Fluid Hammer Effect — study guide

Fluid hammer is the pressure surge that races through a pipe when the flow of liquid stops or starts too abruptly. It cracks pipework, wrecks fittings and contaminates cargo. This guide covers the causes, the effect and the prevention.

What it is

The fluid hammer effect is the **sudden increase in pressure inside a pipe** when a moving liquid is forced to stop or change speed too quickly, converting its kinetic energy into a pressure spike.

Common causes

The usual causes are rapid manual valve opening or closing and too high-speed settings on remotely operated valves. In ballast water, cargo and engine cooling systems the resulting phenomenon is a **hydraulic shock**.

Possible effects

Fluid hammer can cause damage to pumps, valves and filters, chemical and oil cargo contamination, and fractured pipework.

Prevention

The main defence is to change valve positions slowly, so that the liquid's velocity changes gradually. In compressed-air systems, the risk of a "slug" forming is prevented by **opening the inlet valve slowly** rather than snapping it open.

Key facts to remember

- Fluid hammer = sudden pressure increase inside a pipe.
- Causes: rapid manual valve operation; over-fast remote valve settings.
- In ballast/cargo/cooling systems it appears as hydraulic shock.
- Effects: damaged pumps/valves/filters, cargo contamination, fractured pipework.
- Prevent it by opening and closing valves slowly; open a compressed-air inlet valve slowly to avoid a slug.

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