Marine Construction & Welding

NA21003

Autumn 2020

End Launching

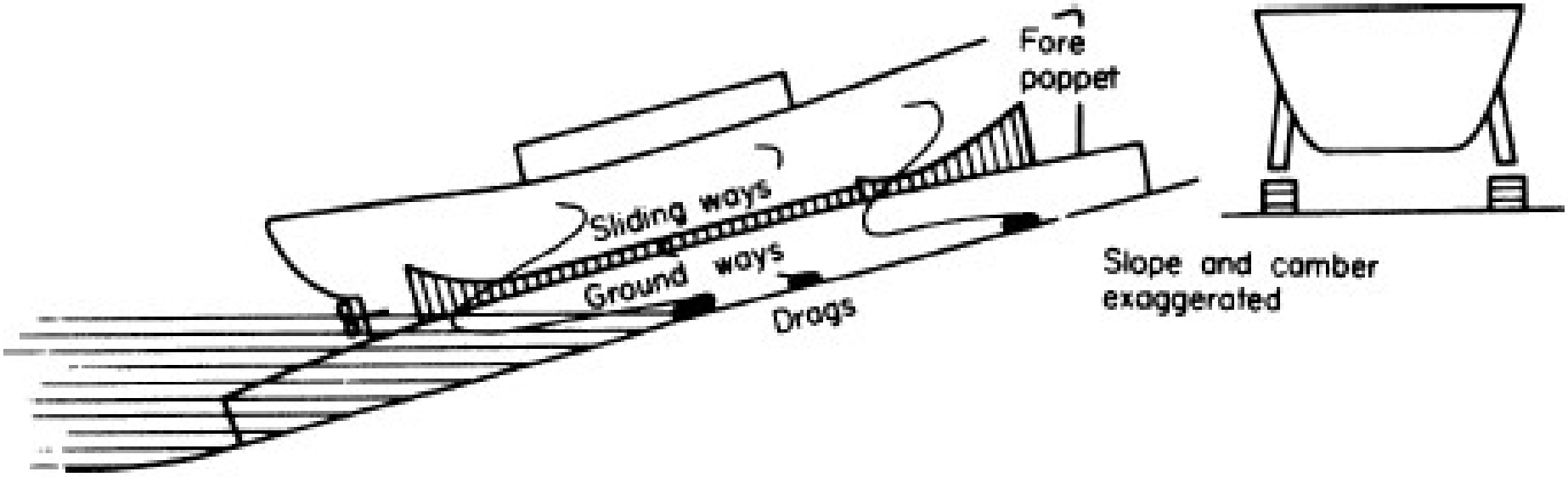
End Launching

Generally the ship is launched stern first into the water as this part is more buoyant.

The slipways are usually used, which are partially or totally below high water level.

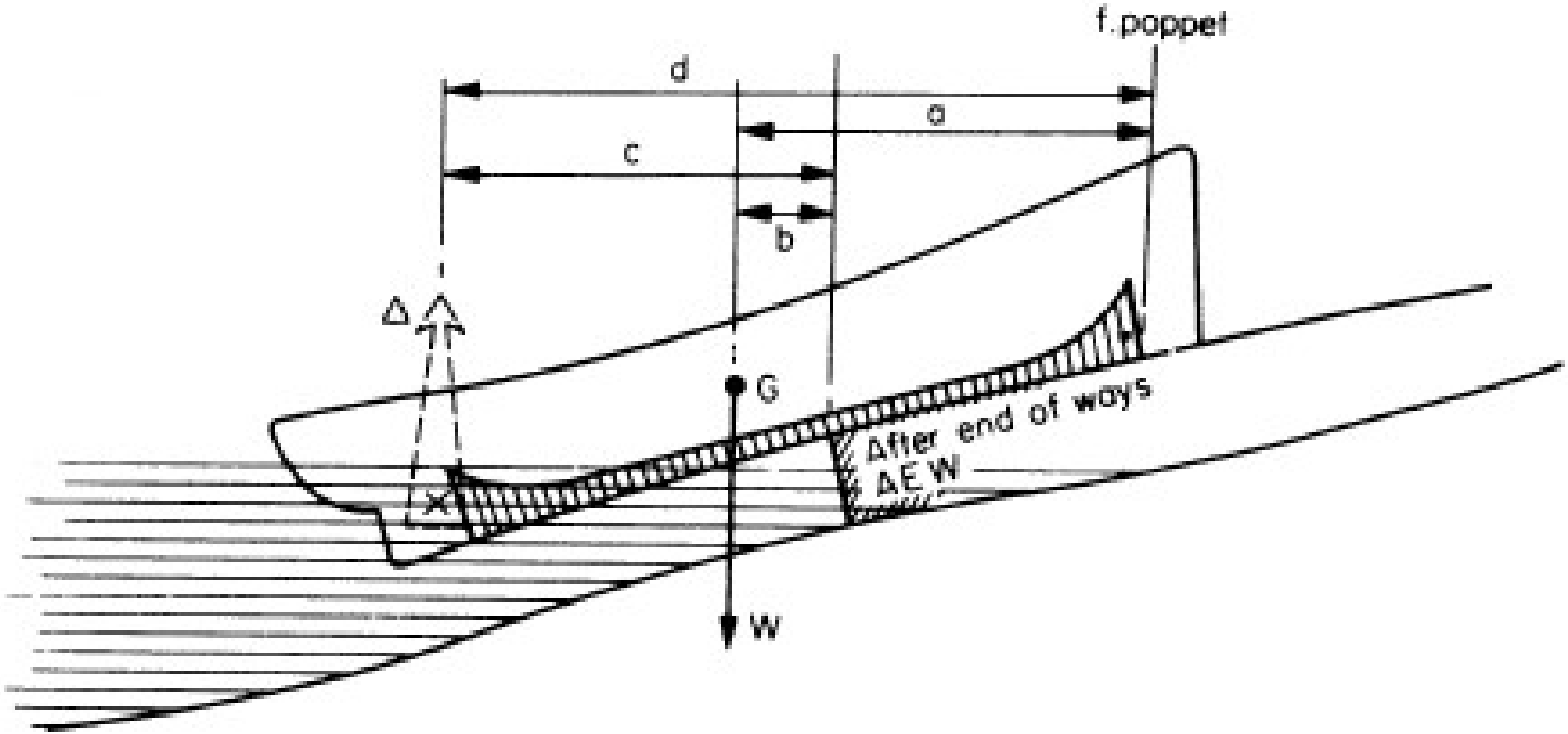
The site is kept dry using doors, and during launching they are opened to allow water inside and provide some buoyancy.

