

**Marine Mammal Scientific Support Research Programme MMSS/001/11**

USD 2

Testing the hypothetical link between shipping and unexplained seal deaths

**Executive summary**

This investigation was driven by the need to determine the cause of spiral lacerations in seals; a cause of death which has been reported with increasing incidence in the UK for the past decade. The purpose of this study was to demonstrate the ability of certain propulsion systems used on vessels to cause these types of injuries. The effect of animal size, propeller speed and propeller type on the occurrence of seal- propeller interactions was investigated. All trials were conducted with scale models of seals comprised of silicon rubber cores and wax outer layers.

A total of 59, 80 and 75 seal models were recorded and analysed for the ducted propeller, open propeller and Voith-Schneider propeller treatment groups respectively. Each propeller type was tested at four different rotation speeds and three model sizes representing different life stages were subjected to each speed. Only scale models which were subjected to a ducted propeller (a propeller fitted with a static housing) displayed characteristic injuries similar to those seen on stranded seals in the UK and Canada. Propeller speed was a significant factor in determining damage attributes, with slower speeds producing more spiral lacerations. Model size appeared to be unimportant in determining damage characteristics. Open propellers and Voith-Schneider propellers did not produce these patterns in any of the trials.

Ducted propulsion systems were the only mechanism which produced spiral lacerations under these test conditions. Consequently observations on candidate vessels are vital to gain a better understanding of the circumstances under which these interactions can occur in coastal regions. Viable mitigation can then be developed to reduce the number of cases and protect seal populations.