

# HATCH COVERS

**VOORDRACHT  
BELGISCHE VERENIGING  
VOOR ZEERECHT**

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EVERYTHING YOU  
ALWAYS WANTED TO  
KNOW ABOUT HATCH  
COVERS BUT WERE  
AFRAID TO ASK!

## HATCH COVER CONFERENCE:

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- Hatch cover history
- Design factors to be considered
- Different hatch cover designs
- Hatch Covers and weathertightness (key parts and their function)
- Building hatch covers = challenge
- Applicable rules and conventions
- Hatch cover inspections (visual and testing) and due diligence
- Situation today: hatch covers
- Conclusions
- Training issues
- Questions

## HATCH COVER HISTORY

<1850: Small hatch ways (2x4m), wooden boards & tarpaulins.

1850 – 1900: Different constructions (web beams, longitudinal configuraton)

1900 – 1941: Transition period from wooden to steel hatch covers (with public debate re-steel v/s wooden hatch covers in 1938)

1941: Prototype single pull hatch covers & further development

1965: Many ships fitted with steel/gasketed hatch covers

1965 – 2005: Further research, fine tuning, development of different designs, closing and securing appliances.

## DESIGN FACTORS TO BE CONSIDERED

- Hatch way dimensions
- Available deck space for stowing the panels
- Available stowage height for panels
- Required coaming height
- Required extent of opening
- Type of operation (opening and actuating mechanisms, available power, required opening/closing time, available crew, ...)
- Repair possibilities (shore specialists/ship's crew)
- Carriage of cargo on hatch covers

## DESIGN FACTORS TO BE CONSIDERED

- Required degree of tightness (weathertight (pos.1) /reduced weathertight (pos.2) and non-weathertight (pos.3) ( for pure container ships only since 1995 subject to flagstate approval - on deck transport of “on deck only” D/G containers on non-weathertight hatch covers
- Cost
- Weight
- Construction type (open web, double skin, ) & required fittings (cleats, packing,...)
- Trading pattern

**⇒MANY REQUIREMENTS – MANY DIFFERENT DESIGNS**

# DIFFERENT TYPES OF HATCH DESIGNS



Single pull



## DIFFERENT TYPES OF HATCH DESIGNS



Side rolling



## DIFFERENT TYPES OF HATCH DESIGNS



Folding & Multi-folding type

## DIFFERENT TYPES OF HATCH DESIGNS



Lift away

## DIFFERENT TYPES OF HATCH DESIGNS



Piggy back



## DIFFERENT TYPES OF HATCH DESIGNS



Stacking covers

## DIFFERENT TYPES OF HATCH DESIGNS



Reefer hatch covers

## DIFFERENT TYPES OF HATCH DESIGNS



Spring loaded covers

# HATCH COVER WEATHERTIGHTNESS

ICLL 1966: Weathertightness

"Weather tight means that in any sea conditions water will not penetrate into the ship" (Reg. 3-12).

## **FROM THE WEATHER SIDE**

“The means of securing weathertightness shall be to the satisfaction of the Administration. The arrangements shall ensure that the tightness can be maintained in any sea condition and for this purpose tests for tightness shall be required at the initial survey and may be required at periodical surveys and at annual inspections or at more frequent intervals“ (Reg. 16-4).

Watertight = water will not be passing through the sealing arrangements from both directions across the seal under a head of water for which the appliance was built (not defined in ILLC)

# HATCH COVER WEATHERTIGHTNESS





# HATCH COVER WEATHERTIGHTNESS



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# HATCH COVER WEATHERTIGHTNESS

HAVE A SAFE DAY !!!

