

Twin Screw

Most ships are equipped with twin screws, and the propellers turn opposite ways, either outward or inward. Twin screw is called outward turning when viewed from astern; the starboard propeller turns clockwise, while the port propeller turns counter-clockwise to push ahead. Conversely, the inward turning twin screw has the starboard propeller turning counter-clockwise and the port propeller turning clockwise when pushing ahead.

The Effect of Torque

The torque is the turning moment, which depends on the force and lever described in the Physics section. With twin screws, the distance between the two propellers is important for the turn when using one engine making ahead and the other making astern; the distance between two propellers is the lever between two forces acting oppositely to turn the ship. The effectiveness of the turn is proportional to the distance between the two propellers and the rpm of the propellers. Therefore, the ship with propellers further apart will have more effective turning. On vessels with very fine hulls and narrow beams, the propellers are close together, and executing a turn therefore takes longer.

Transverse Thrust on Outward Turning Fixed Pitch Propellers

When both propellers are going ahead and astern at the same pitch, the transverse thrusts cancel each other out, so there is no transverse thrust effect. When using one propeller going ahead and one going astern for a turn, the transverse thrust takes effect, such as when the port propeller is going ahead while the starboard propeller is going astern; the port propeller creates transverse thrust, pushing the stern to port, and the starboard propeller also creates thrust to push the stern to port, which will assist the turning to starboard. The result is also the same for turning to port.

Transverse Thrust on Inward Turning Fixed Pitch Propellers

For inward turning propellers, when the starboard propeller is put astern for a starboard turn, the transverse thrust will push the stern to starboard and cant the bow to port, opposing the direction of the desired turn; so also for the port propeller. This effect makes the turn more difficult.