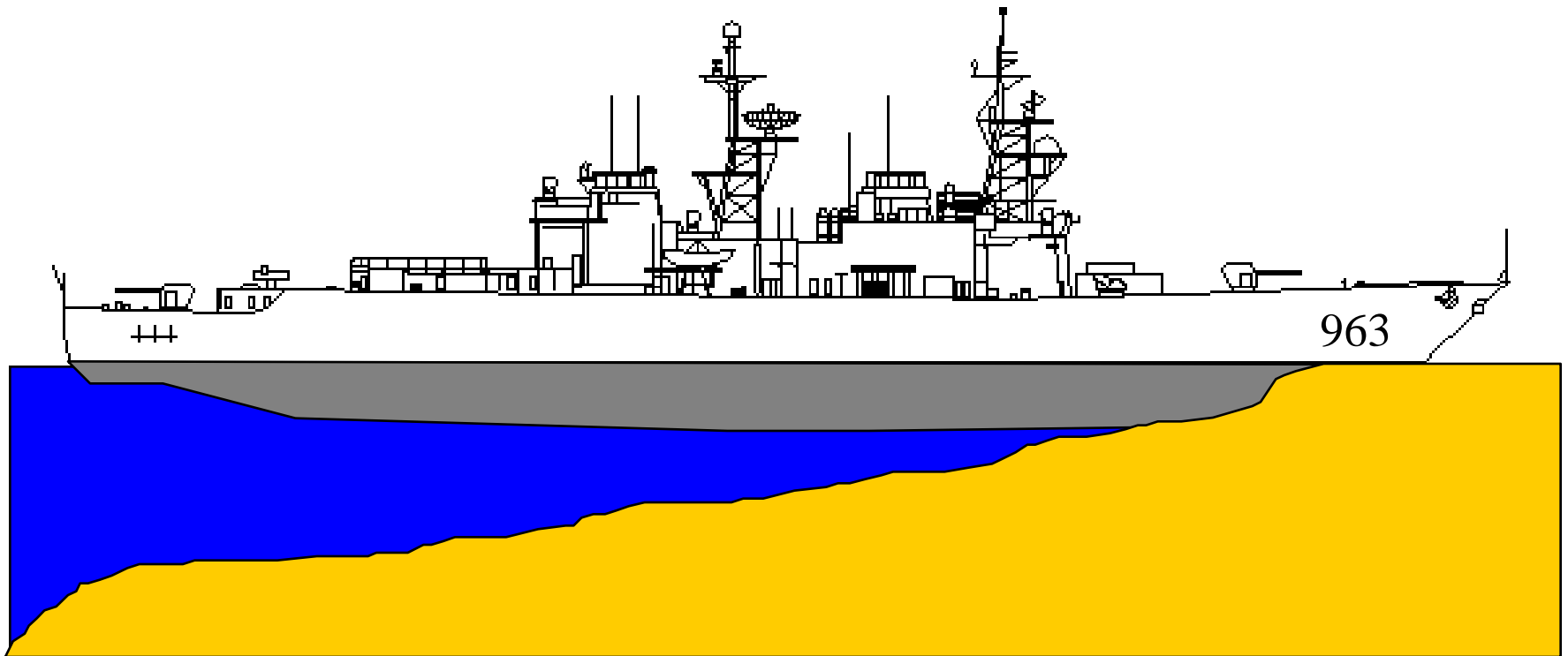


4.5 Docking / Undocking and Grounding / Stranding



References

- NSTM 079 Volume 1
- **NWP 62-1(D)**
- Damage Control Book, section II (a)
- **NSTM 997 Docking Instructions and Routine Work In Dry Dock. ← *This is where you find pre-docking checklist = Chapter 2.***
- MLCA/P STD SPEC 99710S_STD

Enabling Objectives

- DESCRIBE initial actions due to unintentional grounding w/ respect to ballasting, weight shifts, and jettisoning.
- CALCULATE the effect on G from grounding/docking.
- DESCRIBE hull stresses created.
- DESCRIBE and CALCULATE “Critical Draft”

Enabling Objectives

- DESCRIBE contents and usage of docking plan, hull history, hull penetrations drawings when dry docking.
- DESCRIBE Docking Master's responsibilities.
- DESCRIBE problems with firemain during drydock.
- STATE compartments that must be sounded or observed during docking and undocking.

IT DOES HAPPEN!!

- USNS NIAGARA FALLS – OCT 2005
- EX-USS SHADWELL (Katrina & Rita) – SEP 2005
- USS SAN FRANCISCO – JAN 2005
- USS HARTFORD – OCT 2003
- USS LA MOURE COUNTY – SEPT 2000
- USS GONZALEZ – NOV 1996
- USS JEFFERSON CITY – MAR 1994
- USS WASP – APR 1993
- USS CURTS – MAR 1992
- USS SAN BERNARDINO – FEB 1991
- USS ANDREW J. HIGGINS – JAN 1991
- USS PENNSYLVANIA – SEPT 1989
- USS BAINBRIDGE – JUN 1989
- USS GURNARD – MAY 1989
- USS SPRUANCE – JUN 1989
- USS BOULDER – SEPT 1988
- USS SAM HOUSTON – APR 1998
- USS DANIEL BOONE – APR 1987
- USS WILLIAM V. PRATT – DEC 1986
- USS ENTERPRISE – NOV 1985 AND APR 1983



ABILITY TO REFLOAT

“IF THE PROPS ARE REVERSED AND THERE IS **NO TENDENCY** OF THE SHIP **TO BACK AWAY** FROM THE BEACH, **NO FURTHER ATTEMPTS** TO MOVE THE SHIP BY MEANS OF THE PROPELLERS SHOULD BE USED.”

NSTM 079 VOL 1
REPAIR PARTY MANUAL
NTTP 3-20.31





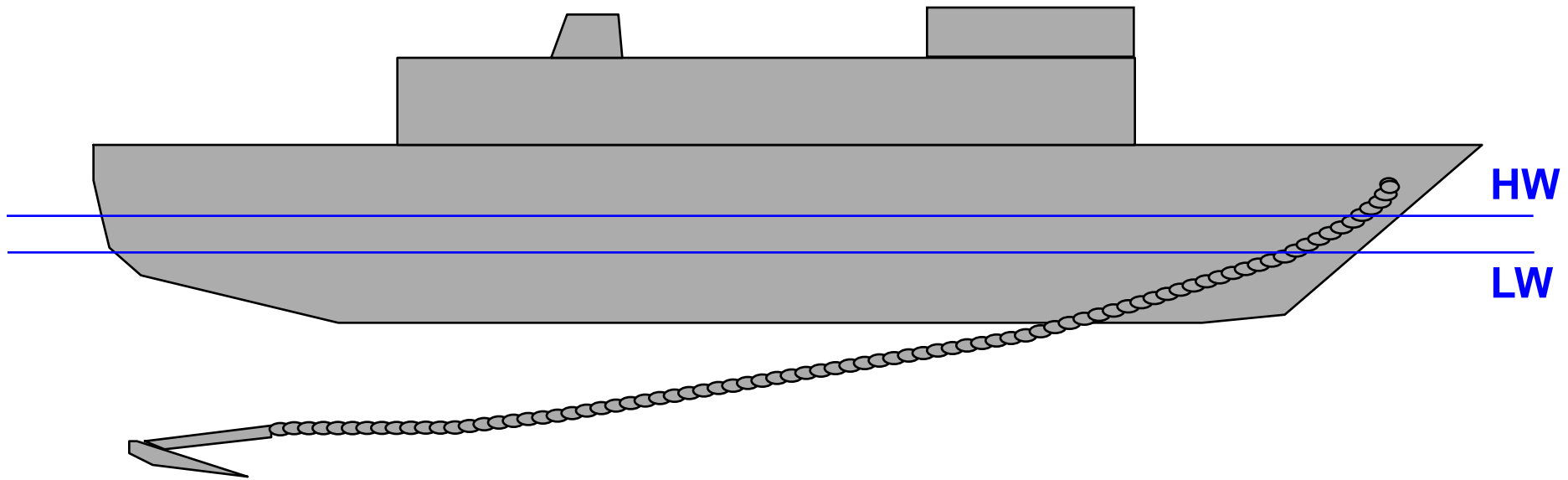


Not ALL groundings are as a result of poor watchstanding.

We have here a properly deployed anchor following a steering casualty....



