Engine Orders and Ship speed

When entering and leaving port, a ship must change its speed and course frequently, and when this happens, we say the ship is manoeuvring (spelled “maneuvering” in American English), but otherwise, they proceed at a relatively constant engine speed. When manoeuvring, an officer of the watch (OOW) on the bridge gives engine orders using the engine order telegraph to change the engine speed, on which the following orders typically appear.

Full Ahead Half Ahead Slow Ahead Dead Slow Ahead
Stop
Dead Slow Astern Slow Astern Half Astern Full Astern

Here, “ahead” means “in the direction to move the ship forward,” and “astern” means “in the direction to move the ship backward.”

The photo on the right shows a typical engine order telegraph located in an engine control room (ECR). The green and red lamps on the left shows the bridge engine order and the lever on the rught controls the engine speed. At this moment, the red lamp shows that the last bridge order was “STOP” and the engine is in the “STOP” position. On the far left, the button that reads “S/B” is lit. This indicates that the engine is on STANDBY, meaning all necessary tests have been finished and the engine is ready to be used.

When the engine order telegraph is changed to “DEAD SLOW AHEAD” on the bridge, the red lamp next to “STOP” will go off, and the green lamp next to “DEAD SLOW” will be lit, and a bell starts ringing on the bridge as well as in the engine control room. When the duty engineer in the engine control room “answers the bell,” i.e., moves the telegraph lever to the “DEAD SLOW AHEAD” position, the bell will stop on the bridge as well as in the engine control room. This is why an engine order is called a **bell**. If the engine is accidentally started in the opposite direction to the bridge order there is a “Wrong Way Alarm” as this could have serious consequences.

On the bridge all the engine orders and the time when each order is given are recorded in a **bell book**. This is a traditional procedure many training ships still follow today, but on modern commercial vessels, the engine is often on direct bridge control, and there is no “answering” the bell. Nonetheless, the word “bell” is still used to represent an engine order, and the captain or pilot may still ask “What was the last bell?”

For each telegraph order, there is a preset engine speed (rpm), and for each engine speed, the ship is expected to proceed at a certain speed in calm water. This speed changes depending on the loading condition of the vessel. Obviously, the more cargo it has, the less the speed. The following table shows an example taken from a large bulk carrier. The "Loaded Speed" column shows the ship's speeds when it is fully loaded, and the "Ballast Speed" column shows those when the ship is in ballast. When a cargo ship has no cargo, it is light and its propeller will get out of water if no additional weight is added to the ship. To submerge the propeller, ships fill their ballast tanks with sea water and discharge the ballast when loading new cargo. Here, the ballast speed means the ship's speed when the ship is proceeding with ballast water alone. Since the total weight of a ship is much lighter when it is in ballast than when it is fully loaded, the ballast speeds below are much faster than the loaded speeds.

	Engine RPM	Loaded Speed	Ballast Speed
Full Ahead	65	11.9 kts	13.1 kts
Half Ahead	58	10.0 kts	12.0 kts
Slow Ahead	40	7.0 kts	8.7 kts
Dead Slow Ahead	28	5.0 kts	6.3 kts
Dead Slow Astern	28		
Slow Astern	40		
Half Astern	58		
Full Astern	65		

Most modern ships now have bridge control of main engines, which gives continuous, unstopped control, but the above step settings are retained for the benefit of masters or pilots giving orders.

A ship's speed is measured in "knots." In the past, a ship's speed was measured by dropping a line with equally-spaced knots. This is why "knot" is used for the unit of ship speed. One knot is a speed at which a ship travels one nautical mile per hour, and one nautical mile corresponds to the distance covered by one minute of latitude, 1852 metres. This is very handy for deck officers since nautical charts (deck officers' maps) always show latitude and longitude, and there is no need to indicate how long one nautical mile appears on each chart. Regardless of the chart scale, one minute of latitude is one nautical mile.