Building on experience

The route to Unit 2

EDF ENERGY HPC CGN

"Our belief that we can do things better drives innovation at Hinkley Point C. As we build the first UK European Pressurised Reactor (EPR) we are learning and improving all the time. This is leading to improved productivity as we build Hinkley Point C's second identical reactor. We will use that experience to underpin our plans for two more identical reactors at Sizewell C."

Stuart Crooks, Managing Director, Hinkley Point C

Cover image: Unit 2.

Building on experience

In 2019, Hinkley Point C completed the base under the first reactor's main buildings, a milestone we call 'J0'. It was the first time a European Pressurised Reactor (EPR) project had met this achievement on time.

Now, less than a year later and ahead of schedule, we have completed the same milestone on our second identical reactor, Unit 2. Our teams have used the knowledge gained on Unit 1 to increase efficiency and productivity. EDF, CGN and contractors have also used innovation based on experience from other EPR projects and from the UK construction industry. Techniques like large-scale prefabrication and digitalisation are increasing predictability and reducing the hours needed for Unit 2's construction. From Unit 1 to Unit 2, and for Units 3 and 4 at Sizewell C and beyond, we'll continue to see tangible gains as we use replication and experience to drive innovation...

4,667

tonnes of steel installed on Unit 2 vs 3,194 tonnes in the same time frame on Unit 1

Unit 1.

Replication… prefabricating steel reinforcement

Prefabrication is a key innovation at Hinkley Point C and is an increasing trend in global construction. It means large parts can be assembled and lifted into place complete, improving quality and reducing schedule risk. For example, long sections of giant cooling pipes, steel containment rings and even Campus bedrooms are assembled before being installed.

An on-site prefabrication yard and covered 'bunkers' replicate factory conditions, while tunnel segments are cast in a purpose-built factory at Avonmouth. Prefabrication reduces the need to work at height or in bad weather – an issue on other EPR projects. The work can be completed and checked in a controlled setting.

Hinkley Point C has the world's largest land-based crane to handle the vast amount of prefabrication. 'Big Carl' will lift more than 500 prefabricated steel and concrete elements weighing up to 1,600 tonnes.

Hinkley Point C is increasing the amount of prefabrication used in Unit 2 and across the project. This is increasing safety and productivity. For example, at the end of March, 4,667 tonnes of steel had been installed, compared to 3,194 tonnes at the same point in Unit 1. Thanks to learnings from Unit 1, 46% more steel was installed in the same time frame. Unit 2 is also benefitting from overall reinforcement rates that are more than 25% faster.

'Big Carl' lifts the liner cup into Unit 1.

"Over 500 tonnes of Unit 2's steel reinforcement for the common raft is being prefabricated and lifted into place, with minor adjustments made in situ. The approach improves safety, efficiency and productivity."

Jonathan Davies, Nuclear Island Unit 2 Senior Engineer, Bylor

Prefabrication drives improvement

In response to learnings from Flamanville 3 and Taishan, both reactors' containment liners are being built in five giant sections in a specially designed, weather-proof building before being lifted into place by 'Big Carl'. These cylinders contain the reactors and key equipment.

Liner cup floor
Construction time for the second liner cup floor is 30% quicker than Unit 1, 39 days vs 57, while quality during prefabrication has remained high.

Unit 2 Nuclear Island.

Experience...

preparing for concrete pours

The 49,000-tonne base or 'common raft' of each reactor is constructed in five main concrete pours.

Before the concrete is poured, steel reinforcement is installed along with embedded items, pipes and steel boxes called sumps, which form part of the drainage system.

As well as using prefabricated steel reinforcement, drainage system pipes were welded together in a controlled factory environment and delivered in sections up to 25 metres long.

Welding and testing in a controlled factory environment has reduced disruption on site and improved safety, quality and productivity.

Each step in the process is critical to the next. When the Unit 2 works met a problem with the late delivery of sumps, teams were able to use the knowledge gained in Unit 1 to adjust the sequence of works.

The changes cut the time from 10 weeks to 10 days between the arrival of the sumps and the concrete pour, and the works were completed on time. This time saving can be taken forward to Sizewell C.

Innovation… improving techniques

Hinkley Point C has learnt from leading construction projects across the world and been able to successfully utilise new techniques and innovations to build a legacy of skills and expertise.

The 'sump suction lines' for the power station's emergency cooling system, weighing up to 10 tonnes, were installed with zero defects and zero accidents. Contractor Darchem believes it can now cut installation time on Unit 2 by 50%, from 12 weeks to six.

With works on the nuclear drainage and vent system pipes and sumps, the number of pipe-to-pipe welds conducted on the raft was reduced by 12 to just three in Unit 2, improving quality and minimising the need for disruptive testing.

Robotic Mesh Factory

An exciting innovation on the project is the new Mesh Factory, which can produce up to 1,000m^2 of reinforcement mesh per day. The factory's tying gantry comprises five individual robots that have been programmed especially to perform tying within the factory, each fitted with a replaceable tying gun attachment to bind mesh together. As well as increasing productivity, this innovation will reduce the amount of manual handling for our Steel Fixers and the risk of associated injuries.

Unit 1 with liner cup and sump suction lines installed.

50%

reduction in installation time on Unit 2's cooling system components

Did you know?

'The Common raft' is the foundation that sits under the reactor building and the four buildings that surround it. There are five concrete pours to complete the common raft for each of Hinkley Point C's two reactors.