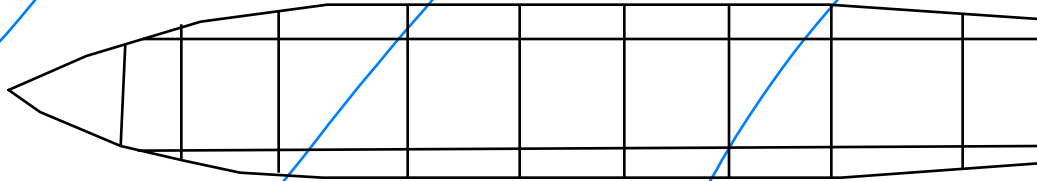
BRIDGE ACTIONS

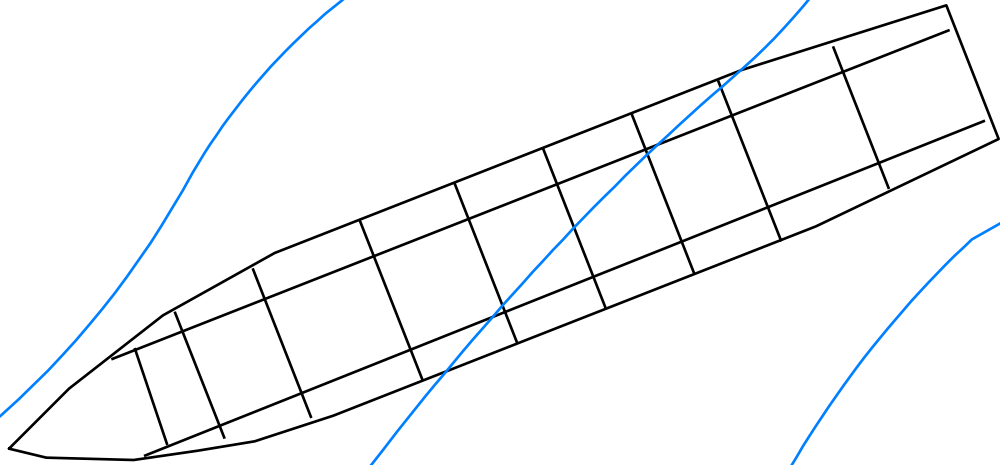


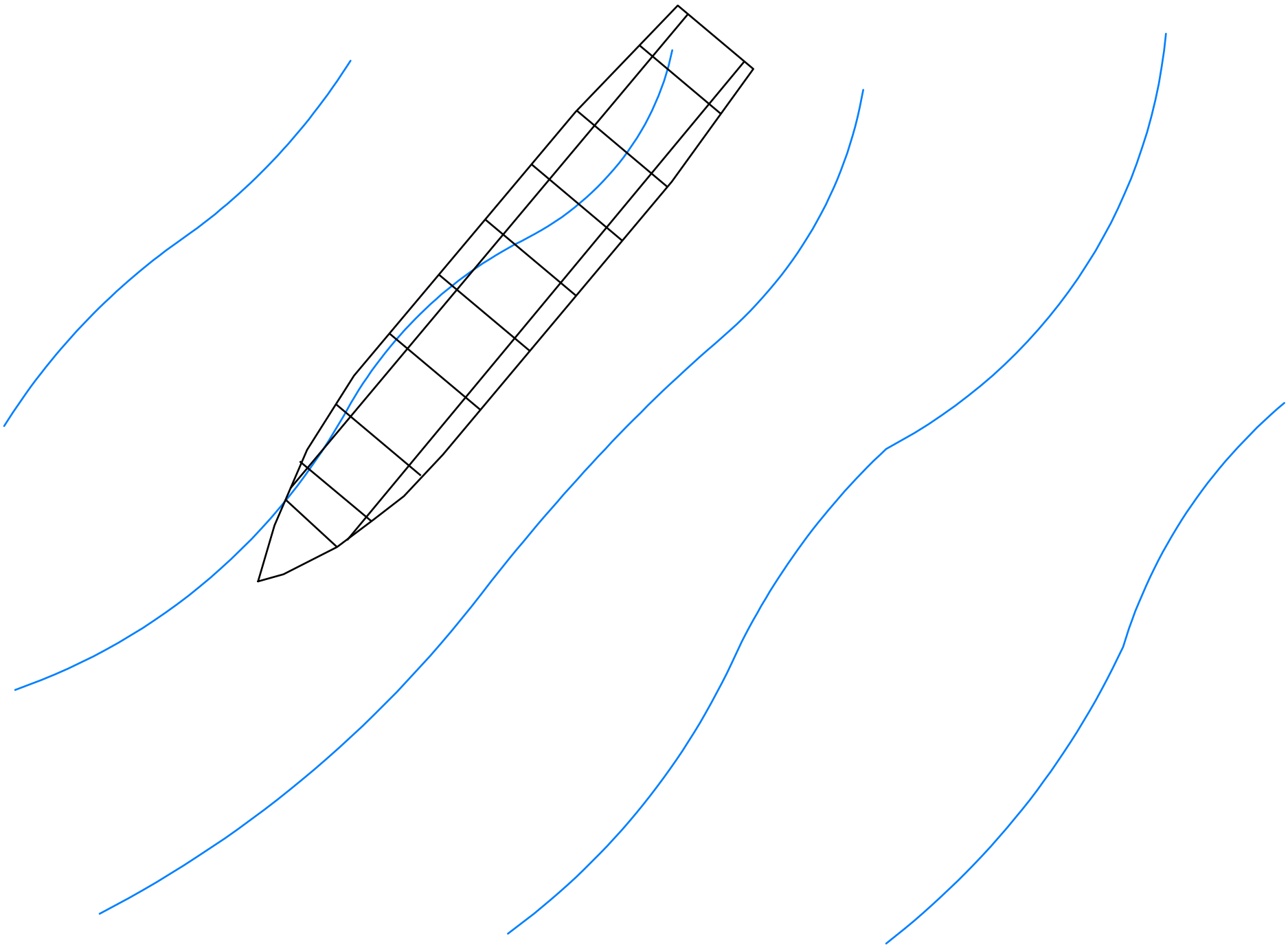
- RIG GROUND TACKLE & KEDGE ANCHORS (IF POSSIBLE)
- COORDINATE LIGHTENING SHIP WITH HIGH TIDE
- TAKE A STRAIN ON GROUND TACKLE
- **REQUEST SALVAGE ASSISTANCE (SERT, SUPSHIP SALVAGE)**

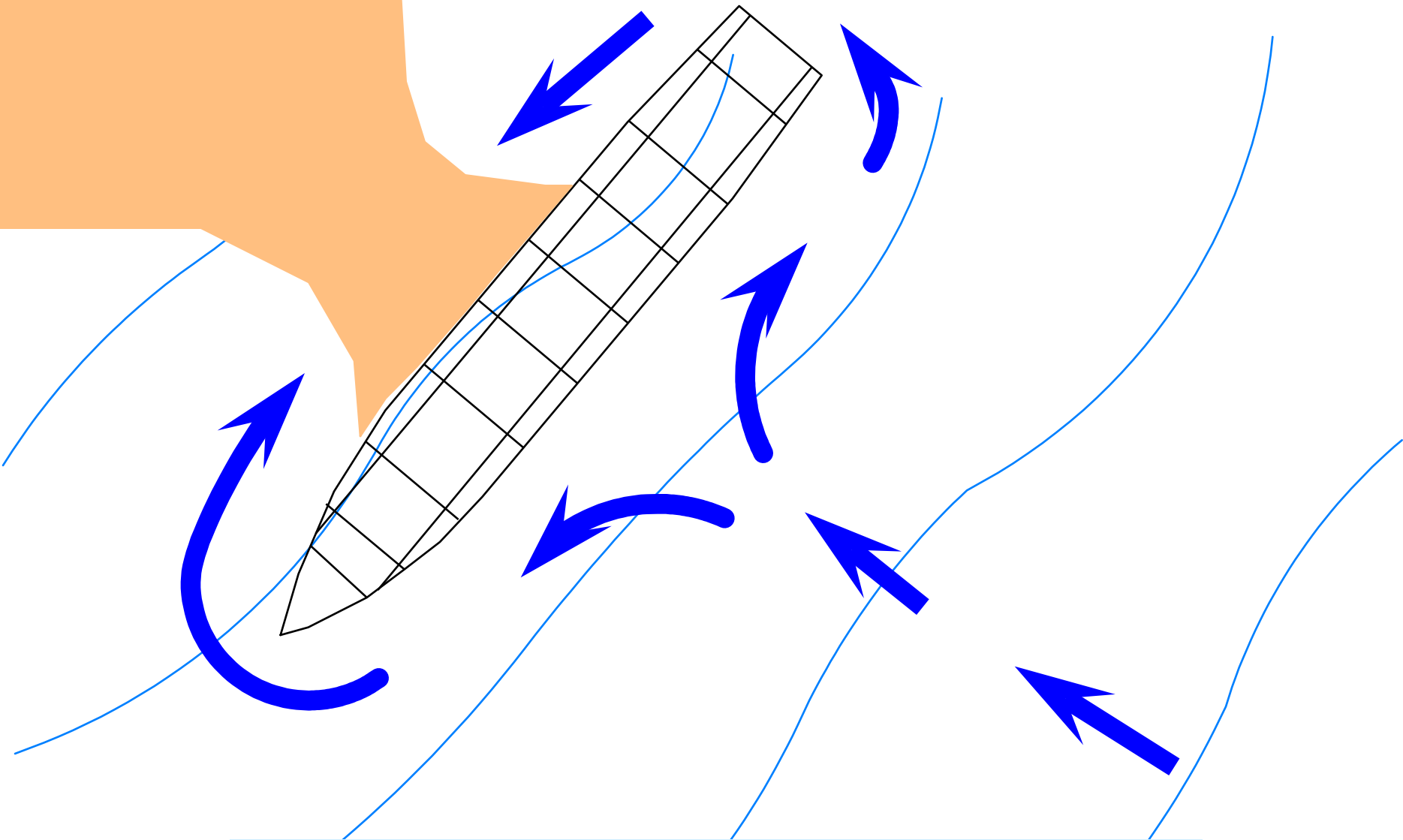
DCA ACTIONS

- WEIGH THE SHIP DOWN HARD









WEIGHT SUPPORTED BY HALF OF KEEL
= ***BROKEN KEEL***



Scott Phillips / KMTR

AGROUND: DCA ACTION

WEIGH THE SHIP DOWN HARD

INVESTIGATE FOR DAMAGE

- **SOUND ALL TANKS & VOIDS**
- **CHECK FUEL TANKS FOR LEAKAGE**
- **STRUCTURAL DAMAGE?**
- **EXTENSIVE SOUNDINGS** (*LOWER SMALL BOATS*)
 - ✓ **ABOUT THE SHIP**
 - ✓ **SEAWARD**

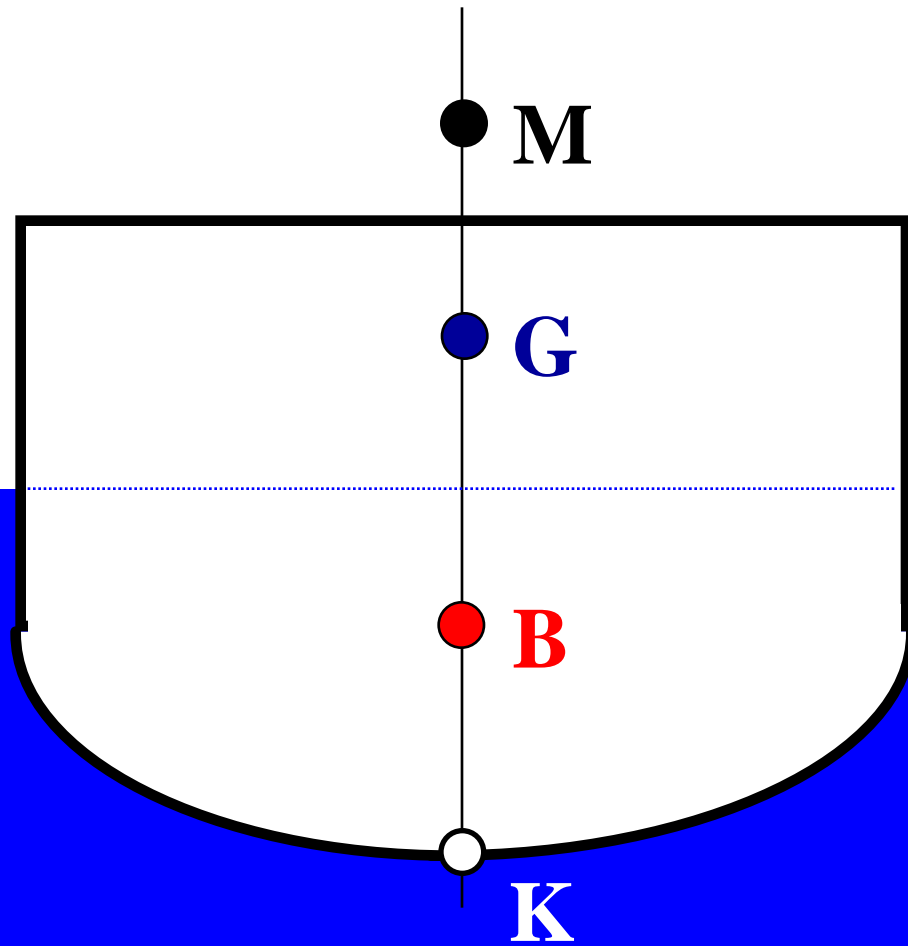
AGROUND: DCA ACTION

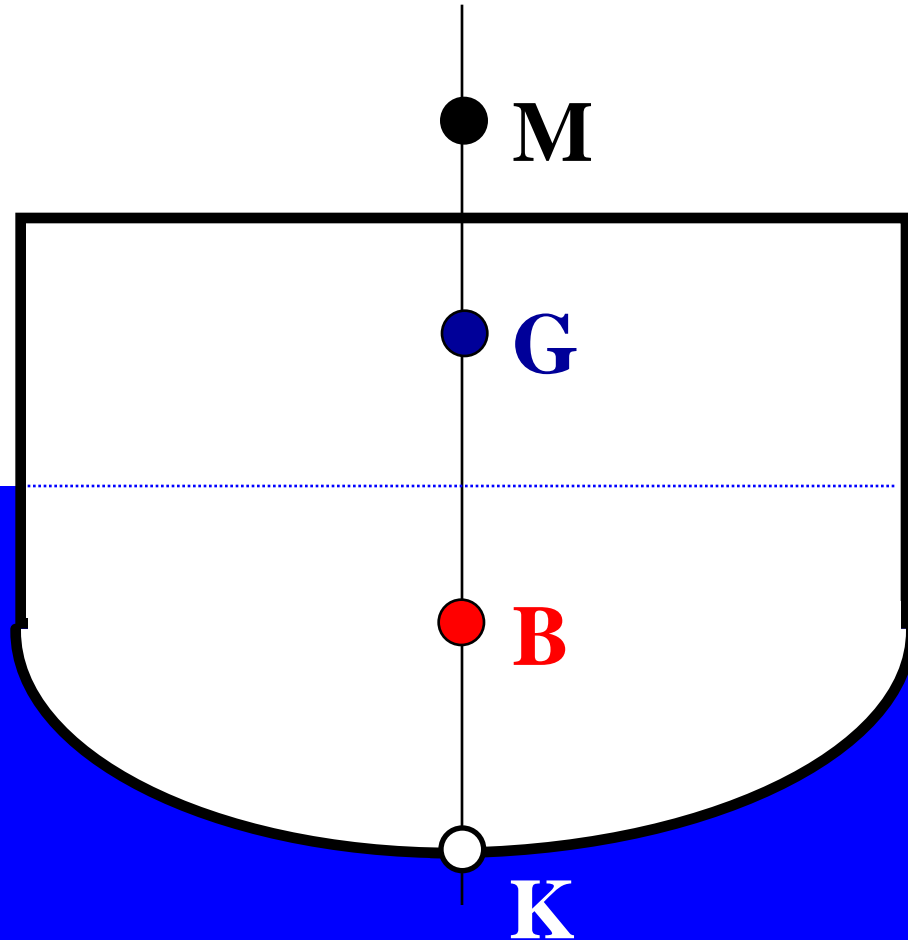
DETERMINE AMOUNT OF TONS AGROUND

- FM KNOWN DRAFTS, DETERMINE ORIGINAL DISPLACEMENT
- READ DRAFTS AFTER AGROUND
- DETERMINE NEW DISPLACEMENT
- DIFFERENCE EQUALS TONS AGROUND