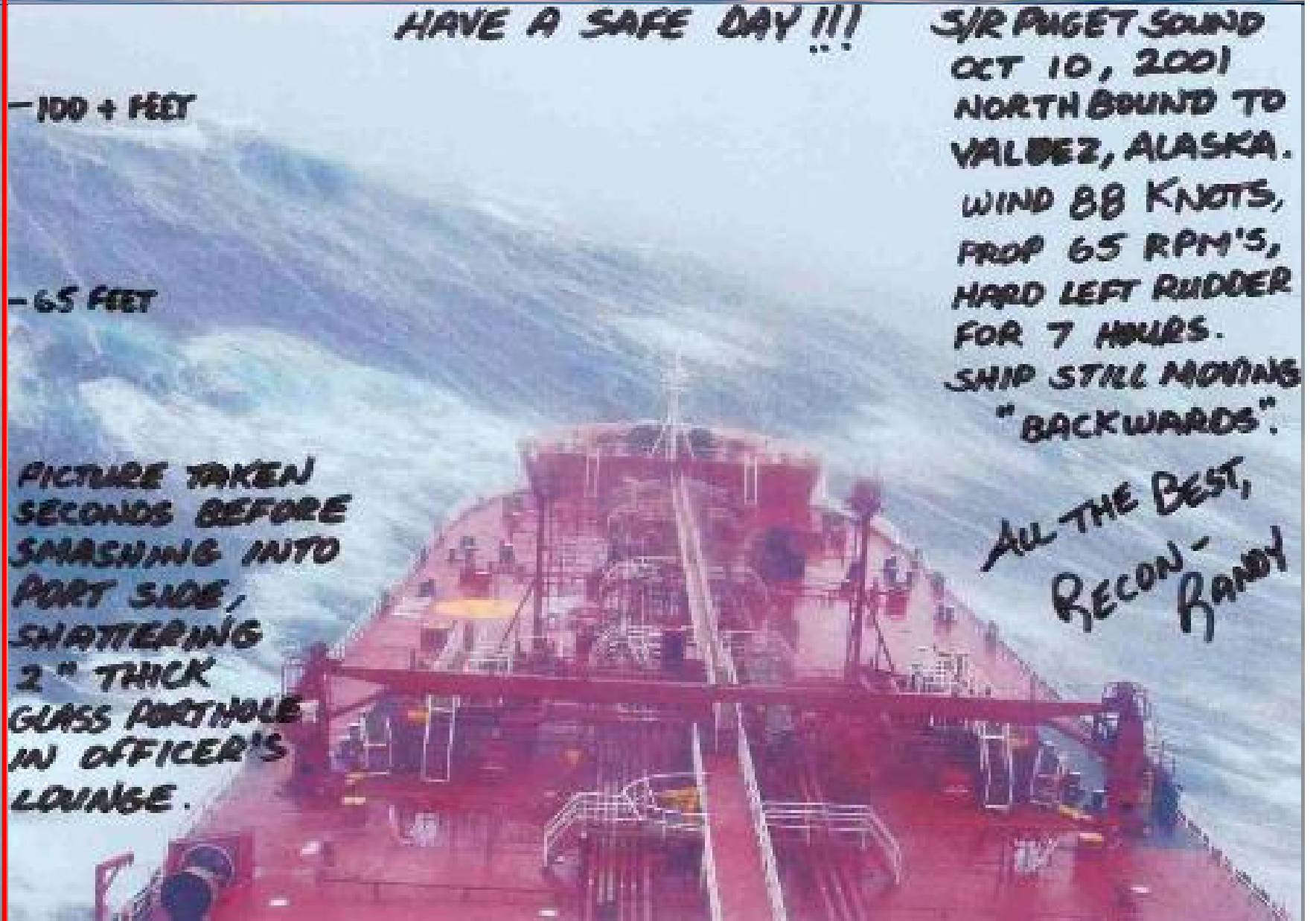
- 100 + FEET

- 65 FEET

PICTURE TAKEN  
SECONDS BEFORE  
SMASHING INTO  
PORT SIDE,  
SHATTERING  
2" THICK  
GLASS PORTHOLE  
IN OFFICER'S  
LOUNGE.

S/R PUGET SOUND  
OCT 10, 2001  
NORTH BOUND TO  
VALDEZ, ALASKA.  
WIND 88 KNOTS,  
PROP 65 RPM'S,  
HARD LEFT RUDDER  
FOR 7 HOURS.  
SHIP STILL MOVING  
"BACKWARDS".

