



The Worshipful Company of Arbitrators

Incorporated by Royal Charter

UNBLOCKING THE SUEZ CANAL: AN EXPERT VIEW

Presented on behalf of

THE MASTER, MARGARET BICKFORD-SMITH QC

by

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MBA, LLB (Hons), CMMAr, CMarTech, FIMarEST, FNI, AFRIN, TAE

EVER GIVEN – WEDGED ACROSS THE SUEZ CANAL



SHIPS IN SUEZ CANAL



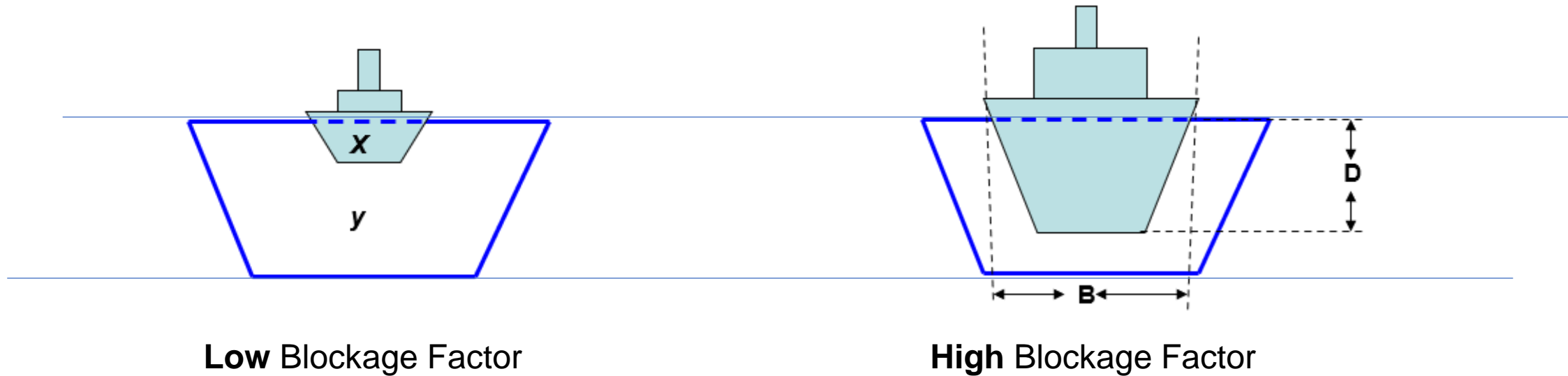
SHIPS IN MANCHESTER SHIP CANAL [1]



SHIPS IN MANCHESTER SHIP CANAL [2]



DEFINITION: BLOCKAGE FACTOR



The **BLOCKAGE FACTOR** is the mathematical relationship between and that of the vertical **underwater cross-sectional** of a ship and the vertical **cross-sectional area of the waterway**- usually expressed as a percentage of one against the other.

In the diagram above the Blockage factor may be expressed as the relationship between x and y or $x/y \times 100\%$