CALCULATE CRITICAL DRAFT

- IF STABILITY IS CRITICAL, LOWER G & ESTIMATE TIME
- ELIMINATE HIGH WEIGHT
- FLOOD LOW COMPARTMENTS





M



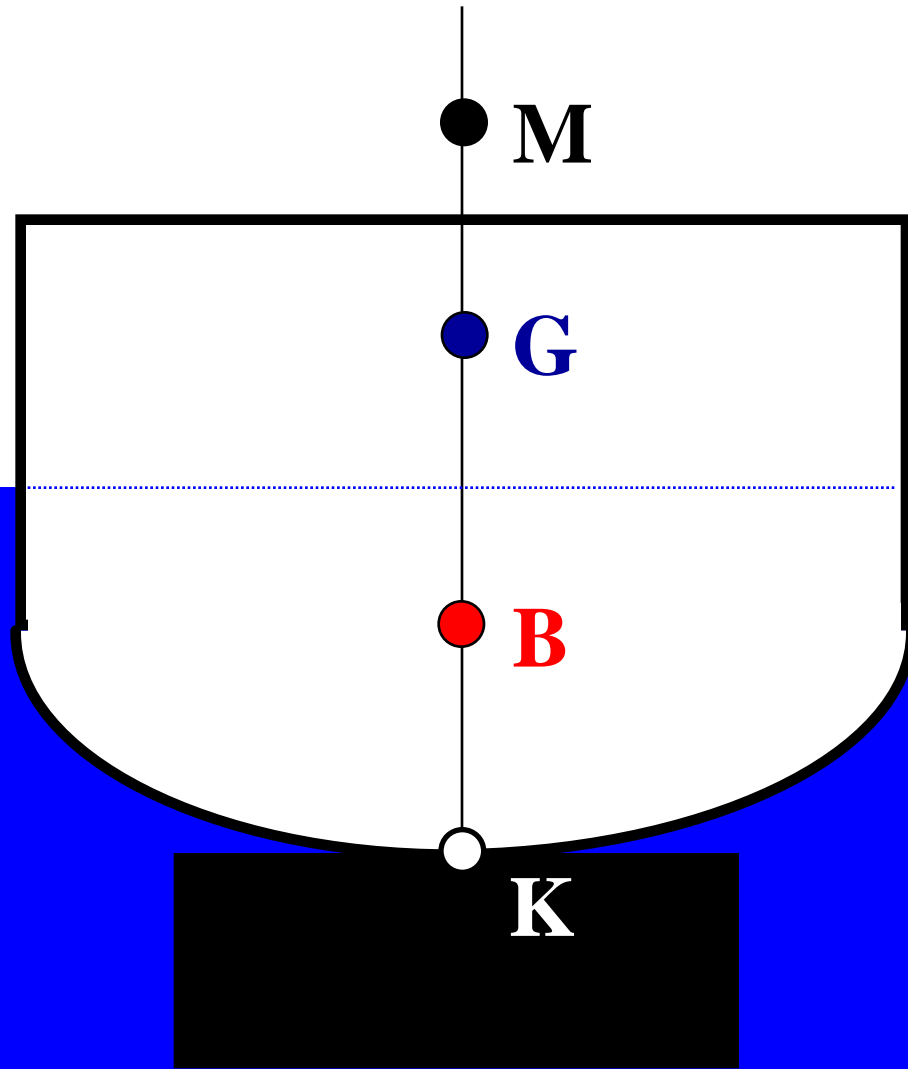
G

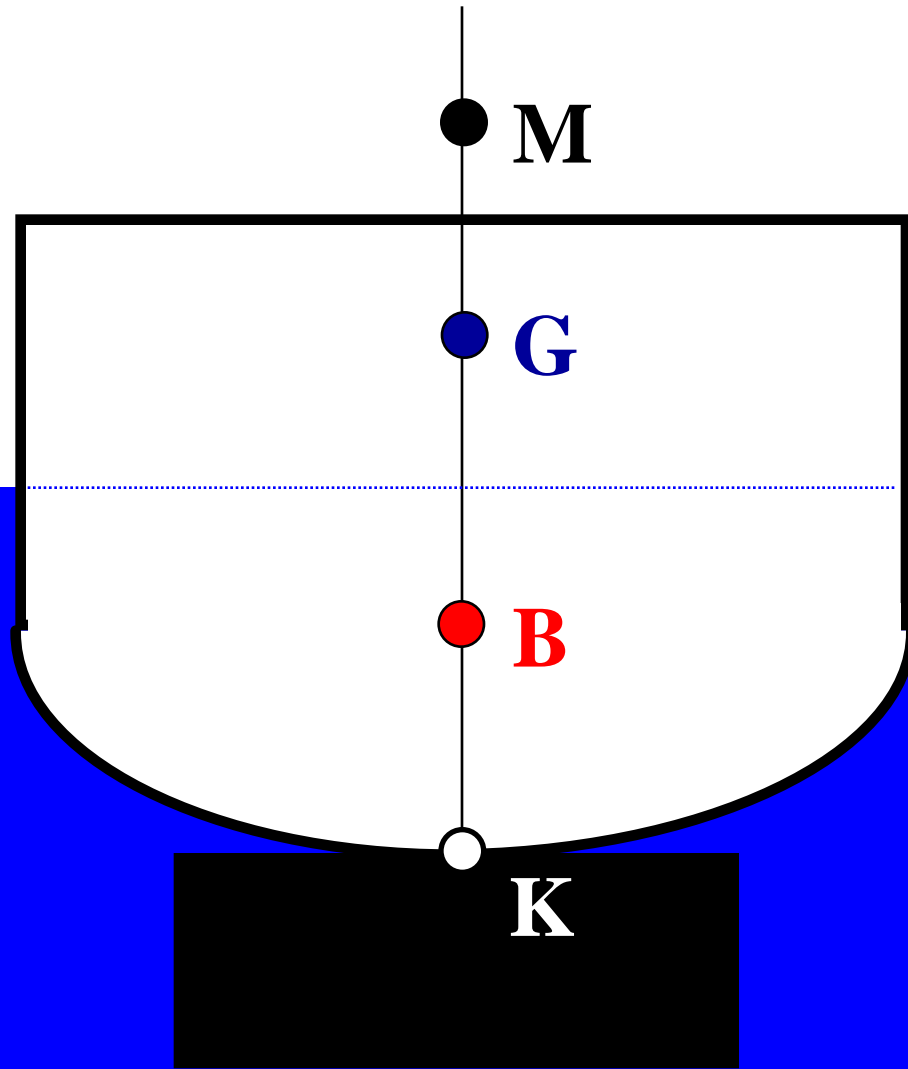


B

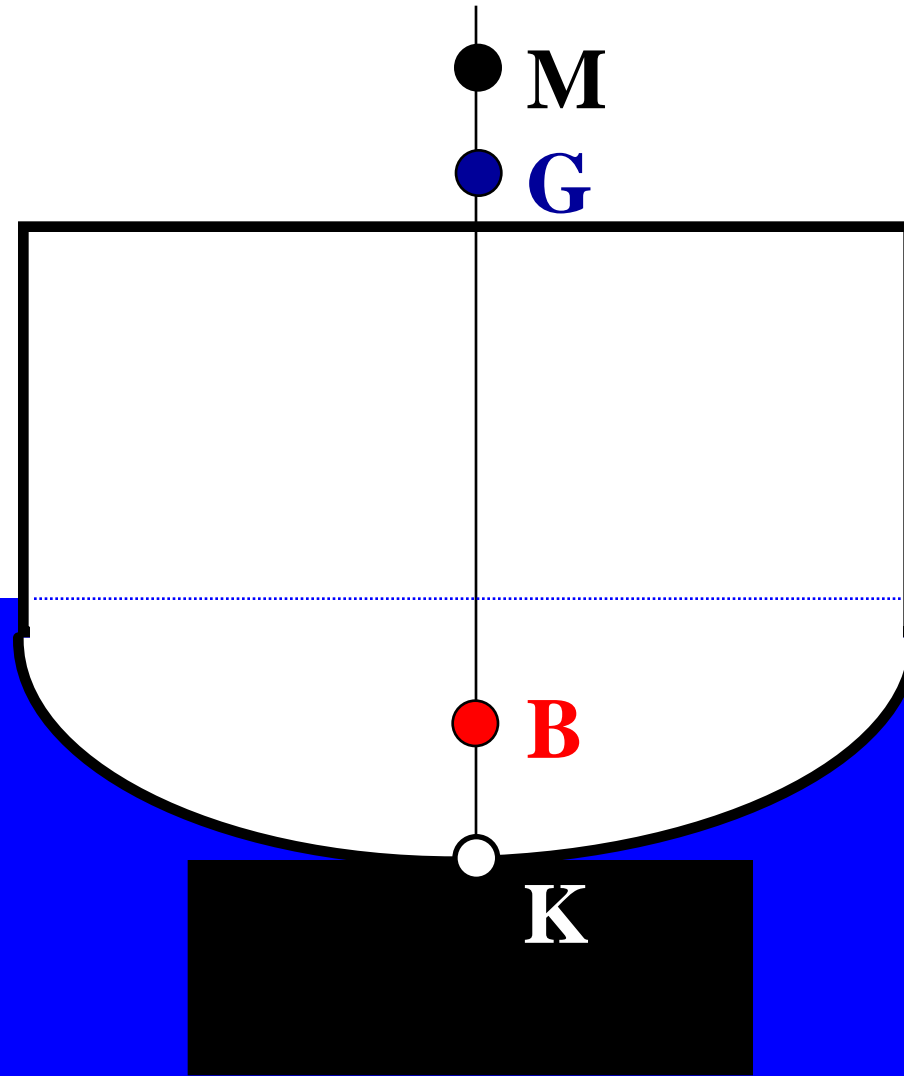


