



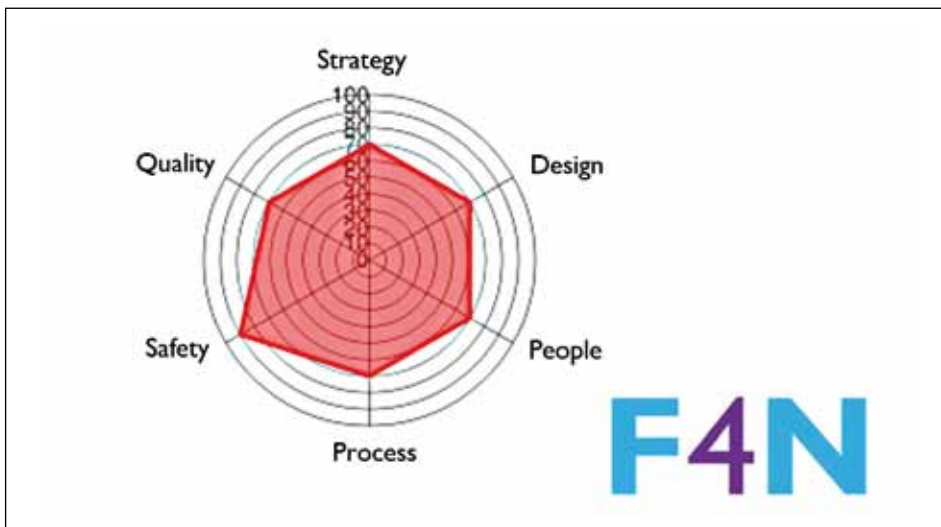
NUCLEAR AMRC

NUCLEAR AMRC NEWS

THE NEWSLETTER OF THE NUCLEAR ADVANCED MANUFACTURING RESEARCH CENTRE

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Are you fit for nuclear?



The Nuclear AMRC has launched a new diagnostic tool to test whether manufacturing companies are ready to enter the nuclear supply chain.

The Fit For Nuclear (F4N) programme helps companies measure their current operations against the standards required to supply the UK's new generation of nuclear power stations, and take the necessary steps to enter this £40 billion market.

The initial diagnostic is based around a questionnaire covering key areas of business operation and performance. The results help identify any gaps that the company can address.

The Nuclear AMRC and its partners can help fill these gaps through a tailored Fitness Programme, addressing areas such as technology capabilities; quality and accreditation; health and safety; and skills.

"Fit For Nuclear is designed to help UK manufacturers prepare for the huge global business opportunities in nuclear new-build," says Nuclear AMRC programme manager Steve Clements.

"The utility groups and reactor providers which will be building the new power

stations are already developing their supply chains. Manufacturing companies which want to win business in the nuclear market need to make sure that they're fit to compete."

Companies which are identified as requiring more fundamental business improvement may be referred to the Manufacturing Advisory Service (MAS) to bring their operations up to the level where they can benefit from the Nuclear AMRC's specialised support.

F4N can offer a direct route into the supply chains of the reactor providers and top-tier manufacturers. Under a collaborative agreement signed in March, the Nuclear AMRC will act as an entry way for companies which do not have an existing relationship with Areva, but which have the potential to become nuclear-capable and provide products within Areva's scope of supply. Initial identification of potential suppliers will be carried out through F4N.

The F4N programme is free to UK manufacturing companies. To reach as many companies as possible, the F4N questionnaire and diagnosis will be delivered online through our website namrc.co.uk.

TIC for manufacturing excellence

The Nuclear AMRC will play a key role in the first of the UK's new network of Technology Innovation Centres.

The Nuclear AMRC and its sister institute, the University of Sheffield AMRC with Boeing, will jointly operate the High Value Manufacturing TIC as part of a consortium of seven established manufacturing and process research centres.

The other centres in the consortium are the Advanced Forming Research Centre, Glasgow; Centre for Process Innovation, Teesside; Manufacturing Technology Centre, Coventry; National Composites Centre, Bristol; and Warwick Manufacturing Group.

Businesses which have worked with the Nuclear AMRC or another individual centre will now be able to tap into the resources of all seven centres.

As well as creating a national network capable of addressing all manufacturing issues, the TIC status will allow each of the seven centres to build on their established success and expertise. New funding will be invested in expanding current operations in response to industry needs, and creating research programmes in new technology areas.

Professor Keith Ridgway OBE, programme director at the Nuclear AMRC and research director at the AMRC with Boeing, said: **"The government recognises that we are a manufacturing nation, and supporting the kind of collaborative research pioneered at the AMRC is a proven way of making sure that our manufacturers are at the cutting edge of innovation."**

Business Secretary Vince Cable MP and Deputy Prime Minister Nick Clegg MP marked the launch with a visit to the AMRC. Cable said: **"The investment in the new centre will further bridge the gap between universities and businesses."**

Manchester laboratory offers a window on materials performance



Crack research: Dr Fabio Scenini with the imaging autoclave

Research equipment at the *Nuclear AMRC's* Manchester facility provides a unique view of how materials perform in a reactor environment.