LOW BLOCKAGE FACTOR SHIP



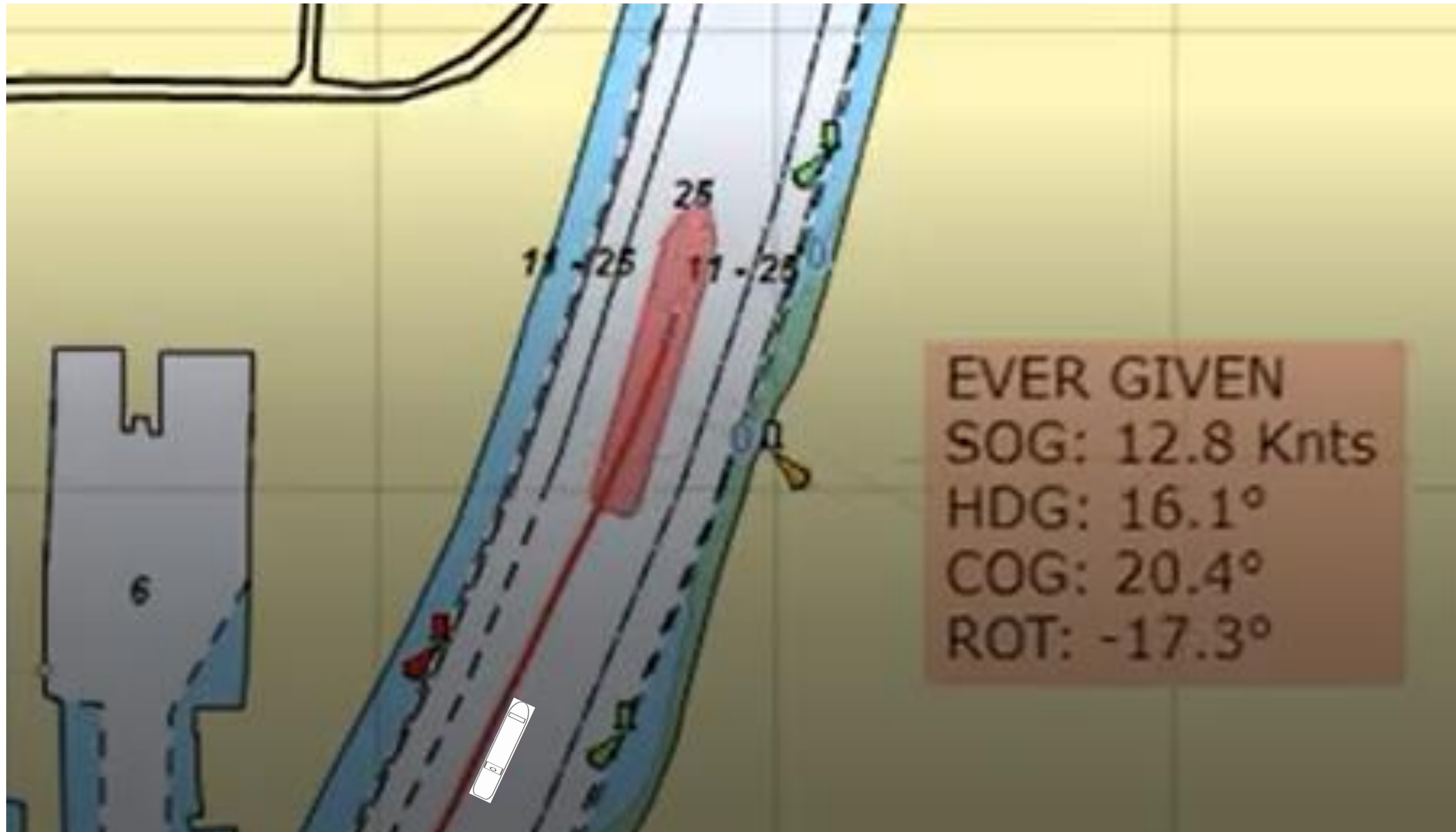
HIGH BLOCKAGE FACTOR SHIP



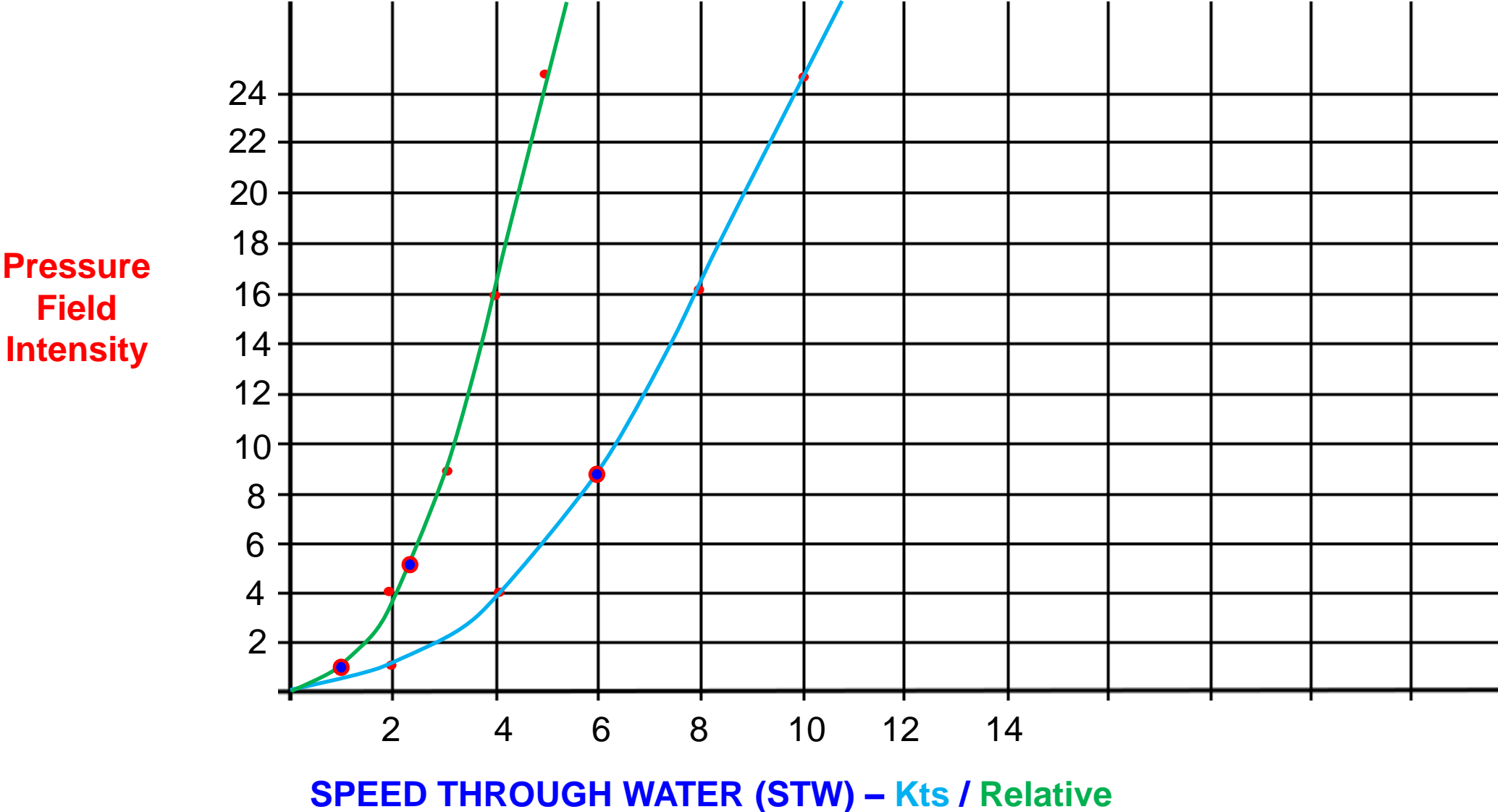