End Launching



Stern first launching

Forces during End Launching



A distributed load of (W-Δ) acts on the slipway, which becomes concentrated at the fore poppet at stern lift.

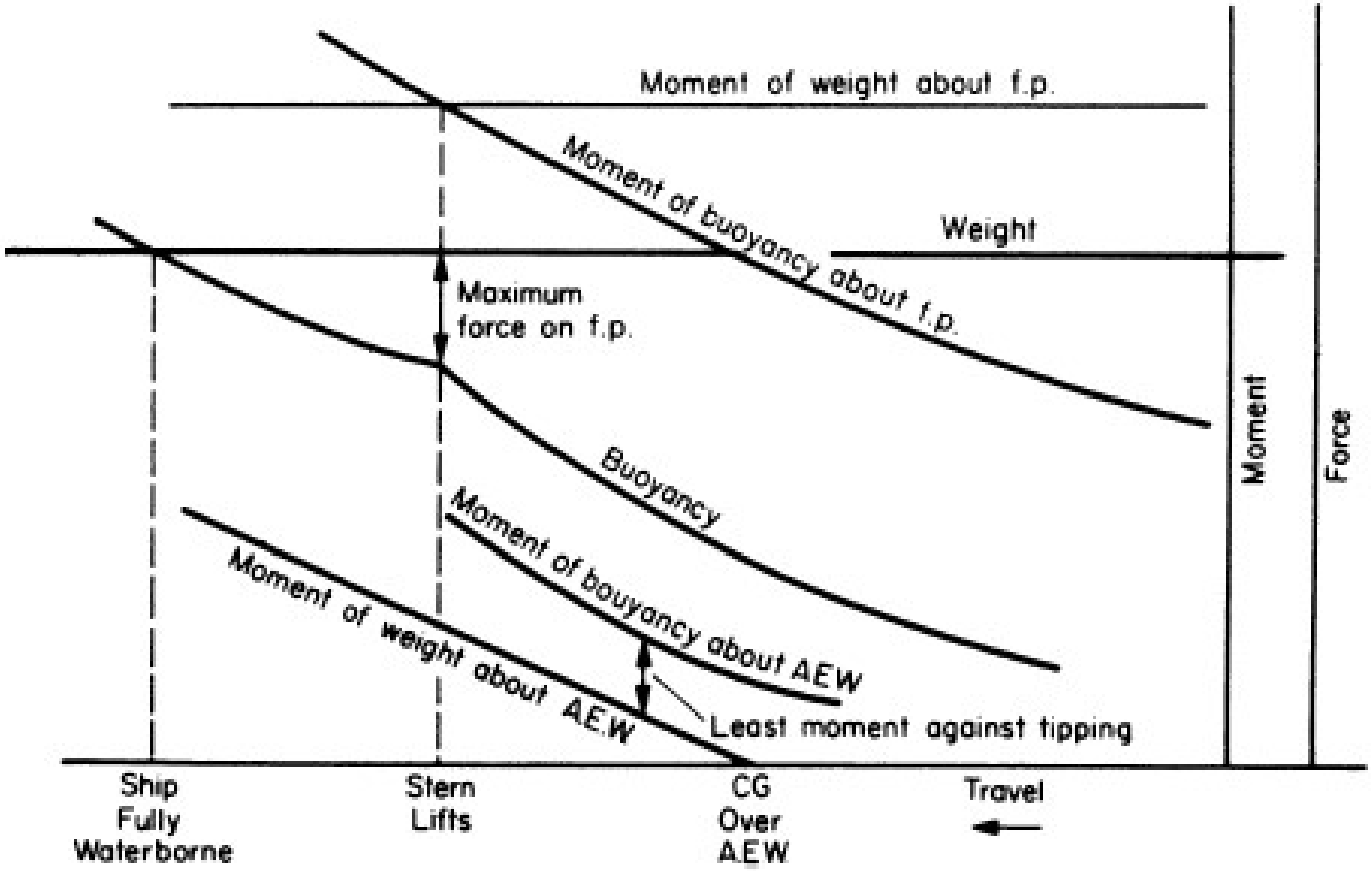
Launching Curves

A set of six curves plotted against distance of travel down the slip

Used to predict the behaviour of the ship during launching

- Weight
- Buoyancy
- Moment of weight about fore poppet
- Moment of buoyancy about fore poppet
- Moment of weight about after end of groundways
- Moment of buoyancy about after end of groundways

Launching Curves



Launching Curves

Features:

- The stern lifts at the point where the moment of the buoyancy about the fore poppet is equal to the moment of the weight about the fore poppet.

- The difference between the weight and buoyancy at this point is the maximum load on the fore poppet.

Launching Curves

Features:

- Curve of the moment of buoyancy about AEW should lie completely above the curve of the moment of weight about AEW. The minimum difference gives the least tipping moment about AEW.

