



# Case study

## Type 23 rolling platform test rig

### THE CHALLENGE

Securing landed helicopters onto the deck of a ship can be problematic, particularly during adverse weather conditions.

Various designs of capture manoeuvre and restraining mechanisms have been developed to help secure the helicopter, however, testing these devices to realistically simulate the roll and pitch of a deck could only be conducted onboard a ship at sea. Being an unpredictable and uncontrolled environment, this introduced significant safety concerns, and lacked the required control and repeatability.

With this in mind, Frazer-Nash were commissioned to develop a land-based test rig that would simulate the movement of a type 23 Frigate's deck whilst at sea.

### OUR SOLUTION

We designed a solution which consisted of a flat deck surface, which was mounted onto a structure operated by a hydraulic mechanism. This system could angle the deck to  $\pm 30$  degrees in one plane within 15 seconds, realistically simulating deck attitudes of up to sea state six.

Meanwhile, to mimic the combined roll and pitch of the deck, a slewing ring was incorporated enabling the deck to be rotated. Mounted in the centre of the deck was a section of the actual ship's capture structure, enabling the rig to test various capture mechanisms under fixed angles of attack in a safe, realistic and controlled environment.

We used considerable finite element analysis to optimise the design, so that when constructed, our deck would be light enough to meet the stringent weight constraints, but stiff enough to minimise flexing during operation.

The basic framework (*measuring 16 x 12 metres*) was constructed from standard rolled steel sections, and the top surface was clad in steel open walkway panels. The capture structure was bolted into the centre of the deck, allowing different structures to be interchanged as necessary, and the articulation structure incorporated a fully controllable hydraulic actuation and control system.

To complete the project, we worked in partnership with both the prime contractor and manufacturer to take our detailed design specification to the commissioning stages.

Because of its sheer size and scale, we designed the deck to be built in five sections for transportation by road. However, once at the test rig site, the platform sections were welded together before being craned into place on the articulation structure.

### Client

Defence Evaluation and Research Agency (DERA)

### Business need

Design a test rig to simulate landing on a rolling deck of an aircraft carrier for a helicopter

### Why Frazer-Nash?

Frazer-Nash has considerable expertise in mechanical and structural design using CAD tools and innovative design concepts



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