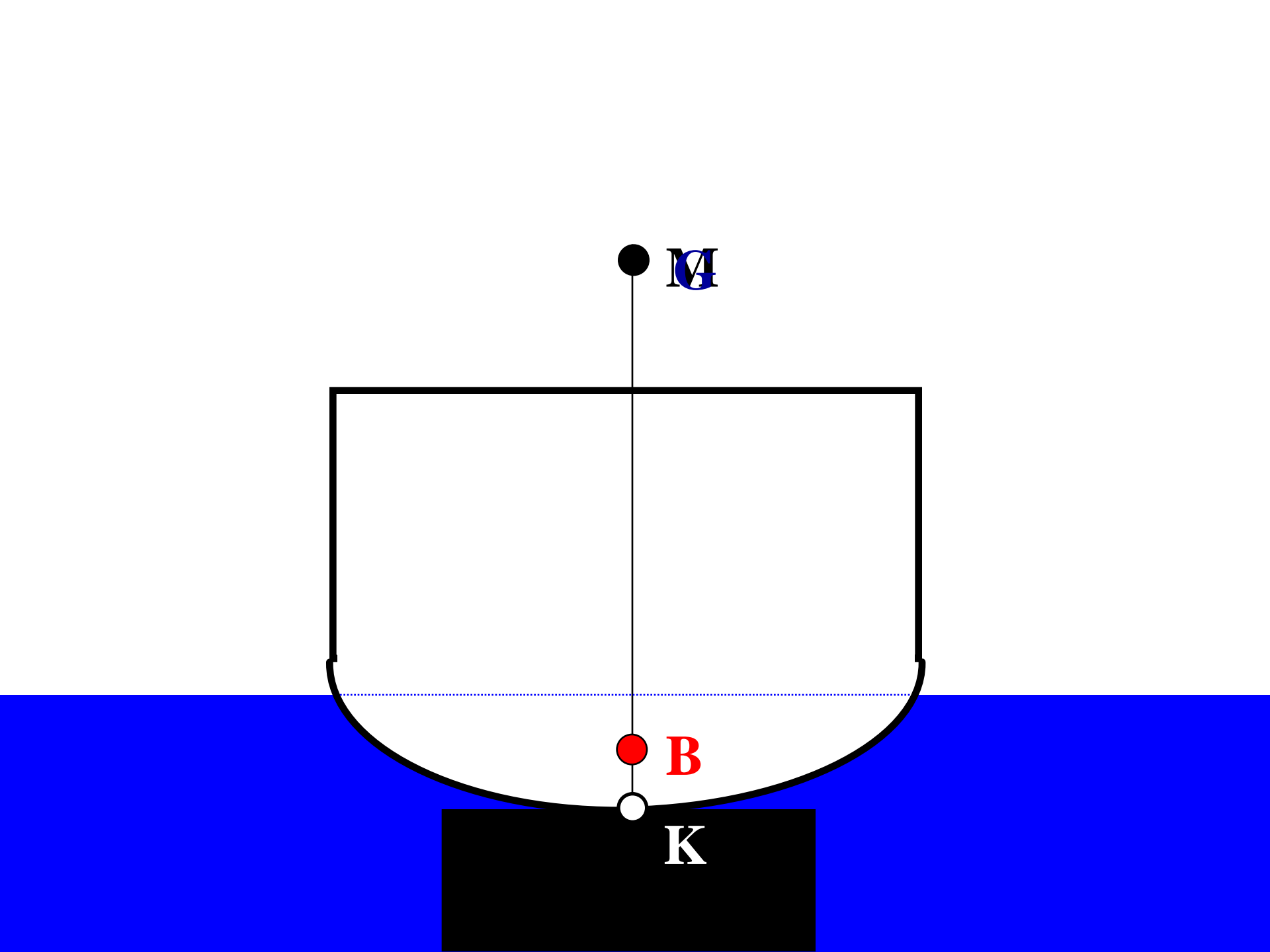
K

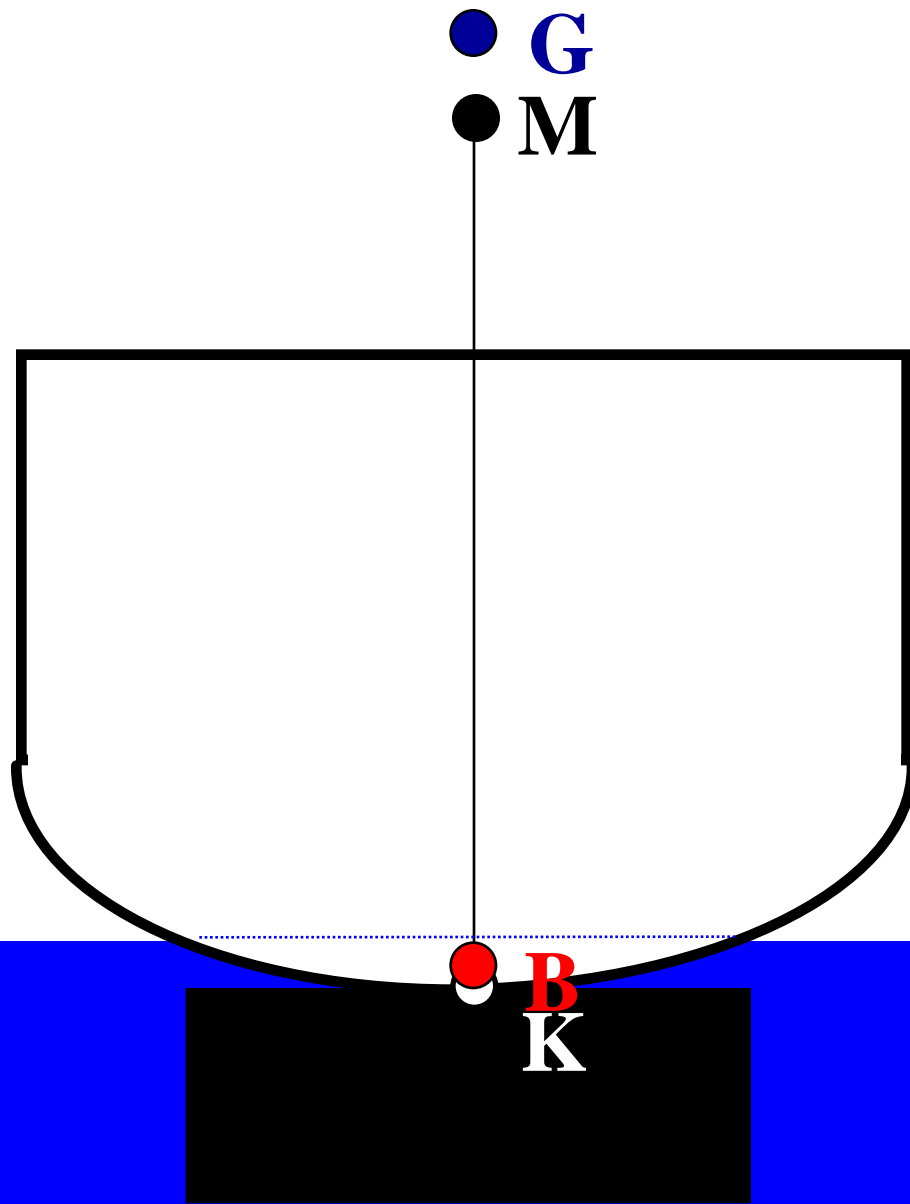


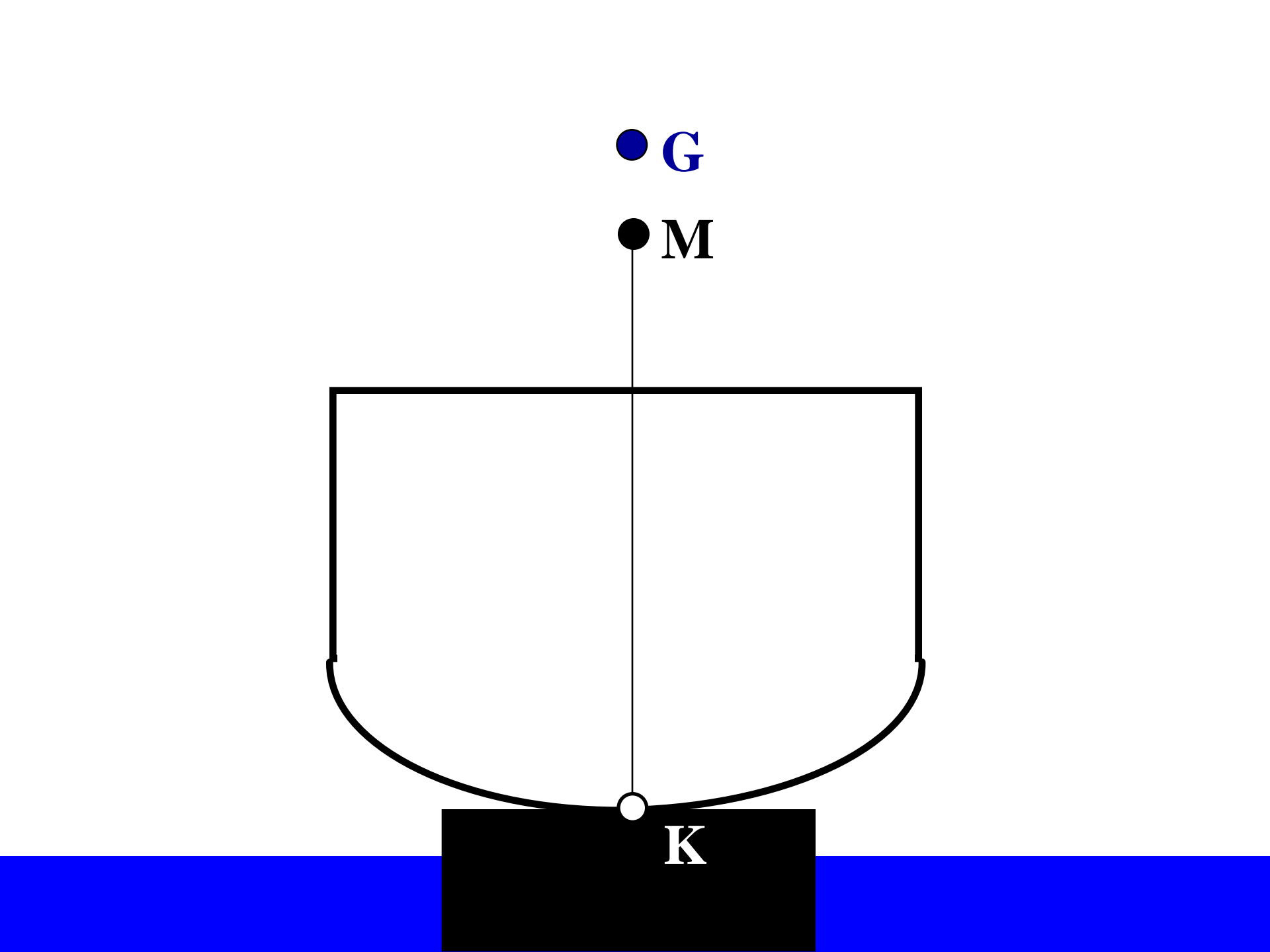


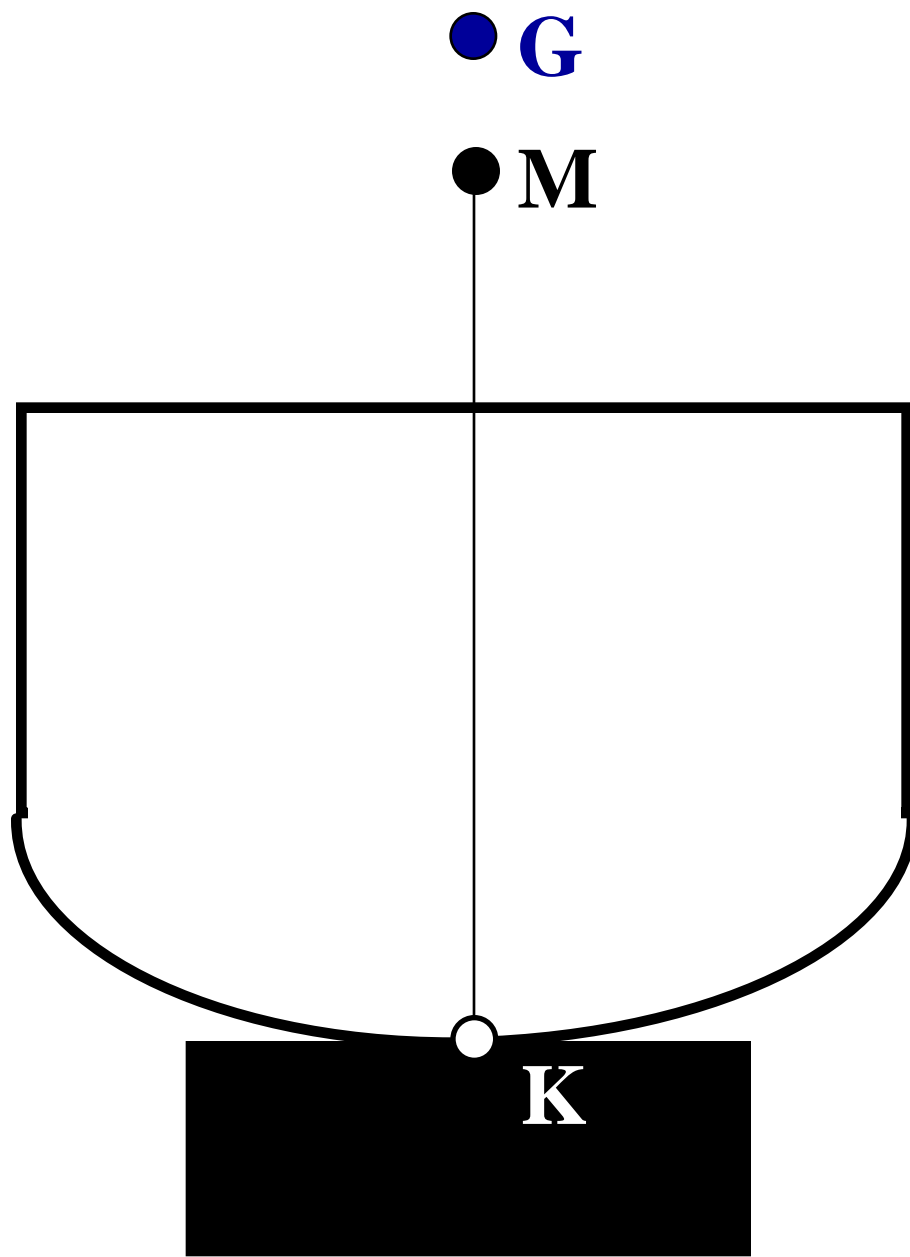
Remember: G moves faster than M!!



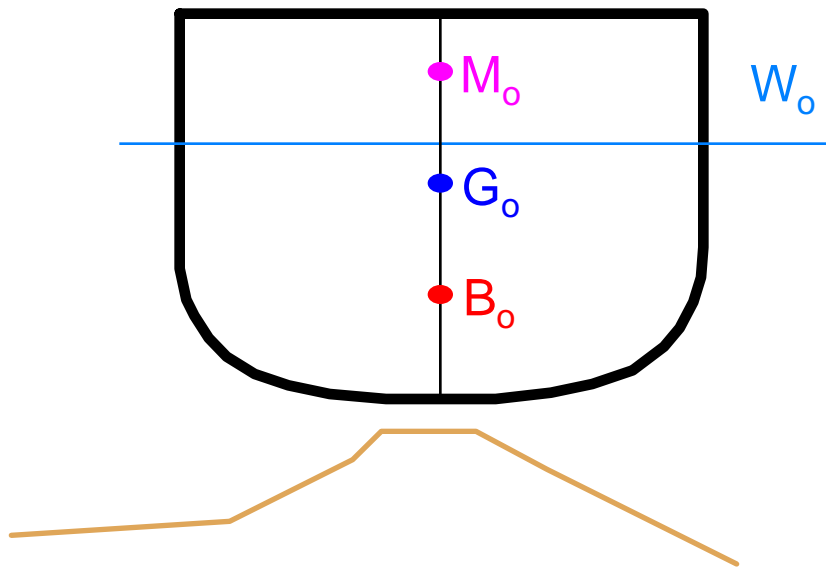