ALL THE BEST,  
RECON-  
RANDY



# HATCH COVER WEATHERTIGHTNESS



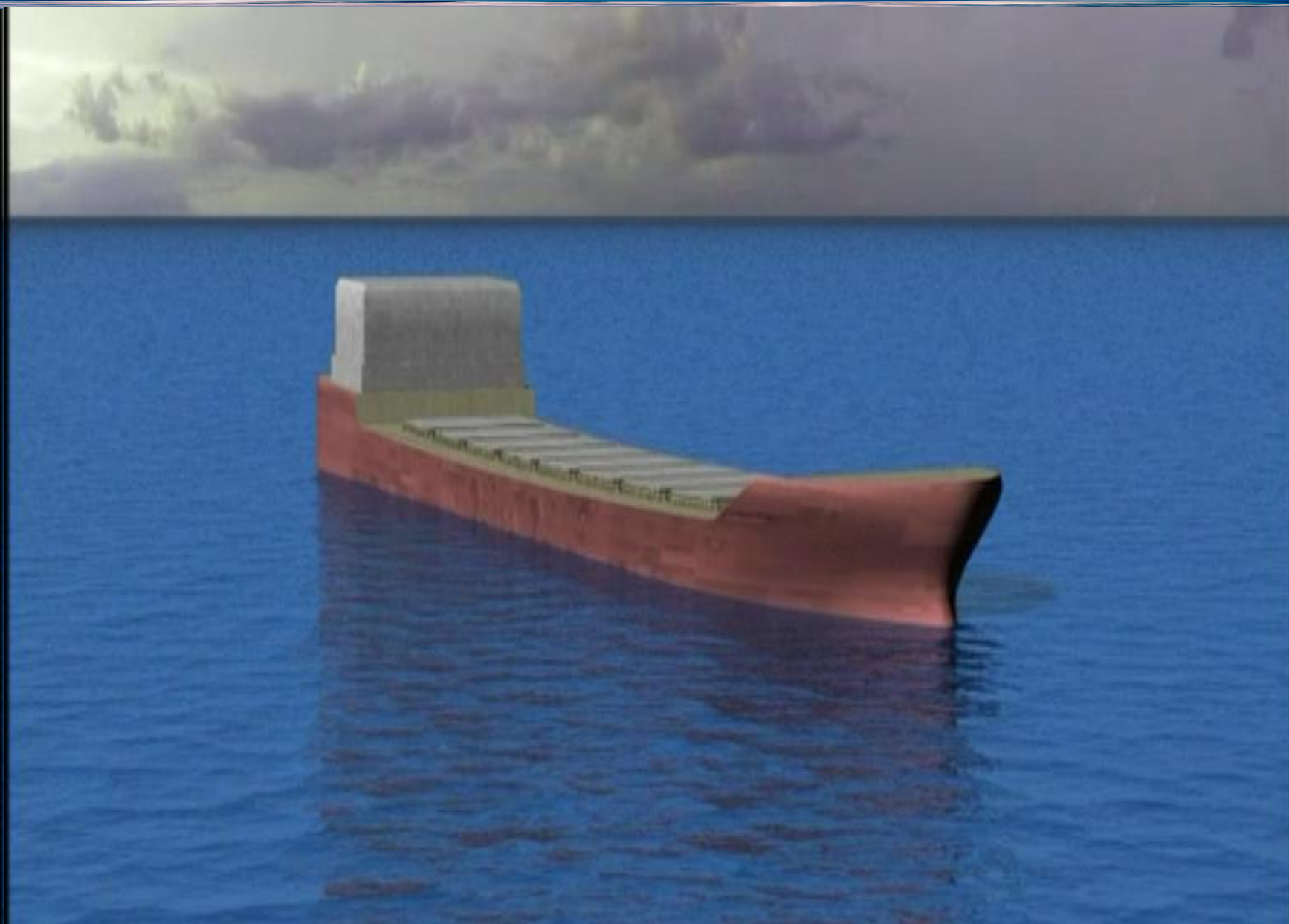