The imaging autoclave at the University of Manchester Dalton Nuclear Institute is among the most sophisticated systems of its kind in the world. It allows researchers to study how materials behave under the temperatures, pressures and chemical conditions experienced inside a pressurised water reactor (PWR).

The equipment is used to understand the mechanics of how material samples, such as welded plate, behave under stress at temperatures up to 250°C and pressures up to 50bar. The chemical characteristics of the pressurised water, such as pH and dissolved gas content, can be precisely controlled to mimic the coolants used in modern PWRs.

The imaging autoclave features a thick sapphire window in the pressure chamber, allowing real-time visual and spectroscopic analysis of the sample.

Research will focus on understanding how cracks and corrosion phenomena interact with the microstructure of critical components of a nuclear reactor.

“With this windowed autoclave, we can stress the sample and identify where a

crack is going to form, even before it is obvious,” says Dr Fabio Scenini, lecturer in nuclear materials manufacturing.

The imaging autoclave is just part of the *Nuclear AMRC's* extensive research facilities at the Dalton Nuclear Institute. The former Royce Laboratory for mechanical engineering, within the University's Sackville Street building, has been refurbished to provide a dedicated *Nuclear AMRC* laboratory.

The laboratory will host a variety of autoclaves, with different models capable of even higher temperatures and pressures, or with larger volumes. Other equipment includes a high-speed strain machine, and a range of welding equipment including a laser welding station based around one of the most powerful lasers in Europe. The *Nuclear AMRC's* Manchester-based researchers will be based in offices on a mezzanine level within the laboratory.

Nuclear AMRC members will also be able to draw on the wider resources of the Dalton Nuclear Institute. Other facilities in Manchester include the Henry Moseley X-Ray Imaging Facility and a wide range of scanning and transmission electron microscopes, which allow detailed study of the microstructure of manufactured components and mechanisms of crack propagation.

Material issues key for suppliers

Changing how a nuclear component is produced can have significant effects on how it performs in a nuclear environment.

That was a key message for delegates at the first of a series of one-day workshops from the *Nuclear AMRC*, aimed at helping manufacturing companies prepare to enter the nuclear supply chain. The first event focused on the North West region, with 11 companies attending.

Dr Fabio Scenini, from the *Nuclear AMRC's* Manchester-based research team, described how changes in manufacturing route, surface finish or welding methods can reduce the lifetime of a component by an order of magnitude.

“When you design a new manufacturing route to make it more cost effective, it's important to understand the implications on the microstructure, and to validate the performance of the component in the nuclear environment, to avoid problems later in life,” Scenini said.

The *Nuclear AMRC* team in Manchester will test the performance effects of the new production processes developed at the main facility in South Yorkshire.

Other workshop sessions covered how modern reactors actually work, and an introduction to quality and accreditation issues for manufacturers, delivered by Parsons Brinckerhoff.

Keep an eye on the *Nuclear AMRC* website for news on supply chain workshops in other regions. Topics will be selected in response to delegate demand.

Sign up to the **Members Area** of the Nuclear AMRC website for extra features, including a discussion forum and library of industry reports and information. Registration is open to all UK companies with a genuine interest in the civil nuclear manufacturing supply chain.



EDF: We need to build a UK supply chain

EDF Energy is actively looking for top-quality companies in the UK to construct its planned EPR power stations at Hinkley Point and Sizewell.

Procurement manager Chris Squires told an audience of manufacturers that the French-owned utility has an established supply chain in France, where it is already building an EPR at Flamanville, but needs new suppliers for the UK.

"We have a supply chain in France that's fairly experienced in doing things, and you could argue that the simplest thing would be to take those and use them in the UK," Squires said. ***"But we think there's very good companies in this country who are more than capable of building our stations. We need to develop a supply chain in the UK."***

EDF is aiming to have its first UK EPR at Hinkley Point online in 2018. To meet its targets, it is looking to use collaborations between French and British suppliers.

"When we bring the two together, we have the French partner who knows how the technology works but doesn't understand the regulatory regime and

culture in the UK, and the British partner who can fill that gap," Squires said. ***"There's a lot of Anglo-French companies coming together. There are a lot of opportunities that are going to arise, so this is the time to get involved."***

Squires was speaking at the Advanced Manufacturing Forum, a regular industry-led event organised by the University of Sheffield AMRC. The March event focused on the current state of the nuclear new-build programme, and was attended by managers from over 60 manufacturing companies.

David Mitchell, global commodity leader for pumps and valves for Rolls-Royce's nuclear business, also outlined his company's approach to new-build.