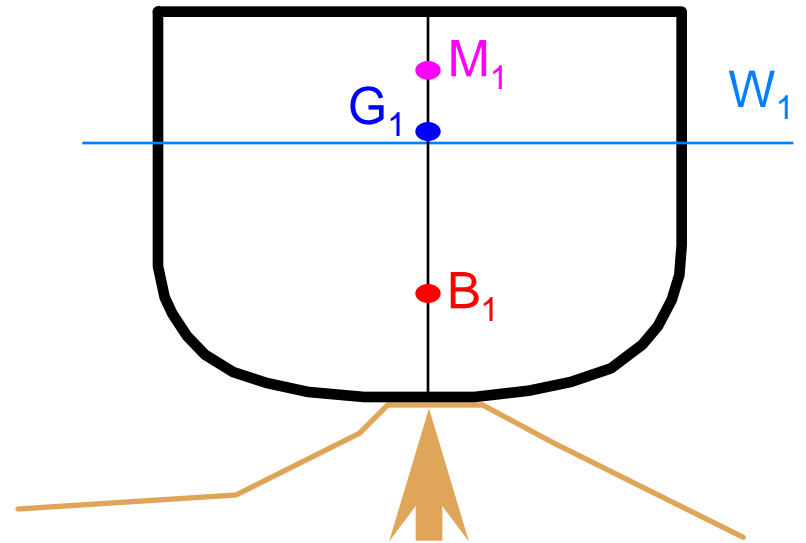




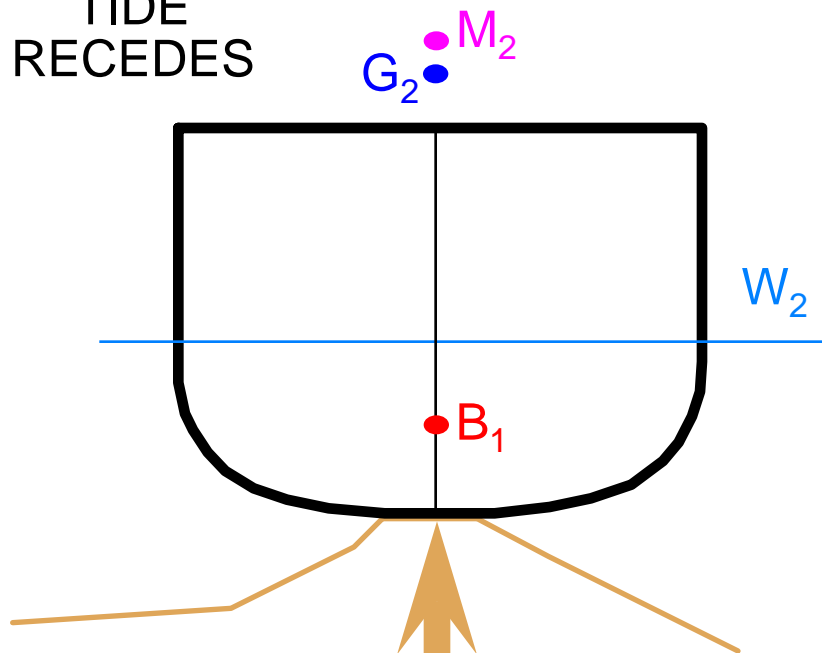
ORIGINAL CONDITION



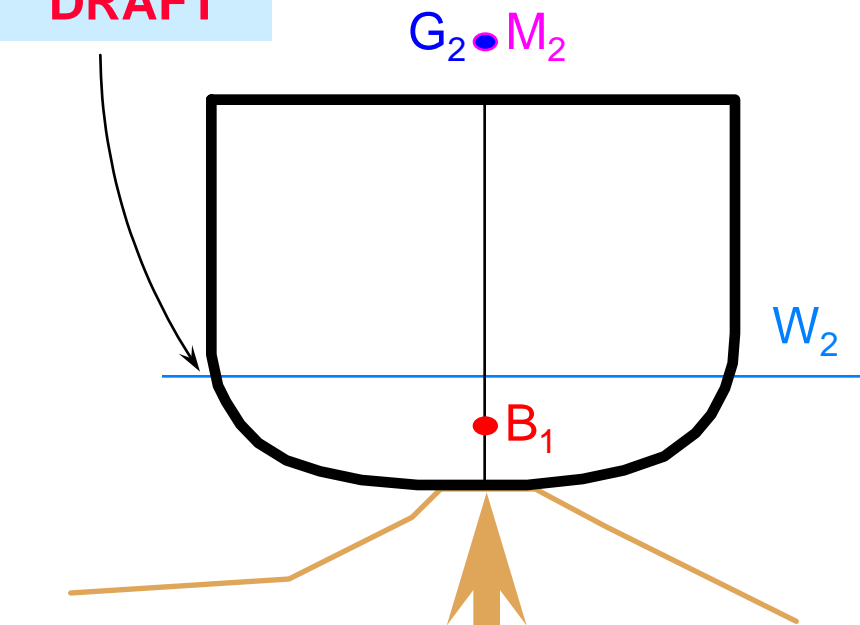
AGROUND



TIDE RECEDES



CRITICAL DRAFT





...and if you can't get off the beach in one piece...





