When a ship is turning, the rotational motion is about a vertical axis. The postion of this axis is influenced by the ship’s shape, the ship’s motion and the point of impact of various forces acting on the ship. The axis moves about with a change in the lateral and rotational motion of the ship, we call the position of this axis a pivot point. In the present paper, how the pivot point wanders about with a change in the forces that affect the ship is discussed taking into account the rudder effect, the propeller effect, the wind effect and the effect of tug asistance. The numerical examinations were carried out using a computer analysing system which can generate ship’s motion under the ma thematical simulation model and show simultaneously the estimated position of the pivot point on a graphic display.
Ship handling has been viewed by many as an 'art', meaning that it cannot be performed by scientific calculations alone, but must also be relied upon one’s own experience and intuition. One of the factors contributed to this view was the concept of 'pivot point'. It has been the central and important tool in ship handling, unfortunately, however, it has been a rather ambiguous entity, resulting in some confusion and misuse amongst ship handlers. Yet practitioners have been trying to understand ships’ motion in terms of it. The knowledge about the position of the pivot point in a manoeuvring situation provides the ship handler with the information on the geometry of motion of the ship. Rowe R W (2000), Clark I (2005), Cauvier H (2008) and Baudu H (2014). Position of Pivot Point When the Ship is Making Headway/Sternway. Below picture shows how the Pivot Point position depends on block coefficient (slender ship vs full bodied ship). Position of Pivot Point Depending on Ship's Shape. Rudder Force & its Effect. Hull Lateral Force Due to Sway. Transverse Trust of the Propeller. Ahead - Higher pressure on the port side transverse thrust causes small swing to port hardly noticeable. Astern - Higher pressure on the starboard side much more significant transverse thrust causes swing to starboard. Ahead. Astern. A Pivot Point is a central point on a vessel which remains fixed as the bow and stern swing around it. Fixed is not really correct, because it moves forward or aft as the vessel moves through the water as stated below: 1. Ship stopped. Unless stated otherwise. Each example assumes a ship on an even keel in calm conditions and still water. More important perhaps, than the position of the pivot point, is the effect its shifting nature has upon the many turning forces that can influence a ship. These are rudder force, transverse thrust, bow thrust, tug force, interactive forces and the forces of wind and tide. Related Article: Ship Interactions when Navigating in a Channel. Vessel Stopped. If we look at the ship used in our example, we can see that it has a length overall of 160 metres.