenance, but this is mostly the job of WROVs with their manipulative capability.

And, yet more uses for ROVs

I haven't mentioned the other roles for ROVs, such as cable installation/maintenance, mining or wreck recovery, controlling sledges and ploughs to trench subsea pipelines and umbilicals or steering fall pipes to fill in trenches or provide cover with stones, but hopefully anybody interested in joining this business can see that there is a multitude of skills required from electrical, mechanical and hydraulic to electronic; and jobs on offer on rigs, ships and platforms – close to home or the other side of the planet.



Anybody can be taught to 'fly' an ROV - it is the maintenance that is difficult and requires existing qualifications or training. ROVs have become more reliable but electricity and water do not mix too well!

The industry expects the ROV team to be able to deploy and fly the ROV to the worksite, pilot it through its tasks, then recover it and very importantly, maintain and adapt it for its next task.

This requirement needs specialist knowledge, skills and experience. Okay, an understanding of and respect for the power of the sea, and nature of the marine environment, will be an advantage to learning the necessary piloting skills and then perhaps promotion to a supervisory role can be envisaged, but it is amazing what landlubbers can turn their hand to with the proper instruction.

So if you would like to join an exciting industry that is growing at 10% each year and think you have the right skills and application then I can certainly recommend this as a well rewarded and enjoyable career.

Further information

Further information on the work of IMCA's Remote Systems & ROV Division and careers in the industry can be found at www.imca-int.com/rov





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