"Our plan is to build capability in the UK and use that as a route into the global market," he said. ***"We see this as a once in a generation opportunity, and we're looking to guys like yourselves to make the most of the opportunity."***

Rolls-Royce is currently identifying companies which can meet its own supply requirements. The group has examined over 500 potential suppliers, and is honing the list



Squires: This is the time to get involved

to 70-80 qualified companies by next year. Rolls-Royce is still looking for other suppliers, however. ***"The door is very much open,"*** Mitchell emphasised.

Also presenting at the Forum were Vince Middleton of established nuclear supplier Newburgh Engineering; and Kevin McCormick of precision engineers JJ Churchill, which is preparing to make the strategic move into nuclear.

"You have to make a choice whether to get into nuclear, or stay in the markets you know," Middleton said.

Rolls-Royce unveils nuclear factory plans

Rolls-Royce has selected the Advanced Manufacturing Park, South Yorkshire, as the preferred location for a major new facility producing components for new nuclear power stations.

The proposed factory, on the same site as the Nuclear AMRC's main facility, will focus on large components for pressurised water reactors. The 19,400m² factory will initially employ around 180 people, and become Rolls-Royce's global centre for nuclear manufacturing.

The group is also planning an advanced blade casting facility for aero engines on a neighbouring plot, plus a potential third factory for itself or a supplier.

The plans were unveiled at a public consultation at the AMP Technology Centre in April, before a submission of full planning applications.

The Advanced Manufacturing Park is the UK's leading cluster of high-value manufacturing research and industry, with the University of Sheffield AMRC with Boeing as

its anchor tenant. Researchers at the AMRC are working with Rolls-Royce to optimise the layout of its new factories as part of the European-funded Copernico research project, and the factories will use other technologies developed at the AMRC and Nuclear AMRC. The firm said the region's skills base was also a factor in choosing AMP.

Rolls-Royce has also signed a strategic partnership with Areva to supply key

components for the French group's EPR reactor.

Under the new agreement, the two companies will work together to deliver projects for the EPR. The agreement includes the first new reactors in the UK nuclear new build programme. EDF Energy and Centrica are planning to build four EPR reactors at Hinkley Point, Somerset and Sizewell, Suffolk, with the first operational by 2018.



Inside the future: the workshop area of Nuclear AMRC's new facility on the Advanced Manufacturing Park, as of April 2011. Construction of the 8000m² building is on schedule for completion in September.



Quality start to skills development series

The Nuclear AMRC has launched a new series of skills development events with a seminar dedicated to quality issues for manufacturers.

The event, held at the Nuclear AMRC offices at the Advanced Manufacturing Park, focused on what third-party inspectors look for when assessing a nuclear manufacturer.

Independent third-party inspectors are typically commissioned by the utilities buying new nuclear plant, to ensure that their suppliers conform to industry specifications. The inspectors are charged with assessing suppliers against contractual requirements and industry standards for the production of equipment such as reactor components, steam generators, pumps, valves and piping.

Two sets of technical standards are commonly used for mechanical items in nuclear power plants: parts of the US ASME Boiler & Pressure Vessel codes, and the

French RCC-M code. Of the reactor providers preparing for new build in the UK, Areva works to RCC-M while Westinghouse uses ASME.

“Quality standards and codes can be a very challenging area for manufacturers preparing to enter the nuclear industry,” says Paul Bunting, quality manager at the Nuclear AMRC. **“Our aim is to de-mystify the regulatory and contractual requirements that will flow down through the supply chain, and help companies demonstrate that they can meet the very high standards demanded by the industry primes and regulators.”**

The seminar was attended by managers from nine companies at a similar stage of nuclear readiness. Further quality events will be delivered in partnership with Nuclear AMRC member Parsons Brinckerhoff.

The quality event was the first in a series of skills development workshops and seminars

designed to help manufacturers evaluate the opportunities and prepare their businesses for the nuclear supply chain. The series is designed to complement the Nuclear AMRC’s other support programmes, including Fit For Nuclear.

The next events include a one-day seminar providing an overview of the nuclear industry and the global opportunity, on 24 May; and a half-day seminar on nuclear culture, behaviours and relationships, on 9 June. The initial events are by invitation only, but the full programme will be available to all interested businesses. For more information, please contact Nuclear AMRC training and skills manager Annette Valentine (annette.valentine@namrc.co.uk).

The Nuclear AMRC is also working with industry skills bodies to gain formal accreditation for its skills development programmes.



NUCLEAR AMRC
ADVANCED MANUFACTURING RESEARCH CENTRE

About the Nuclear AMRC

The Nuclear Advanced Manufacturing Research Centre is a collaborative initiative led by The University of Sheffield, The University of Manchester and a consortium of industrial partners.

The Nuclear AMRC aims to be the focal point for the civil nuclear manufacturing industry in the UK.

It works with members to develop new manufacturing technologies to meet the needs of the new generation of nuclear power stations, help companies join the nuclear supply chain, and provide support in skills and accreditation.

For more information call 0114 222 9900 or visit www.namrc.co.uk

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