# HATCH COVER WEATHERTIGHTNESS



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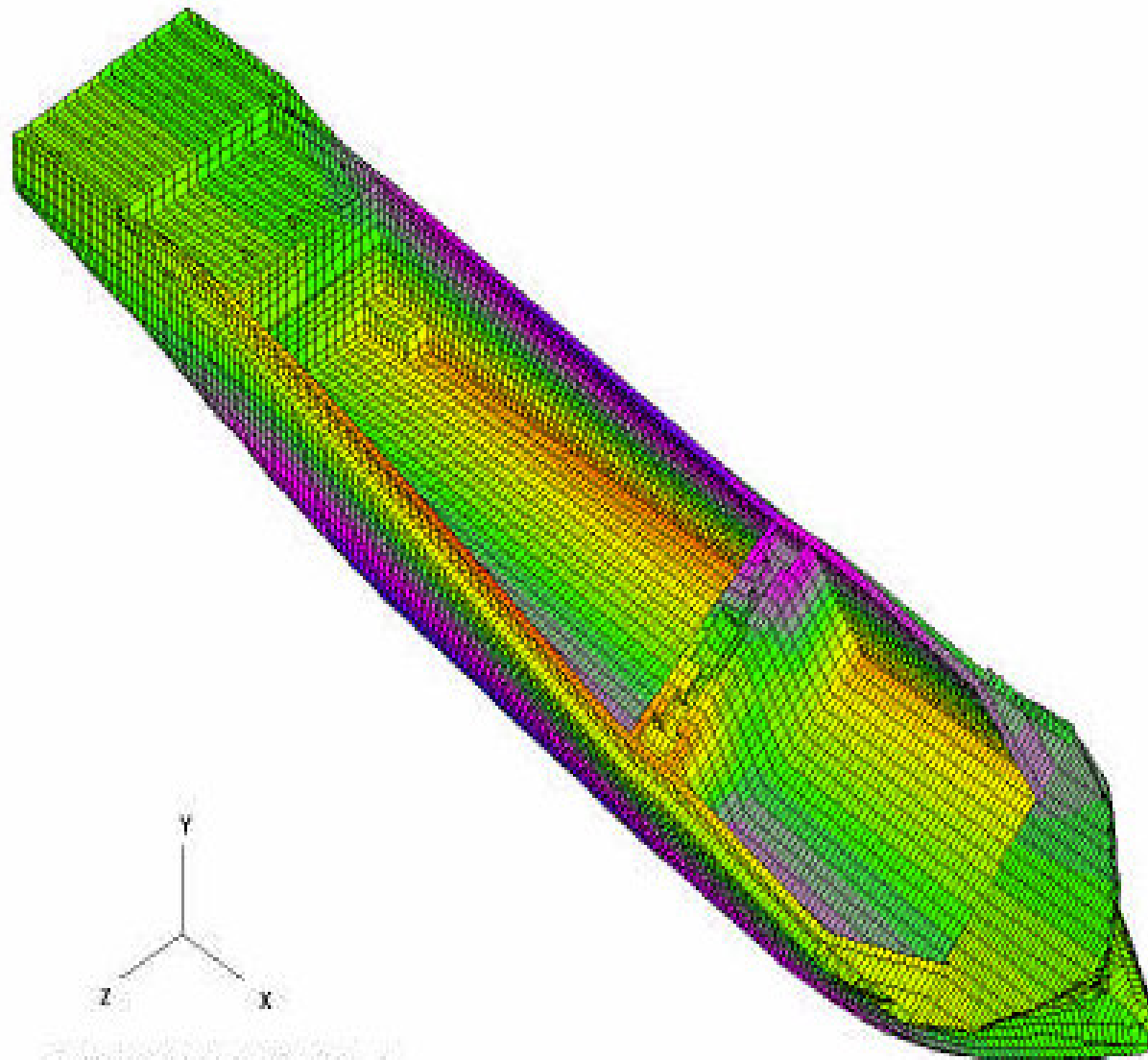