HULL GIRDER STRESS

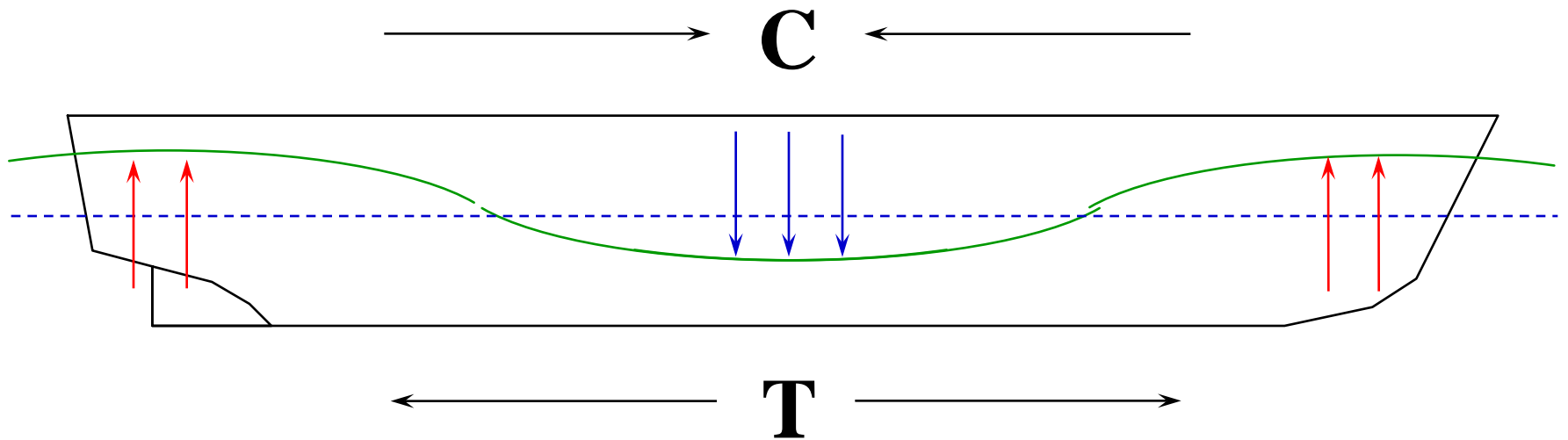
INDICATORS

- SHIP IS HOGGING OR SAGGING
- STRESS FRACTURES, CRACKS, "CRINKLING", OR PANTING OF BULKHEADS, DECKS AND STIFFENERS

ACTIONS

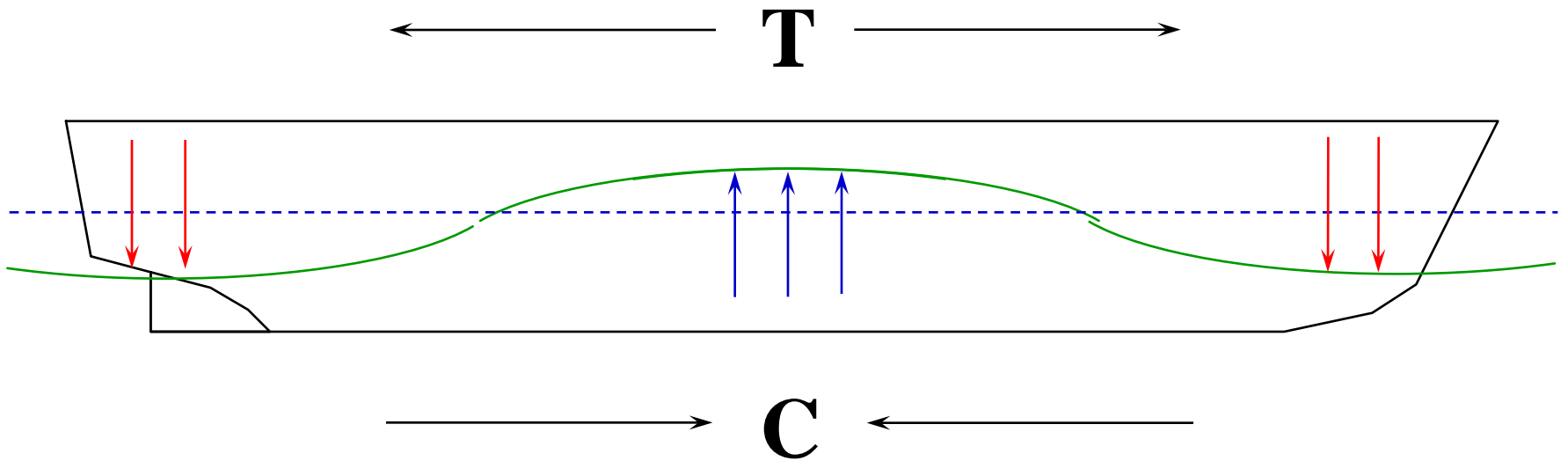
- RELIEVE HOGGING OR SAGGING
- SHORE UP BULKHEADS/DECKS.
- REINFORCE WHERE POSSIBLE.

Sagging Stresses



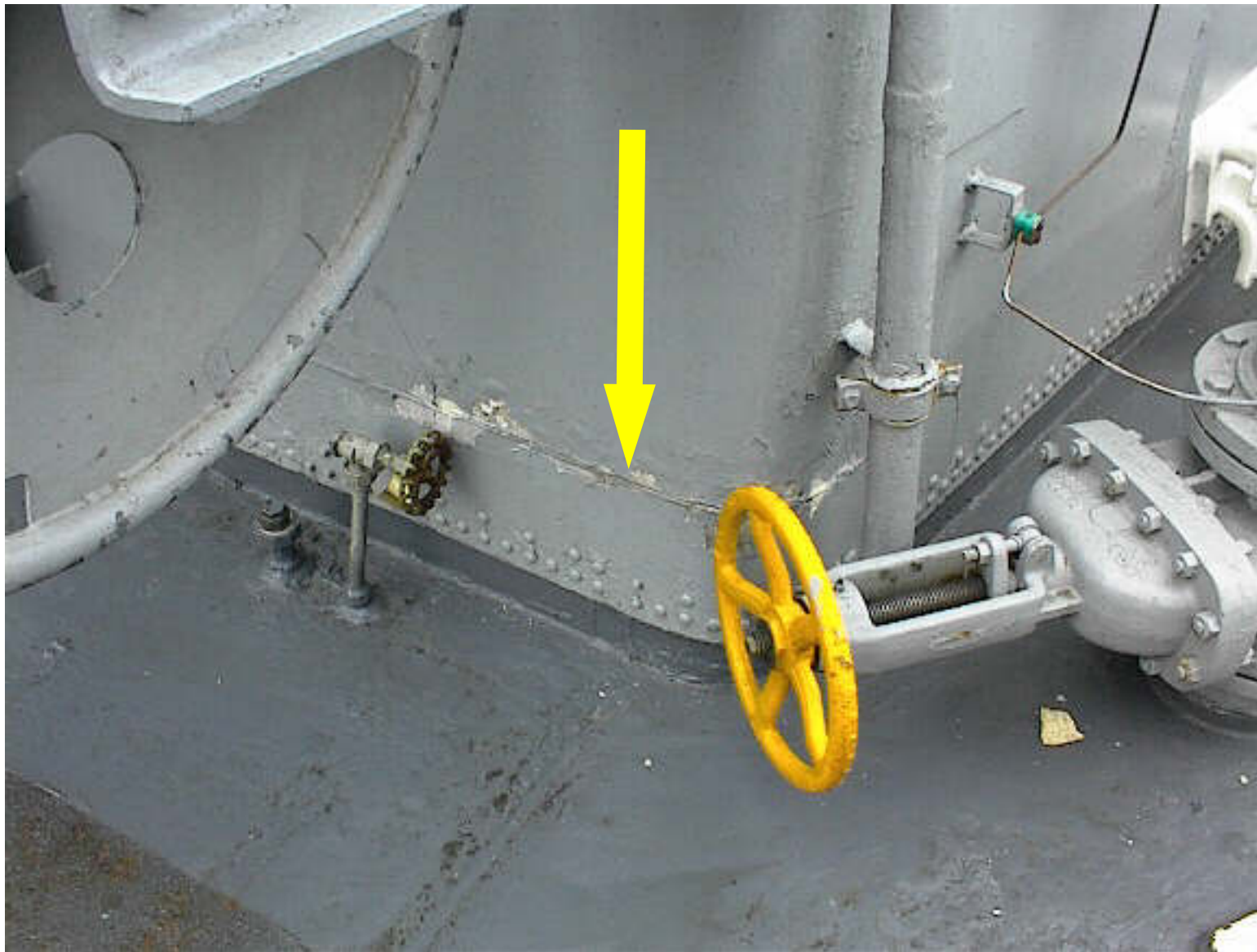
Quiz: What would be the corrective actions??

Hogging Stresses



USS LA MOURE COUNTY (LST 1194)

Superstructure
cracks due
to “flexing”







Docking and Undocking Situations

- Overhaul
- *Emergencies*
- **Repairs to Underwater Fittings**
(**R 210024Z AUG 06** * *See Notes tab*)
- Remove Fouling of the Hull * Rarely conducted anymore.

Docking Arrangements

- Time and Date
- Tugs and Pilot
- Bow or Stern First?
- Proper List and Trim
- Handling of Lines



0800... City pier... *no lines...*
backhoe launch...

USS Nimitz



Docking Arrangements

- Record All Tanks Soundings
- Gangways Available
- Utilities Furnished
- Sanitary Services
- Garbage Disposal
- Safety Precautions
- Pumping Plans

Preparations for Entering Drydock

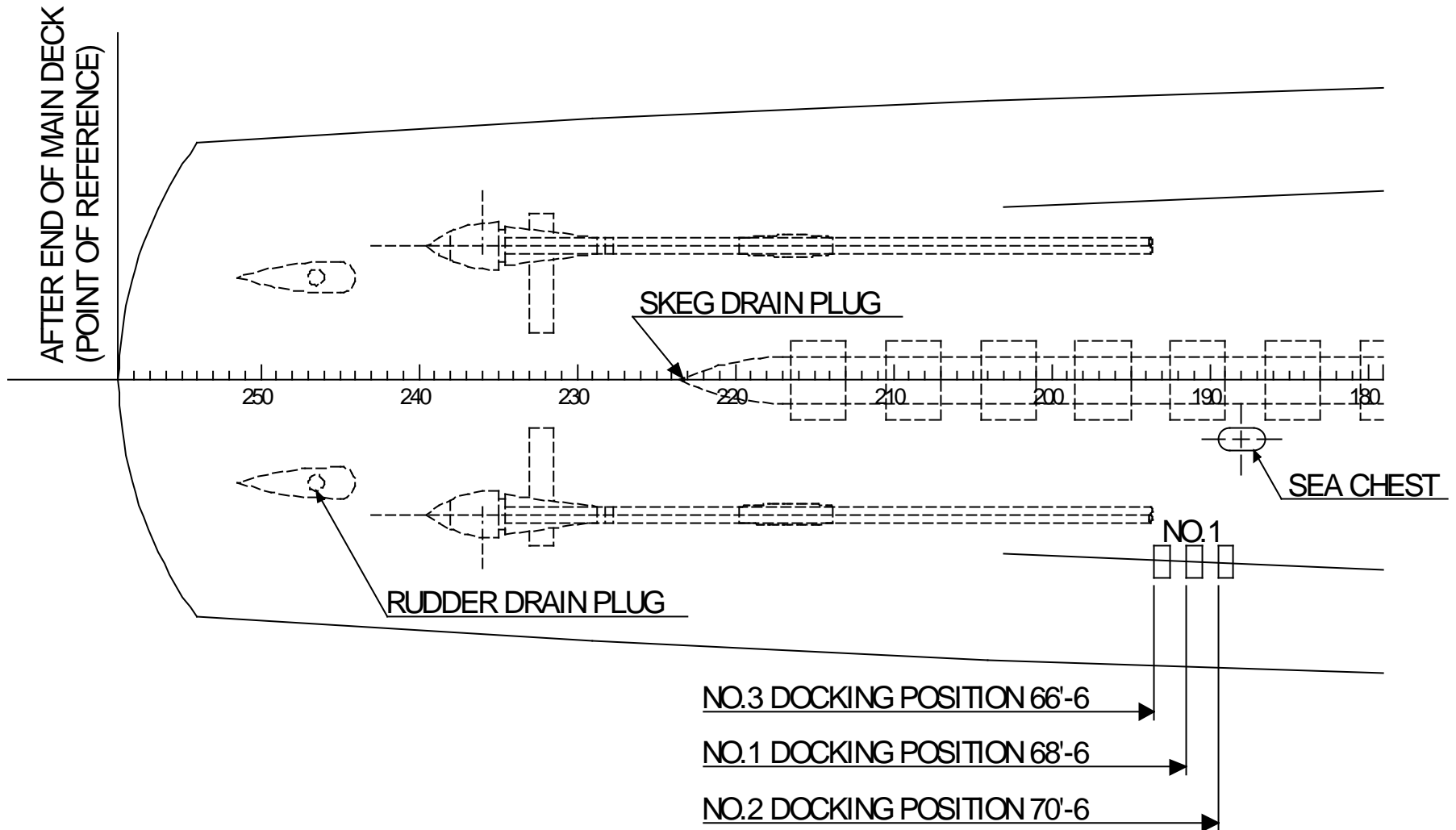
NSTM 997

- Place and Date of Last Drydocking
- Last Docking Position
- Date and File Number of Last Docking Report
- Number of Days Underway Since Last Drydocking

Preparations for Entering Drydock

- General Itinerary of Ship Movements if not Classified (water temp \approx fouling)
- Paint History / Hull History
- History of Touch-Up Painting
- Ship's Weight Distribution
- Proper List **AND** Trim