HIGH BLOCKAGE FACTOR SHIP



EVER GIVEN – CENTRED MID-CHANNEL IN SUEZ CANAL

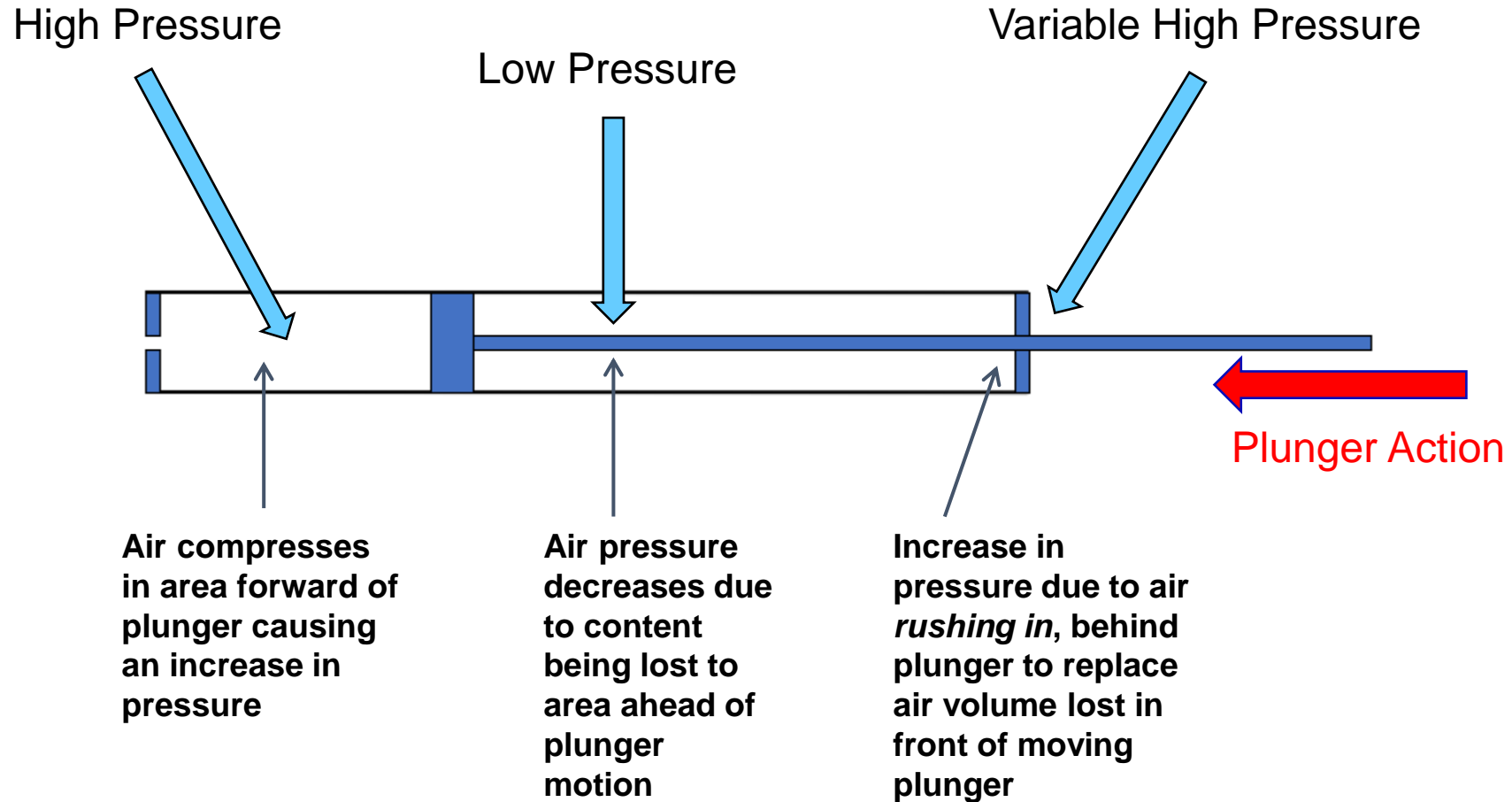