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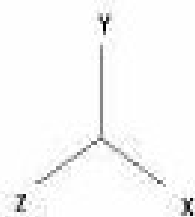
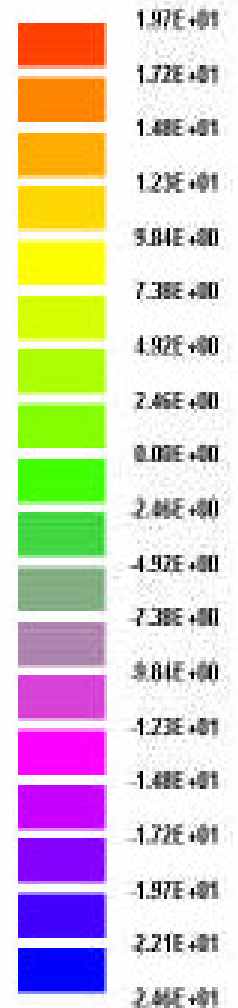


# HATCH COVER WEATHERTIGHTNESS

DISPLACEMENT CONTOURS



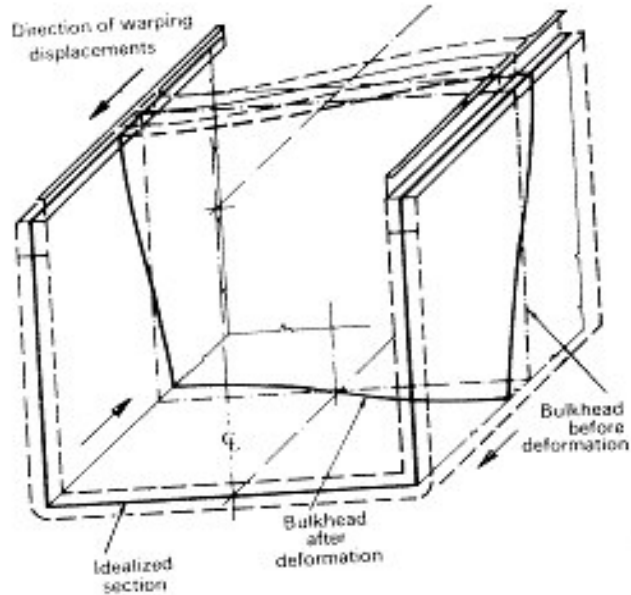
X Translation



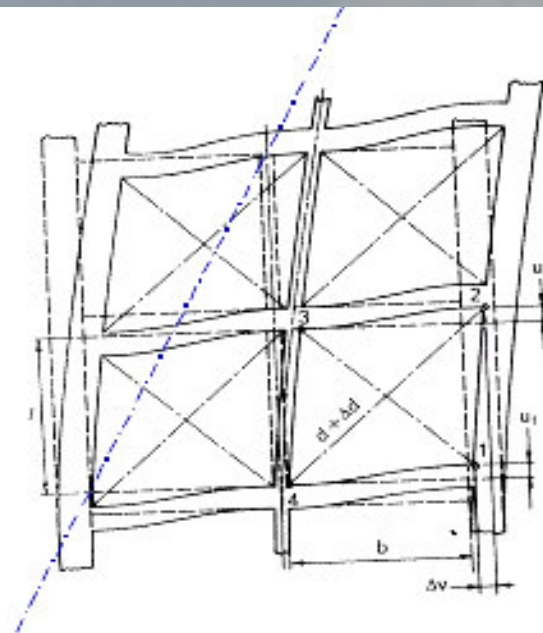
DISPLACEMENTS: LOAD CASE 1:  
TORSION ANALYSIS



