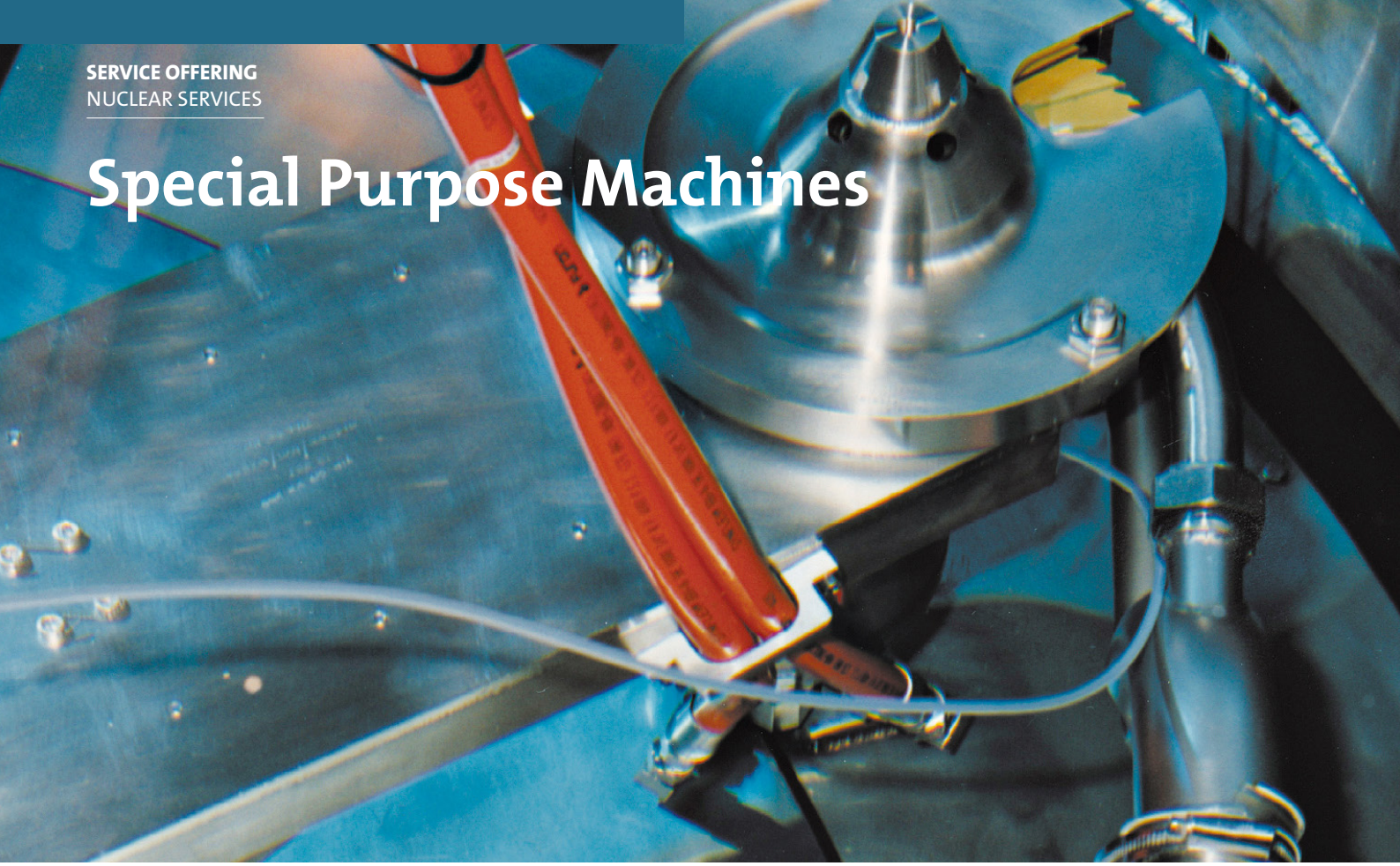
Special Purpose Machines



Solving complex problems through the application of proven engineering capability.

A complete solution

From feasibility assessment, through to conceptual and detail design, development and implementation, Rolls-Royce can provide innovative solutions to problems, using a wide range of purpose built machines and mechanisms.

A Rolls-Royce team of Technical Development specialists works alongside specialists in other disciplines including: Non Destructive Examination, Remote Visual Inspection, Noise and Vibration, Rig Design, Welding and Metallurgy.

With in-house machining and testing facilities, Rolls-Royce can provide a rapid response for developing equipment to meet the customer's emergent problems. Supported by experienced on-site workers, the team can implement the techniques developed whatever the project size.