EFFECT OF VESSEL SPEED ON HYDRODYNAMIC PRESSURE FIELD INTENSITY

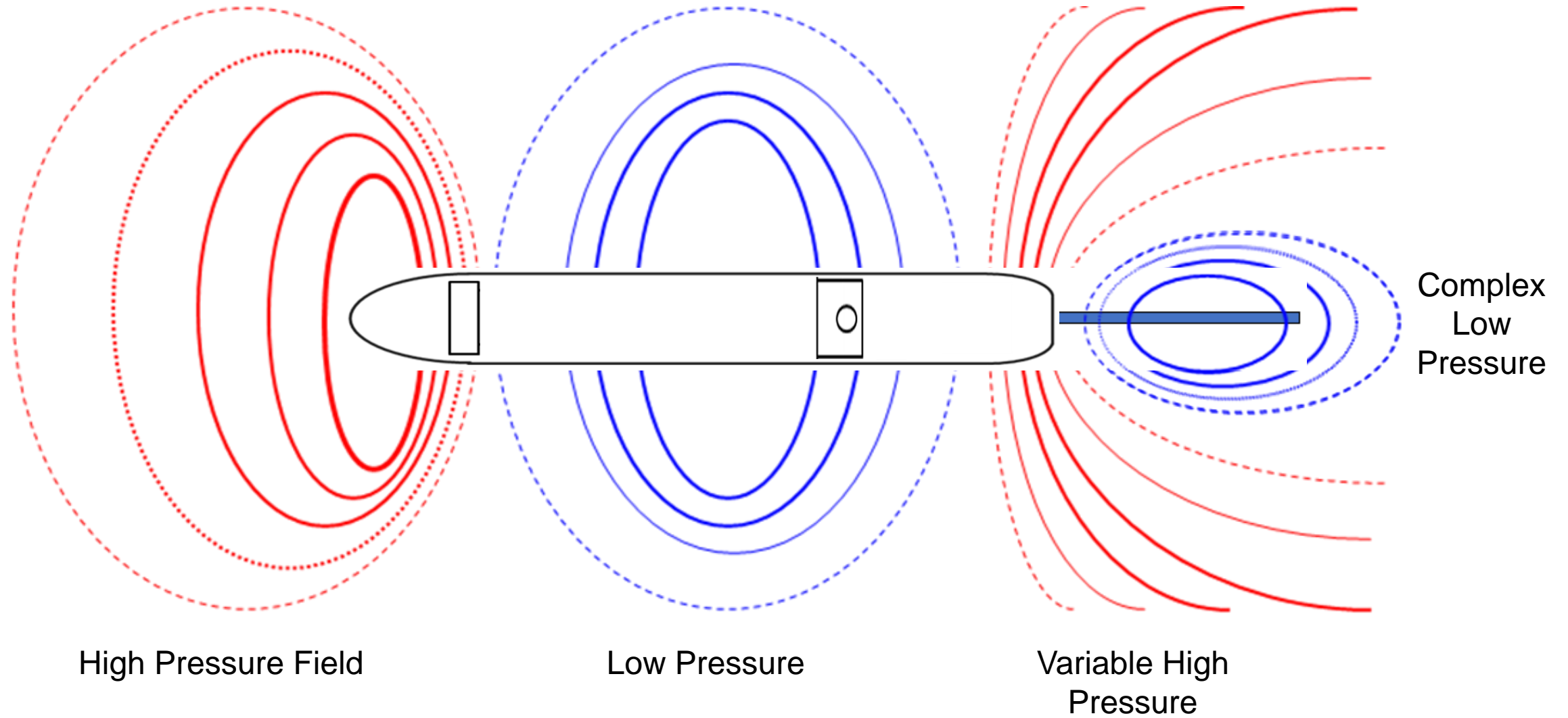


HYDRODYNAMIC PRESSURE FIELDS – THE THEORY [1]