# HATCH COVER WEATHERTIGHTNESS

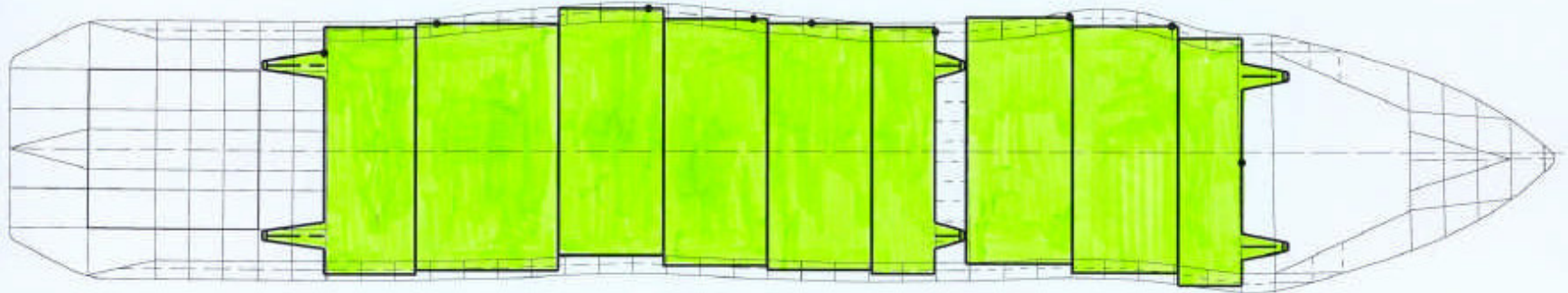


Deformation induced by torsional movement



Hatchway opening deformation for a containership

# HATCH COVER WEATHERTIGHTNESS



## Panel Movements:

- Panels subject to movements as a result from loading conditions, hogging/sagging, warping due to torsion.
- Number of coaming movements during a ship's life > 50,000,000
- Critical number of cycles from a fatigue point of view: 100,000

# HATCH COVER WEATHERTIGHTNESS

ILLC 1966: Weathertightness

"Weather tight means that **in any sea conditions** water will not penetrate into the ship" (Reg. 3-12).

Avoiding that water penetrates into the ship with:

- Several sets of hatch covers per ship
- Ship lengths of up to 300 metres or more
- Single panel or multi panel configurations
- Panels which are all moving differently
- Different weather and loading conditions
- Different climate/T° conditions

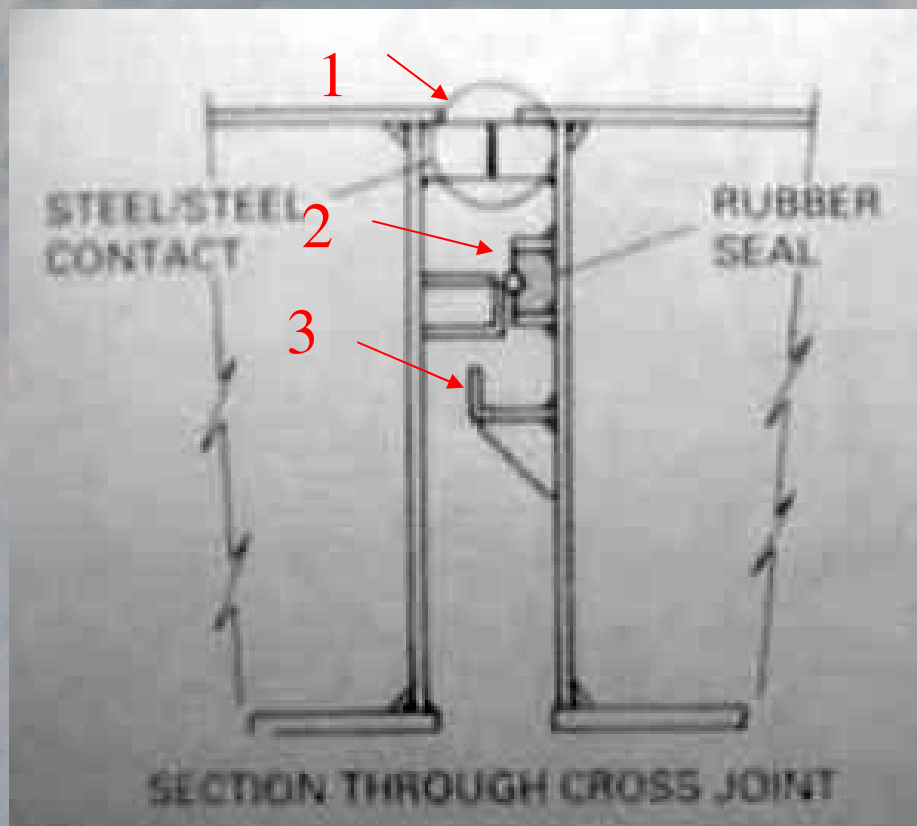
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**CHALLENGE!!**

# BUILDING HATCH COVERS = CHALLENGE

How to keep water out in any seaconditions???

Basic principle: **3 safety barriers:**



# BUILDING HATCH COVERS = CHALLENGE