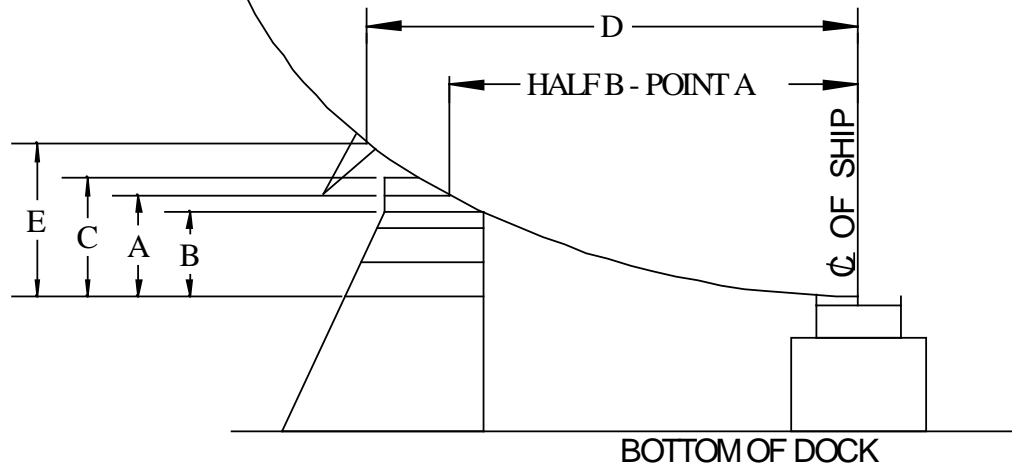
The Docking Plan

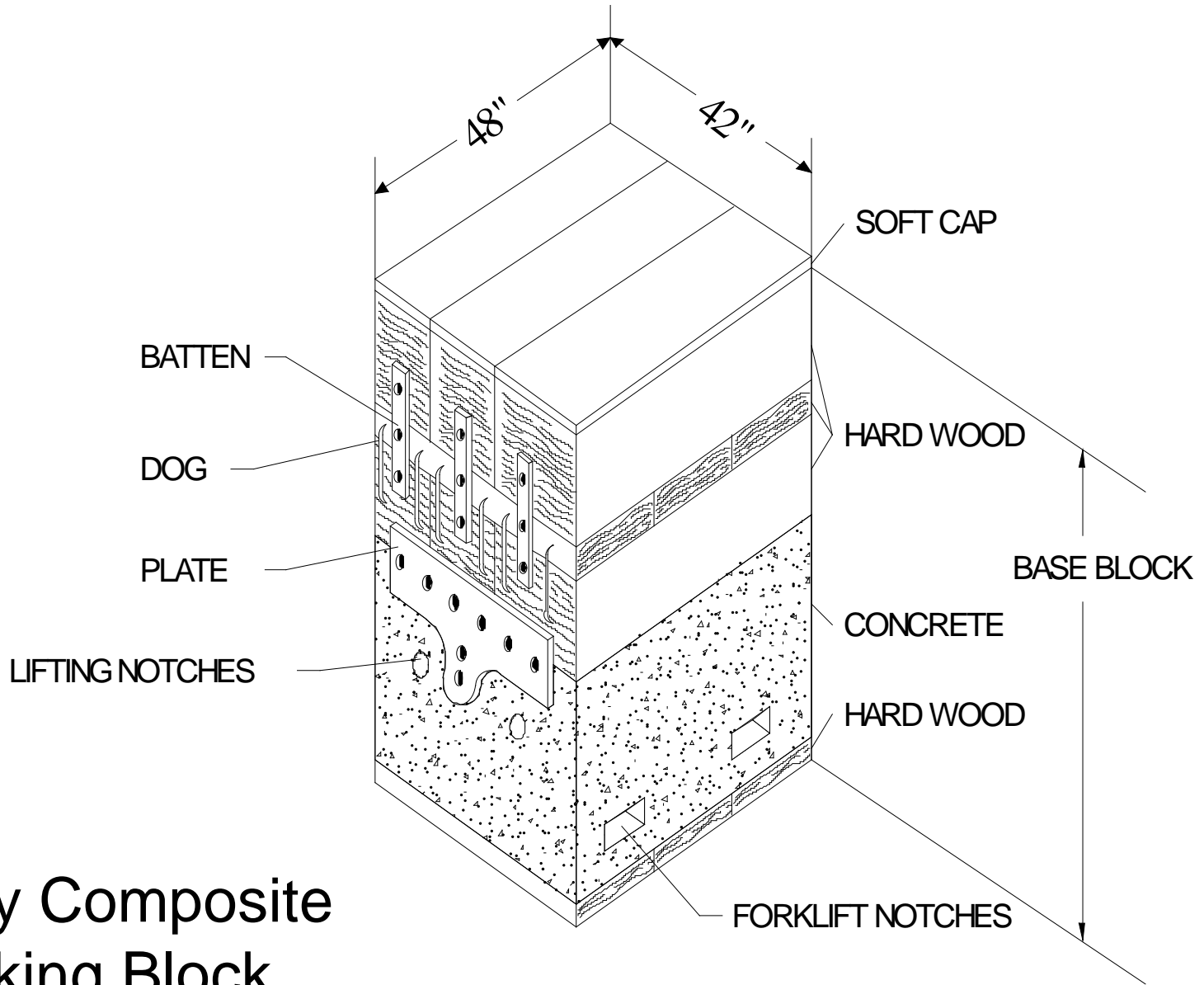


The Docking Plan

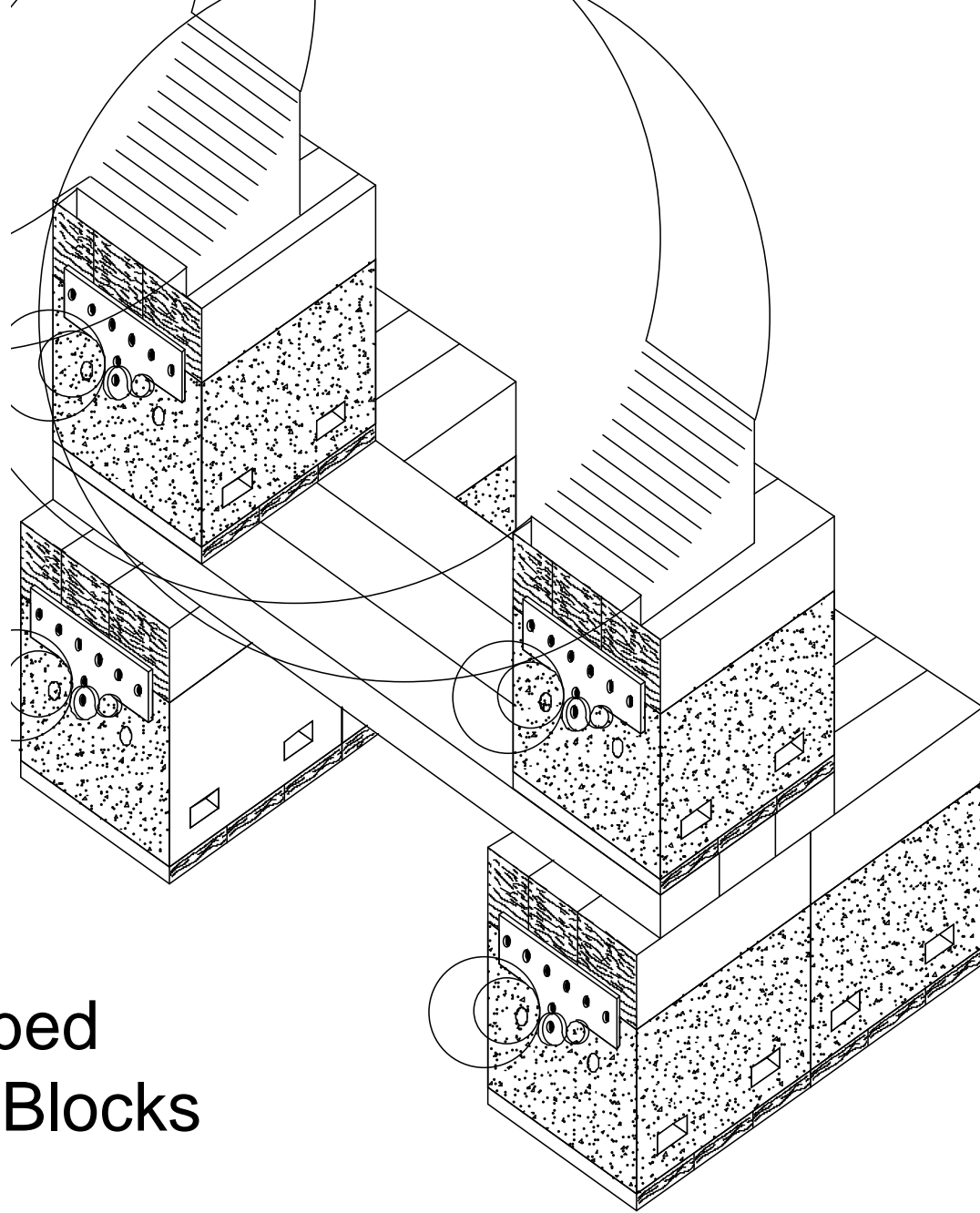
TABLE OF OFFSETS FOR SIDE BLOCKS & BILGE KEEL INTERVALS GIVEN IN INCREMENTS OF 12'-0"											
NO. 2 DOCKING POSITION - AFTER SIDE OF NO.1 BLOCK 70'-6" FROM REF PT.											
SIDE	BLK NO.	FWD OF REF PT.	POINT A		POINT B		POINT C		BEVEL IN 12' FOR ABORC	BILGE KEEL	
			HALFB	HT	HALFB	HT	HALFB	HT		DIMD	DIME
P/S	1	70-6-0	10-9-15	5-10-7	9-9-15	5-5-15	11-9-15	6-2-15	-1 1/8		
	2	82-6-0	11-5-14	4-10-13	10-5-14	4-5-10	12-5-14	5-4-1	- 3/4		
	3	94-6-0	11-8-0	4-0-14	10-2-0	3-7-11	12-2-0	4-6-12	- 3/4	13-4-7	5-1-4
	4	106-6-0	11-8-0	3-6-4	10-8-0	3-1-3	12-8-0	4-0-1	- 3/8	14-0-8	4-10-10
	5	118-6-0	11-7-9	3-3-3	10-7-9	2-10-0	12-7-9	3-8-15	- 5/16	14-4-7	4-8-4
	6	130-6-0	11-9-5	3-4-0	10-9-5	2-10-13	12-9-5	3-10-1	3/16	14-4-6	4-8-12
	7	142-6-0	11-11-11	3-7-6	10-11-11	3-1-12	12-11-11	4-2-7	5/16		
	8	154-6-0	11-7-8	3-10-11	10-7-8	3-3-13	12-7-8	4-6-15	3/16		
▼	9	166-6-0	10-8-14	4-1-2	9-8-14	3-6-6	11-8-14	4-9-15	3/16		

10 feet 8 inches and 14/16 ths of an inch





**Navy Composite
Docking Block**



Fixed Cribbed
Bilge/Side Blocks

Docking

- Transfer of Responsibility
- Pumping of Drydock
 - Upon Touching Blocks: Hull Inspection
- Dock Pumped Dry
- Hull Board Inspection
 - Ship Properly Docked and Shores in Place
 - NOTE Condition of Screws, Rudders, Sea Suctions & Discharges, Cathodic Protection, **ANY DAMAGE**