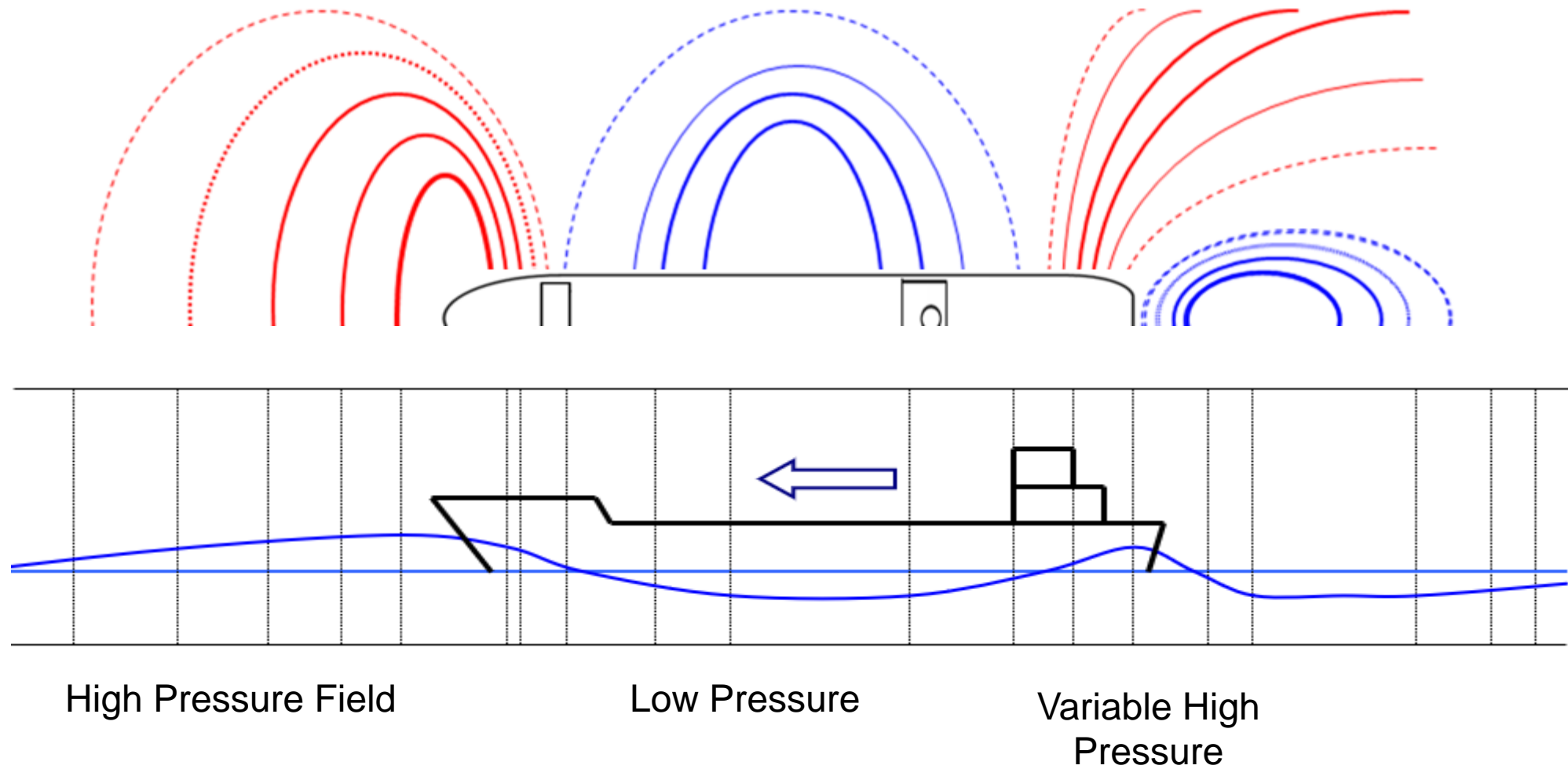
THE BICYCLE PUMP SEQUENCE



HYDRODYNAMIC PRESSURE FIELDS – THE THEORY [2]



HYDRODYNAMIC PRESSURE FIELDS – THE THEORY [3]



HYDRODYNAMIC PRESSURE FIELDS – THE REALITY [4]