- If the weight and buoyancy curves cross before AEW, then the fore poppet will not drop off the AEW.

Launching Ground ways

Ground ways support the launching cradle which again supports the vessel to be launched.

Material: Steel-reinforced concrete, structural timbers, welded steel plates, or composite construction

The ways are straight or cambered to an arc of large radius. Two ground ways may be used with a transverse inclination for each.

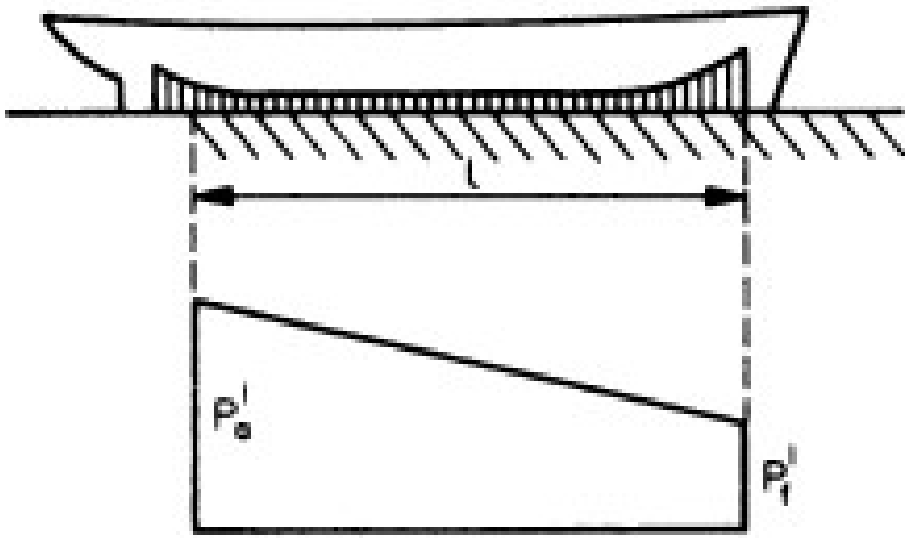
End launch straight ways:
Slope (Declivity): 0.045 – 0.065 to 1 (depends on weight)
Transverse Inclination: 0.020 to 1

Launching Ground ways

Total load on the ground ways at any instant during launching is given by: $W - \Delta$

Moment of this load about fore poppet: $W.a - \Delta.d$

If the load distribution over the ground ways is assumed linear, the curve of load/unit length vs length is a trapezoid.



