HALF A CENTURY OF TRANSOM FLAPS

BY

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The article on transom flaps in the August Journal was fascinating but would have benefited from some mention of the previous half century of work. The Gay class fast patrol boats were designed by J T Revans RCNC based on wartime boats from Vospers. They entered service from 1953 and a serious problem soon developed. At full speed, circa 40 knots, they ran at considerable stern trim which put the intersection of the bottom with the running waterplane at the centre of the longest compartment causing serious structural failures in the bottom. Attempts to strengthen the bottom failed.

Revans then thought of fitting a flap to the transom to reduce trim. Haslar ran a towed model test and forecast a loss of speed of some 1½ knots and warned of the risk of porpoising. Undaunted, Revans had a flap made and fitted by artificers at the base, HMS Hornet. On trials the boat went 4 knots faster and trim was much reduced. The class were all fitted and bottom damage was rare.

When writing the new Ship Hydrodynamics course at UCL in the late 1960s it occurred to me that the flap on the Gay class showed benefits at lower speeds, at Froude numbers appropriate to frigates. After prolonged argument Haslar tested a model but it was a towed model. There was a very small benefit at top speed and penalties lower down the range.

Further lengthy argument followed before a propelled model of a Type 21 was tested. A wide range of flaps, wedges and angles were tried and it was clear that substantial improvement was possible. Settings were selected to give best performance at top speed without significant penalties at lower speeds. Ship trials in Avenger confirmed these tests and she went 1½ knots faster. It was then envisaged that flaps be investigated for all new and old ships. The Type 23 would be fitted on build.

Part of the benefit in most cases comes from reduction in running trim giving reduced transom immersion. As ships get older, they put on weight – like humans – and transom immersion increases. Ship fitting of flaps should be designed so that flap angle may be altered easily at mid life. There is a case for flaps whose angle may be varied from inboard with speed. Much of the benefit comes from changes to 't', the thrust deduction coefficient, but I have never seen a physical explanation.

Reference. D K Brown & G Moore. ***Rebuilding the Royal Navy.*** Chatham Publishing, London, 2003. Includes material from Jack Revans.