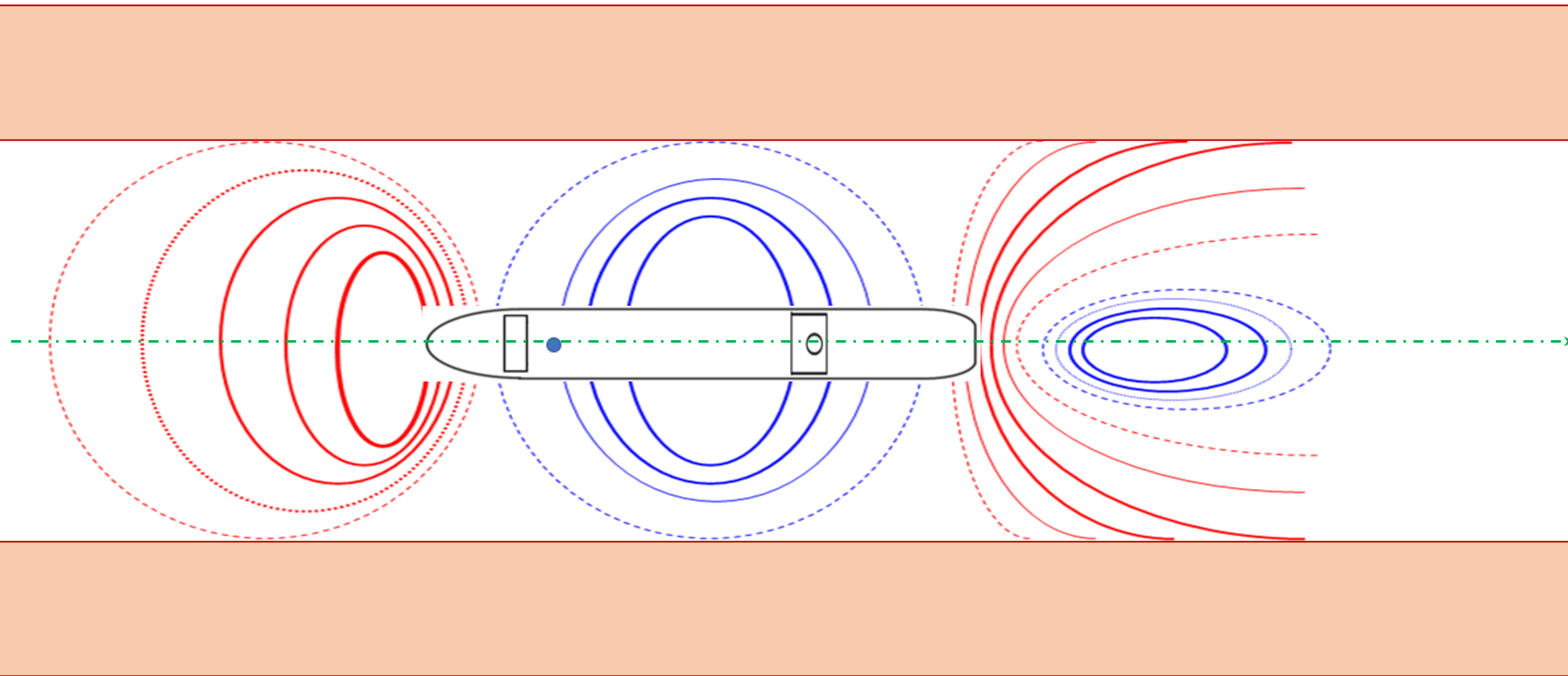
High Pressure Field

Low Pressure

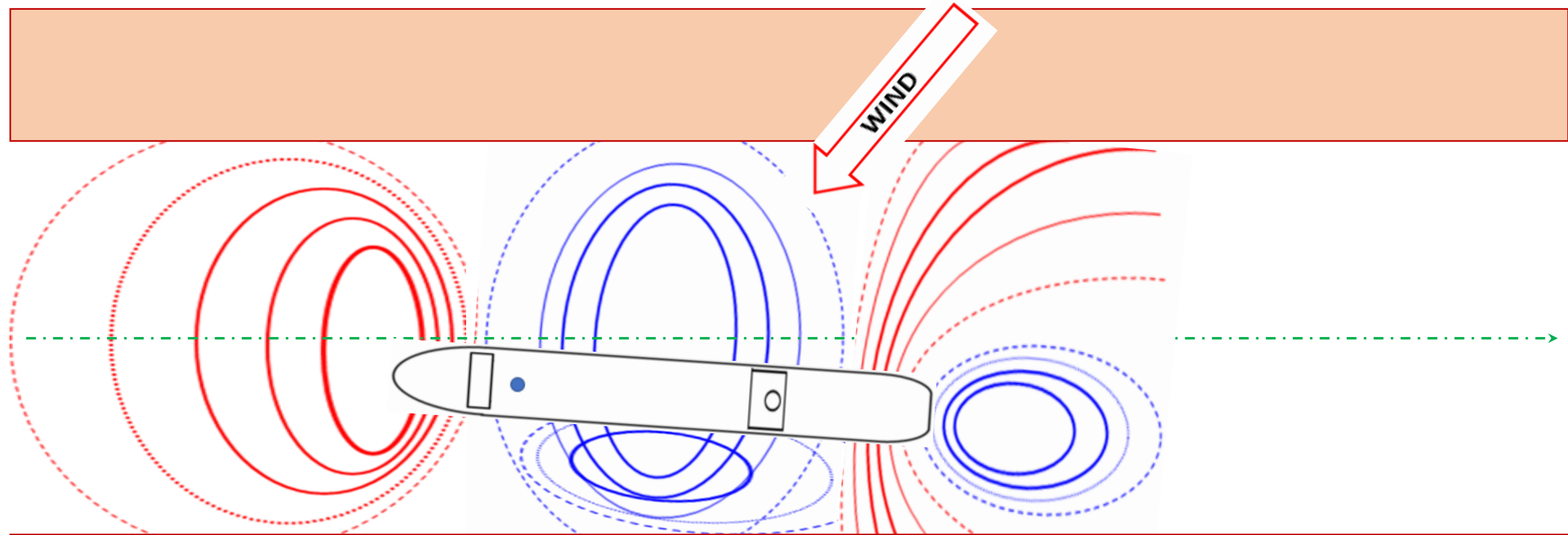
Variable High Pressure

EVER GIVEN - INCIDENT VIDEO

SYMMETRICAL PRESSURE FIELDS – THE IDEAL



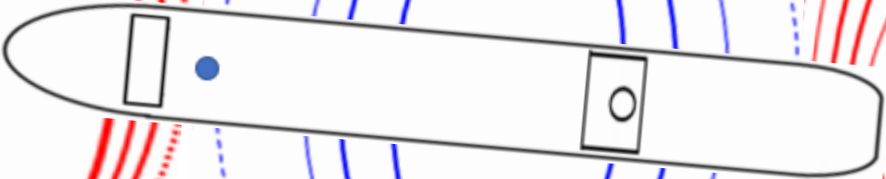
ASYMMETRIC PRESSURE FIELDS – SHIP OFFSET FROM MIDDLE



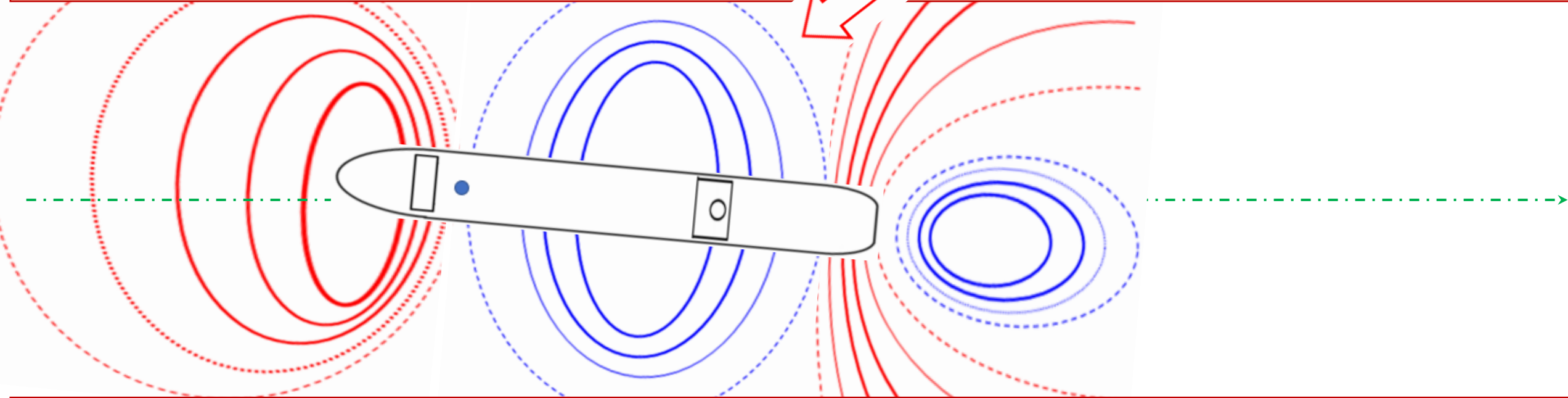
Low Pressure Field
becomes very intense

Bank Rejection [1]

