

SPA

Fish Deflection for Blasting for Forth Crossing Bridge

Firth of Forth, Scotland



Figure 1
Muticat Vessel used for deployment of mobile Sound Projector Array System

The Forth Bridge is a railway bridge located over the Firth of Forth on the east of Scotland west of central Edinburgh.

Blasting was required for the second Forth Crossing Bridge project in 2011. Concerns were raised about the effect this would have on the local fish population including salmon and sea trout. Fish Guidance Systems was therefore requested to provide a behavioural fish deflection system for the site and an assessment was carried out to ensure that a suitable system was provided.

Due to the temporary nature of the project, as blasting was only going to be happening for a short period of time, a mobile Sound Projector Array (SPA) system was deployed from the back of a boat. The boat was required to have the capability of lifting the deployment frame for the SPA system from the dock onto the deck as well as suspending the frame over the side of the vessel. Power to the SPA system was also provided from the boat but could also have been given from a generator.

The Control Equipment was set up under tarpaulins against the starboard side of the wheelhouse with all electrical connections, including the distribution board, protected against water ingress. The cable harness was run along the deck and the connections were made to the Sound Projectors. The cables were then cable tied to the grill of the Sound Projectors ensuring that the cable connectors were not put under undue stress. Attaching the cables to the grill prevented the cables getting snagged once in the water, which could cause damage to the cable or disconnect from the Sound Projectors.

From prior experience of using a suspended deployment system, it was known that the SPA deployment frame can spin in the water if not secured properly, causing the cable to twist around the lifting strops and damage the equipment. This was prevented by securing the frame with lines fore and aft attached to



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Deployment of SPA system of the side of the vessel during operation.

the deployment frame and not the Sound Projectors whilst having the additional effect of preventing the frame rising up at an angle whilst the vessel was underway before and after blasting.

The SPA system was deployed over the starboard side using the crane then the Control Equipment was switched on. The sweep was carried out in a clockwise direction so that the Sound Projectors were as close as possible to the blast area. The sweep started just outside of the yellow safety buoys (approx 70m from the blast site) and gradually increased over the hour. The vessel was steaming at approx 2knts over the ground. This pattern was followed for every blast to ensure that the maximum number of fish were affected by the SPA system to drive them away from the blast area.

The system installed comprised of –

- 1 FGS Model 1-08 Signal Generator
- 4 FGS Model 400 Amplifier
- 4 FGS Mk II 30-600 Sound Projectors
- 4 Cable harnesses
- 1 Deployment Frame

The project was run for 11 days in December 2011, however the technology used for this project is deployed at a number of water extraction sites and have been installed for a number of years.

For further information on fish deflection systems please contact FGS.



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