A well developed process linking concept design through to implementation allows the designer to be the machine builder and developer, and then the on-site machine operator. High performance quality equipment is assured with particular emphasis on ease of installation, operation and maintenance. So throughout the contract life-cycle the customer can rely on a single technical point of contact with an in-depth knowledge and expertise covering the whole project.

- Cutting and welding machines
- Material sampling machines
- Surface defect inspection and replication
- Remote manipulation of end effects

Portable milling machine and hydraulic power pack

A proven track record

With a history of continuous support to the UK naval nuclear power programme spanning 50 years, Rolls-Royce has developed techniques and equipment to support repair, refit and maintenance activities. Whether meeting requirements planned well in advance, or providing a rapid response to emergent problems, the same level of quality and attention to detail is applied.

Having developed a deep understanding of the particular problems associated with working on naval and civil nuclear power plant, Rolls-Royce has for many years supplied its expertise to customers on a wide range of non-nuclear related projects.

Special Purpose Machines

Portable special purpose cutting machines

Various single-point and multi-point portable cutting machines have been designed and built to suit different applications. In particular, cutting and dressing machines have been designed for:

- Remote or 'hands-on' operation
- In-air or underwater use
- Cutting carbon steel, stainless steel or non metallic components.

Remotely operated internal pipe polishing machine

Underwater bandsaw

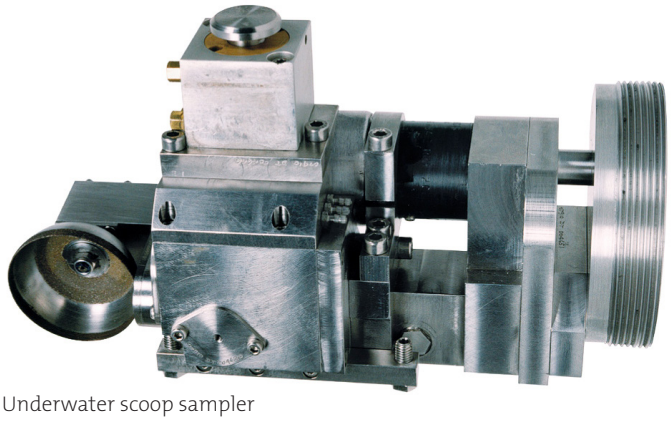
Welding machines

Bespoke orbital welding machines have been designed and built to cover components with an internal bore of 10mm to those of 2 metres external diameter. Weld procedures are developed and qualified using in-house welding engineer and metallurgical support.

Material sampling machines

Whether supporting Plant Lifetime Extension (PLEX) justification, material characterisation or defect analysis, material sampling is a powerful method of rapidly and conveniently obtaining supporting information.

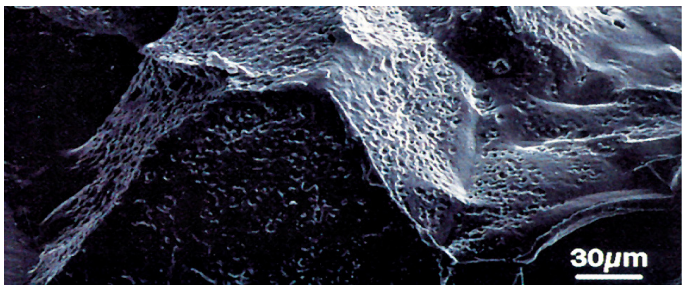
Using our SSam™-2 surface sampling capability, small 'button' shaped samples can be extracted from components – often without any detriment to its future use and operation. A small low stress raising dimple, with a good surface finish, is all that is produced as a result of the scoop sampling process. Larger samples can be obtained by a variety of mechanical processes, and various machines and cutting processes have been produced for these purposes.



Underwater scoop sampler

Surface defect inspection and replication

The application of remote visual inspection equipment or 'putty' replication material is often used to search for surface breaking defects and to establish the extent and cause of such flaws. A great deal of experience has been built up in designing equipment to apply these techniques – either in-air or underwater. Equipment has been designed to prepare the surface of the material, through polish and etching processes, as well as carrying out the inspection itself. Metallurgists work alongside engineers in interpreting the results of on-site inspections.



Example of a High Magnification SEM image of a replication specimen

Remote manipulation of end effectors

Examples of manipulator design and build projects include: ultrasonic inspection of aero engine internals, remote visual inspection of reactor power plant, precise manipulation of a suite of different end effectors (e.g. machining, polishing, etching, replication, shot peening, grit blasting, welding) to the inside of pressure vessels, tube plugging of steam generators, material sampling of a reactor support structure 26 metres below the pile cap.

Example of a Rolls-Royce remote manipulator

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