High Pressure Field
Builds quickly



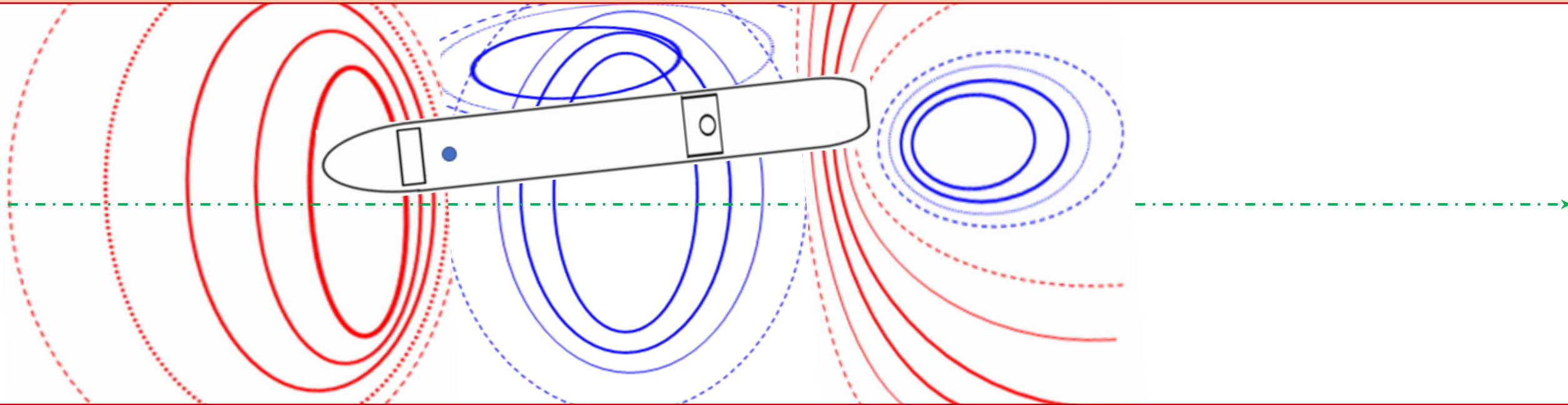
Intense low Pressure
Field has moderated



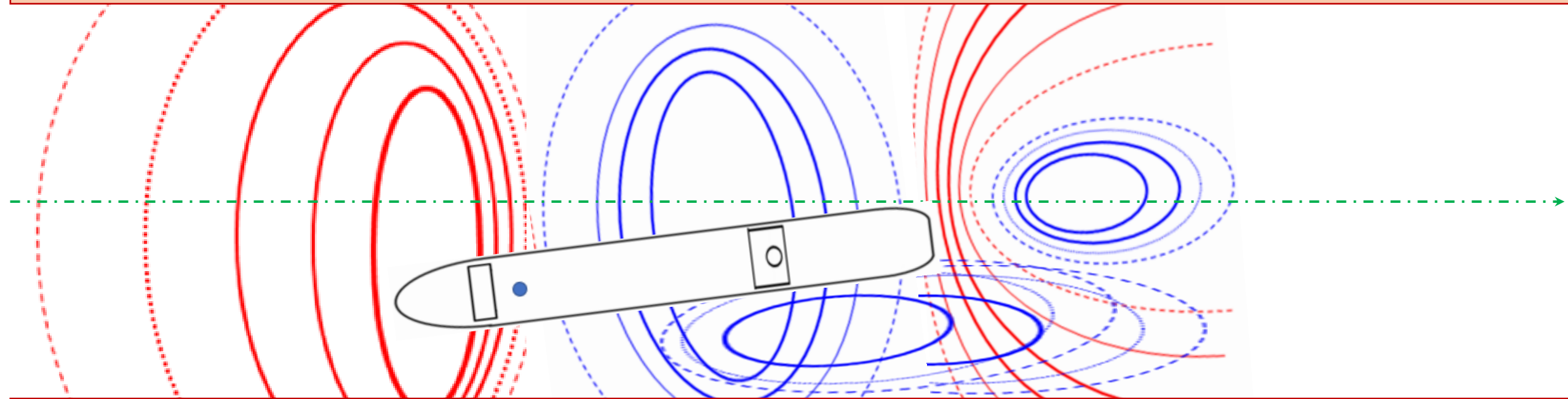
Bank Rejection [2]

High Pressure Field
Forcing the bow off the
bank

Intense low Pressure Field
regenerates on the opposite
(starboard) side and becomes
almost dominant