Launching Ground ways

Length of ways remaining in contact at any instant: l

Load per unit length at fore poppet: p'_f

Load per unit length at after end of ways: p'_a

$$W - \Delta = \tfrac{1}{2} l (p'_f + p'_a)$$

$$Wa - \Delta d = p'_f \frac{l^2}{2} + \frac{1}{3} l^2 (p'_a - p'_f)$$

Launching Ground ways

$$p'_{\mathrm{f}} = 4\frac{W-\Delta}{l} - 6\frac{Wa-\Delta d}{l^2}$$

$$p'_{\mathrm{a}} = 6\frac{Wa-\Delta d}{l^2} - 2\frac{W-\Delta}{l}$$

Launching Problem

A vessel whose launching weight is 25 MN with CG 5 m abaft amidships has the fore poppet positioned 50 m forward of amidships. Find the force on the fore poppet and the travel when the stern lifts from the following data:

Travel down slip, m	50	60	70	80	90
Buoyancy, MN	10.1	12.3	15.3	19.4	24.6
CB abaft amidships, m	47	40	33	26	19

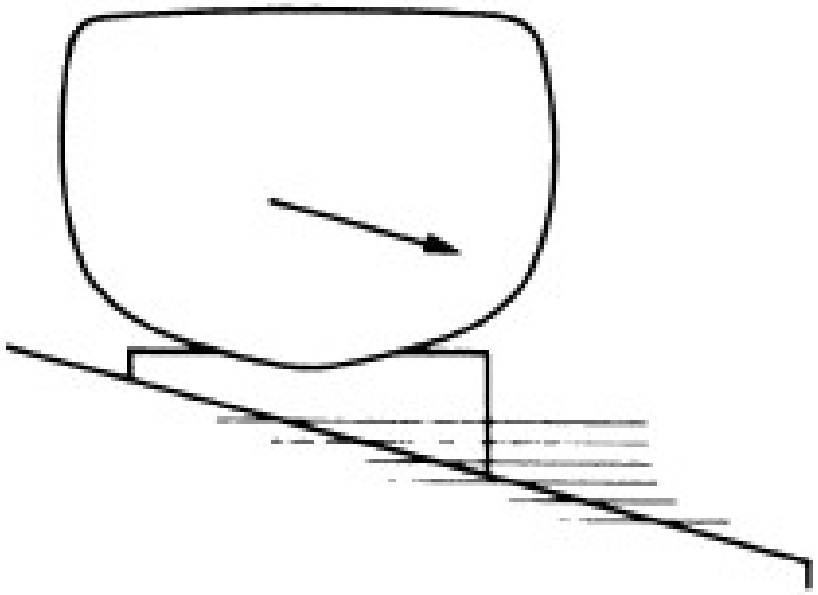
Sliding ways 70 cm wide each side are proposed, with a length of 95 m. What is the mean pressure on the lubricant before motion takes place?

Side Launching

Side Launching

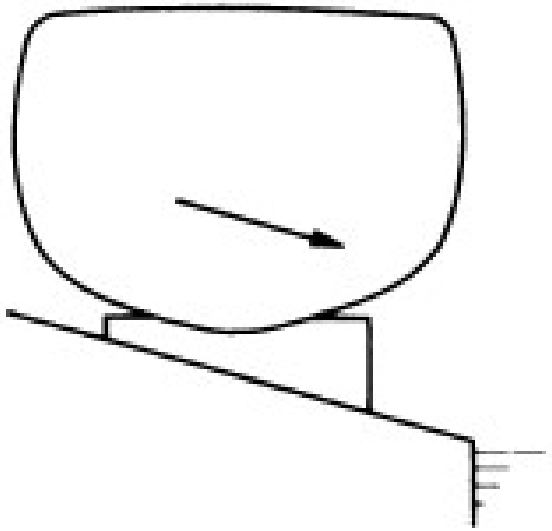
For small ships or restricted waterfront space, side launching is adopted. The keel is laid even, and parallel to the water.

- The ship slides down ways which are built well under water.

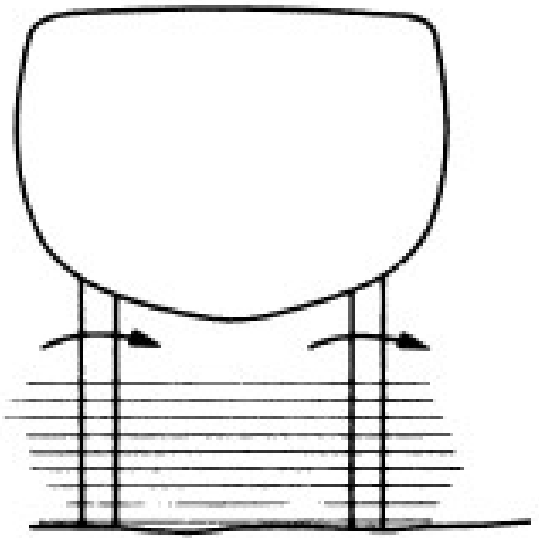


Side Launching

- The ship tips off the end of ways into the water.



- The ship is built on piles which are collapsed releasing the ship into the water..



Side Launching

Considerations:

- The sideways impact into water may cause the ship to roll heavily, even higher than 30 deg.
- Stability at large angles of heel, and water tightness have to be considered.
- May cause damage to adjacent shores.