Railway Dry Dock Systems



BAINBRIDGE TRANSFER.m1v

- Drydocking Surface Ships Video

While in Drydock

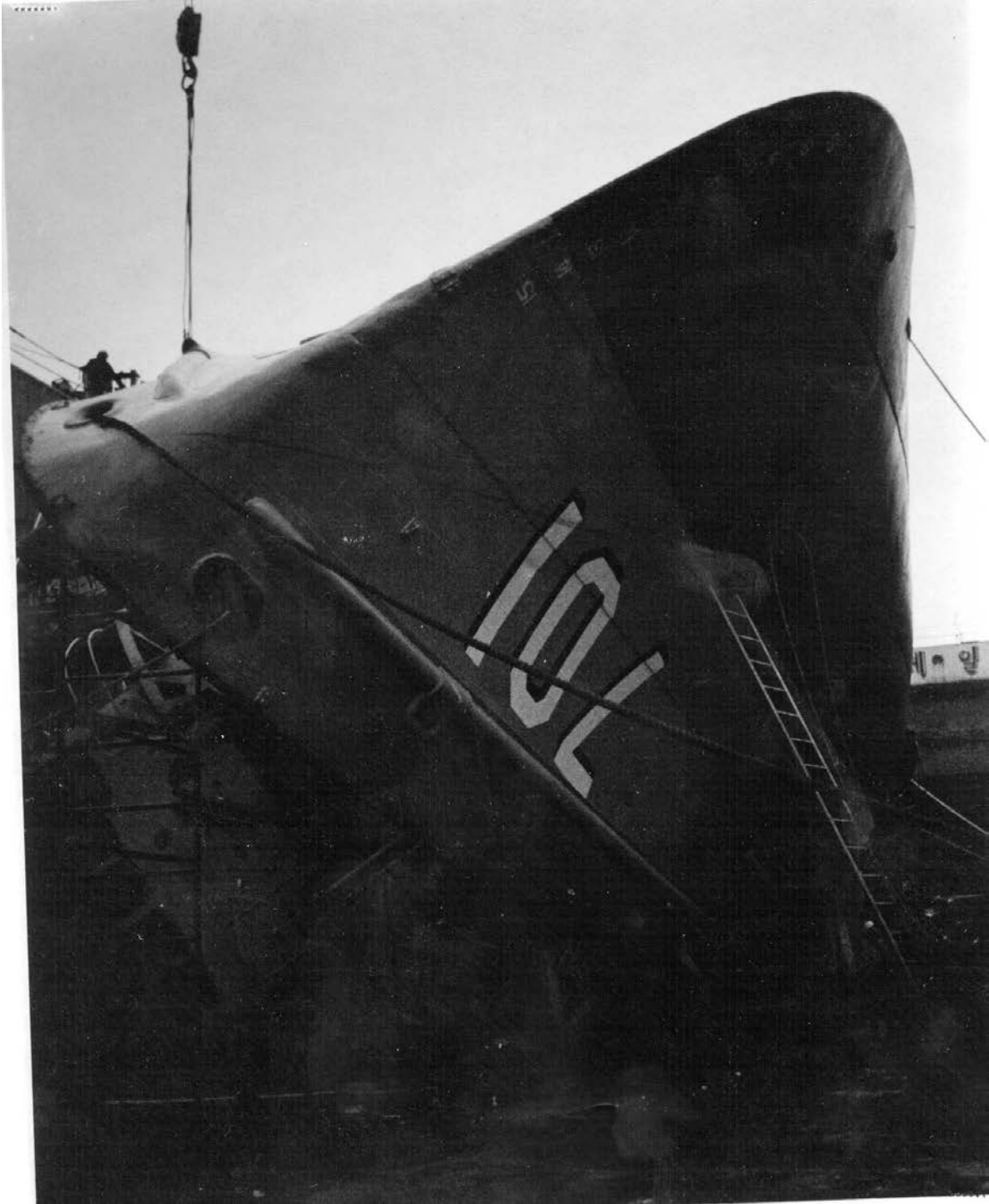
- Dry Weight Log
- Skin Valves Blank Flanged
- Permission for Overboard Discharge
- *Fire Drills / Use of Firemain and VITAL SYSTEMS*
 - **Verify from farthest and highest plug from riser!**
- ****All from NSTM 997**

Notice the distance sparks travel...



Why is the dry and liquid load
log so important....?







Think there are fire hazards here...?

Undocking

- **Hull Board Inspection**
 - Tank Inspections
 - Skin Valve Secured
 - Hull and Projections
 - Drydock Cleanliness

Undocking

- Ensure all Sea Valves Have Been Properly Reinstalled
- Man All Spaces with Sea Valves
- Augment Sounding and Security Watches
- Docking Officer Provide Ship with Undocking Report

- USCGC Thetis undocking, 1993

- USCGC Mesquite, 1989

Review of Enabling Objectives...

- Grounding initial actions.
- Critical draft / movement of G.
- Hull stresses and indicators.
- Docking planning inspections.
- Safety during dry dock / firemain.
- Undocking procedures.

QUIZ...

- **What are the DCA initial actions after grounding?**
 - 1) **Weight the ship down hard!!!**
 - 2) **Conduct soundings on ship and surroundings.**
 - 3) **Determine tons aground.**
 - 4) **Calculate critical draft.**

QUIZ...

- **When does responsibility of ship transfer during docking/undocking?**
 - **When the bow/stern crosses the plane of the dock.**
- **Where do you test firemain pressure from upon drydocking?**
 - **At the farthest and highest plug from the firemain riser.**
- **What spaces do we man during docking/undocking?**
 - **1) Contact w/ Blocks 2) Hull Penetrations 3) Work Done**

Class Example Problem

STRANDING CALCULATION SHEET

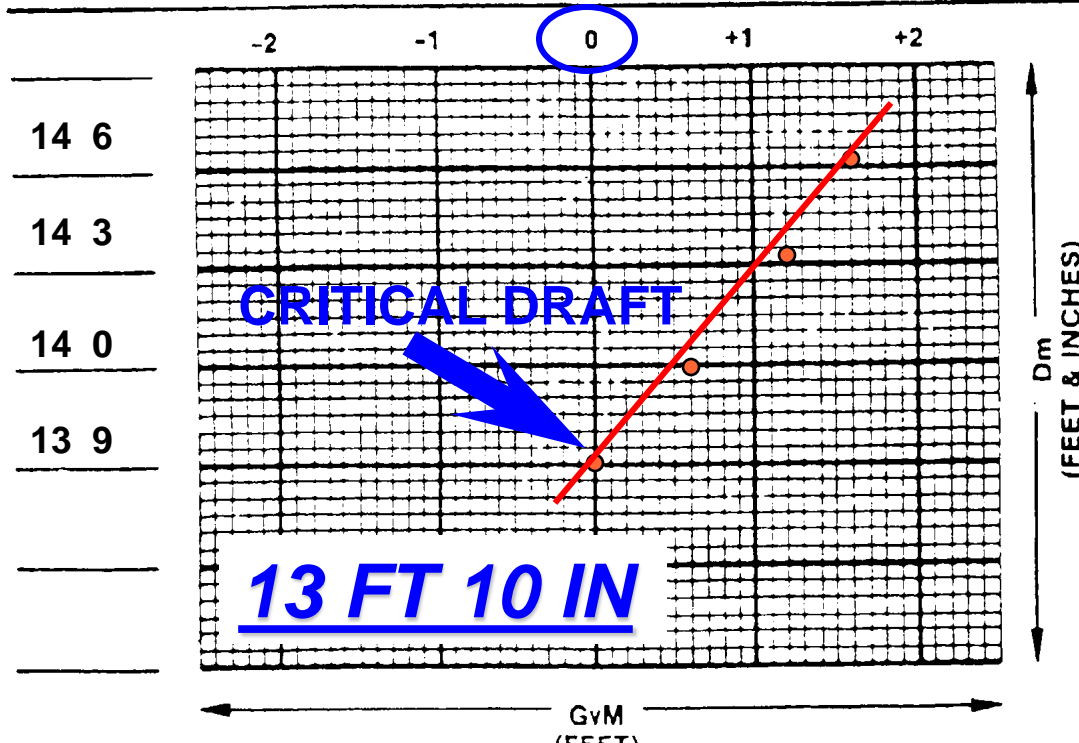
ORIGINAL CONDITION
(BEFORE STRANDING)

D_m	15 FT 6 IN
W_o	3830

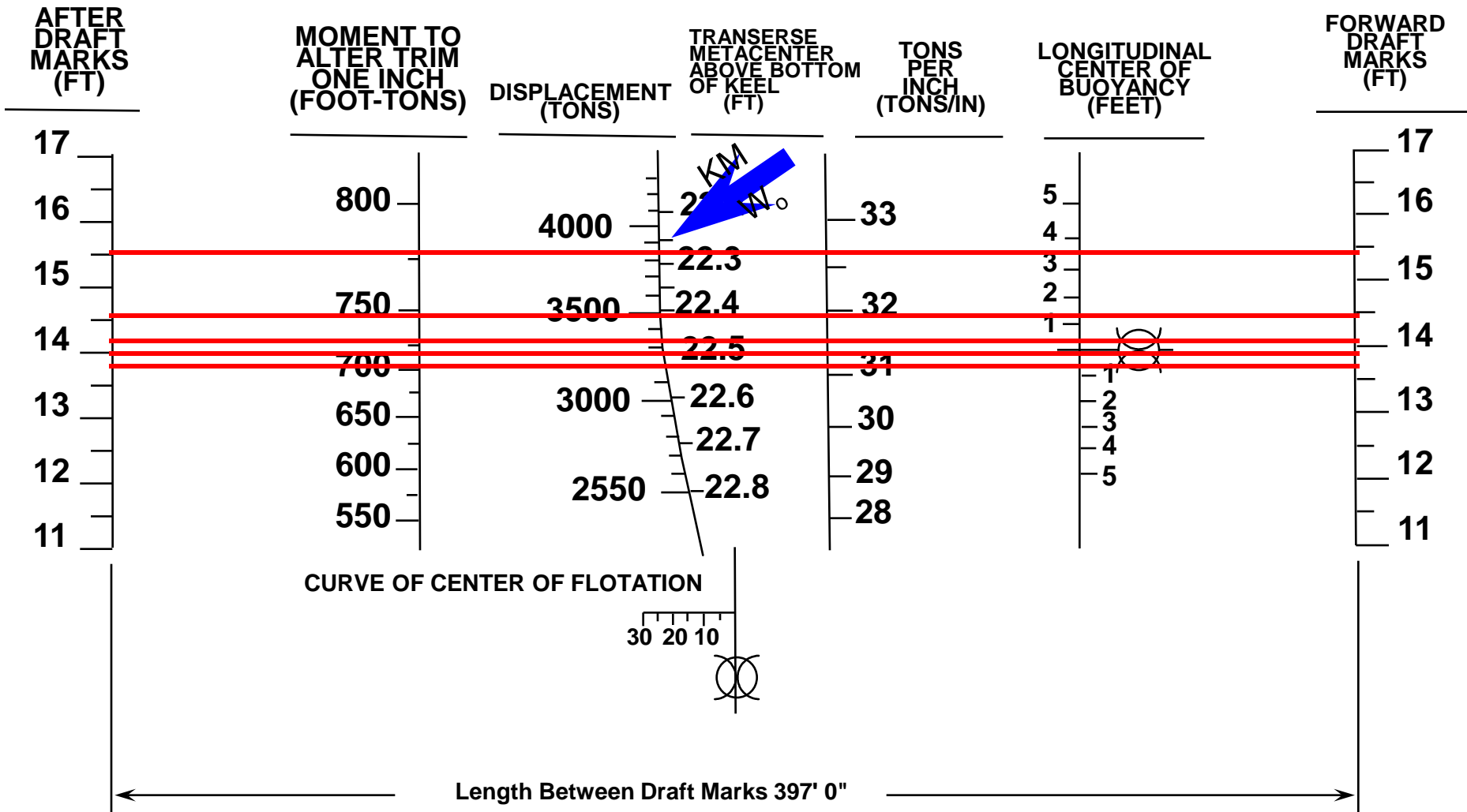
KG_o	18.80
KM	22.28

$$KG_v = \frac{KG_o W_o}{W_a} = \frac{(72004)}{W_a}$$

D mean		W_a	KM	-	KG_v	=	G_vM
FT.	IN.						
14	6	3460	22.42		20.81		1.61
14	3	3400	22.45		21.18		1.27
14	0	3300	22.49		21.82		0.67
13	9	3200	22.53		22.50		0.03



DRAFT DIAGRAM AND FUNCTIONS OF FORM



DRAFT FWD = 15 FT 0 IN
 DRAFT AFT = 16 FT 0 IN
 DRAFT MEAN = 15 FT 6 IN
 $W_0 = 3830$ TONS

$KM = 22.28$ FT
 $KG_0 = 18.80$ FT