BANK SUCTION

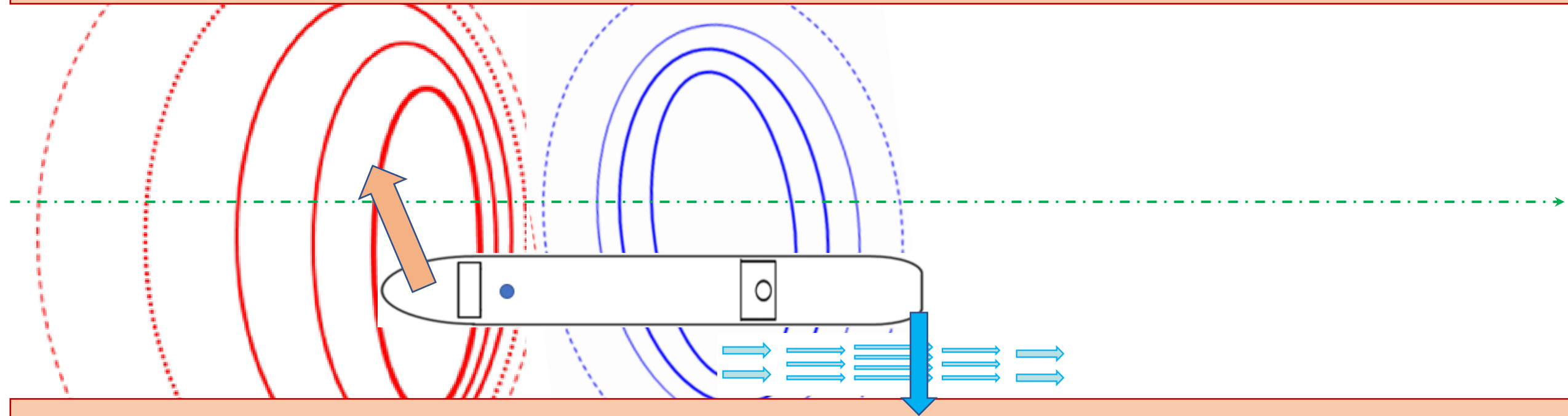


High Pressure Field
Forcing the bow strongly
off the bank

Intense low Pressure Field regenerates
on the opposite (Port) side and
becomes dominant

High Pressure Field
At the stern is breaking down
and no longer helping to keep
the stern off the bank

BERNOULLI'S OVERCOMING EFFECT

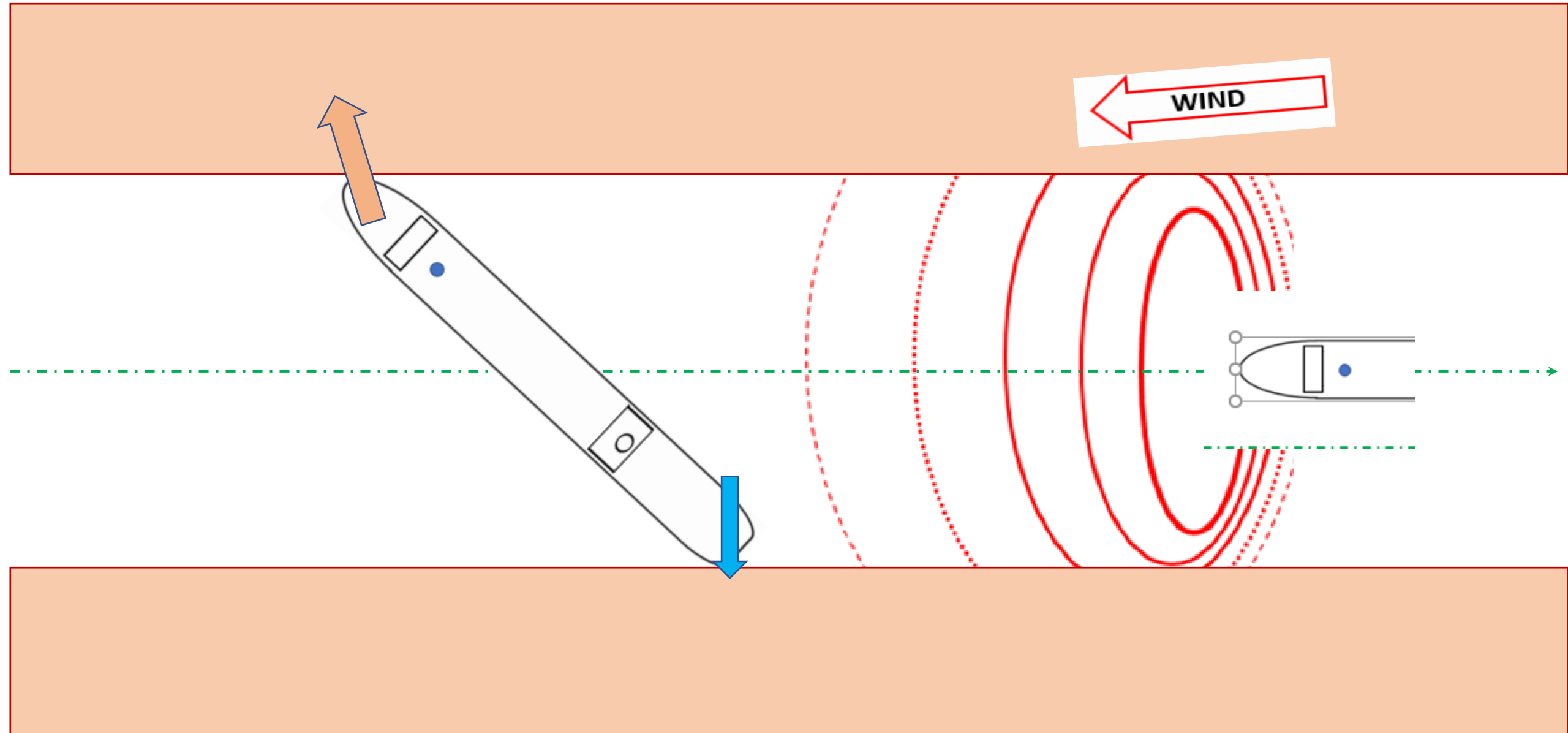


High Pressure Field
Forcing the bow strongly
off the bank

Intense low Pressure Field regenerates
on the opposite (Port) side and
becomes dominant

The stern draws towards the
bank under the increasing
Bernoulli suction effect.

RUNNING AGROUND



NOT THE FIRST TIME SUEZ CANAL BLOCKED



World Peace at El-Ferol Bridge 1954