Polar Code:

large or small effect on ship design?

March 16th, 2017

FORESHIP
AT THE SHARP END

Polar Code & Polar Class

NEED TO GET INTO POLAR AREAS (>60°N/S)?

IF, THE SHIP HAS TO BE **POLAR CODE** SHIP

POLAR CODE CATEGORY B
At least thin first-year ice, which may include old ice inclusions.

IN PRINCIPLE **POLAR CLASS** IS NEEDED: PC6 or PC7

POLAR CODE CATEGORY C
Ship can operate in ice conditions less severe than Category B.

NO POLAR CLASS, LOWER (or NO) ICE CLASS IS OK (1A, 1B or 1C...)

Polar Code is a **Goal Based Regulation**

Operational Assessment will define the actual requirements for the ship and operation in question. Thus the actual requirements depend on, for example:

- Time of year (cruise ships operate in summer period)
- Ice coverage (from no ice to multi year ice)
- Minimum temperatures
- Risk for icing
- Availability of day light
- Need to evacuate onto ice
- Possible support vessels
- High latitudes (>80°) operation
- Etc.

⇒ This means the ship design can be affected significantly by Polar Code, or affected only a little.

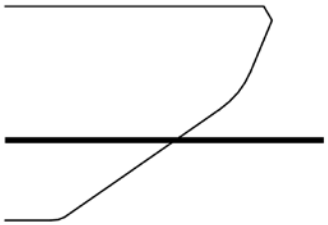
Example of Effects

- **Hull Form:**
  - Ice breaking or not?
- **Structures:**
  - ice strengthening (ice class), steel quality
- **Stability:**
  - ice accretion, damage stability requirement
- **Life Saving Appliances:**
  - Life boat capacity vs. non-Polar Code ship
  - life rafts or not?
  - Evacuation onto ice or not? Special equipment for this, or life rafts?
- **Removal of ice:**
  - Electrical heating or mechanical removal?
- **Cold weather survival clothing:**
  - Thermal protection or heavier clothing
- **Additional protection for survivability with personal and group survival eqp.**
  - Overkill is possible

Ice Breaking Capability vs. Bow Shape?

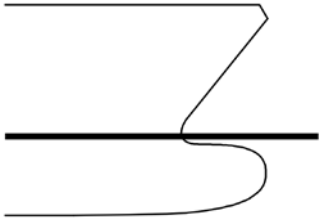
Proper Ice Breaking Bow?

- Brakes ice by bending (not crushing)
- Bad open water performance



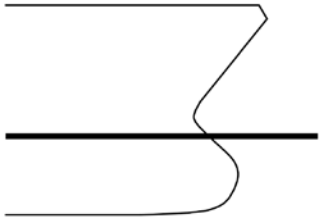
Typical Open Water Bulbous Bow?

- Breaking of first year ice is possible with the high installed power.
- Provides very good open water efficiency with moderate ice breaking capability.



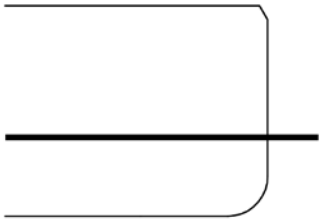
Ice Type Bulbous Bow?

- Maybe 15% worse than open water bulbous bow
- Can break sheet ice



Vertical Bow?

- Can be used in broken loose ice, but not for ice breaking or ice channel navigation
- Good in open water and waves, when properly designed.



Life Saving Appliance Scenarios

Normal LSA

2 x 150 p in boats + 100 p in rafts
= 400 person

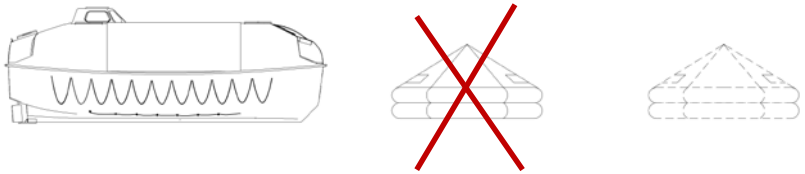
Polar Code Boat (150p -> 140p assumed)

2 x 140 p in boats + 92 p in rafts
= 372 person

Heavy Duty Polar Code Boat (150p -> 105p assumed)

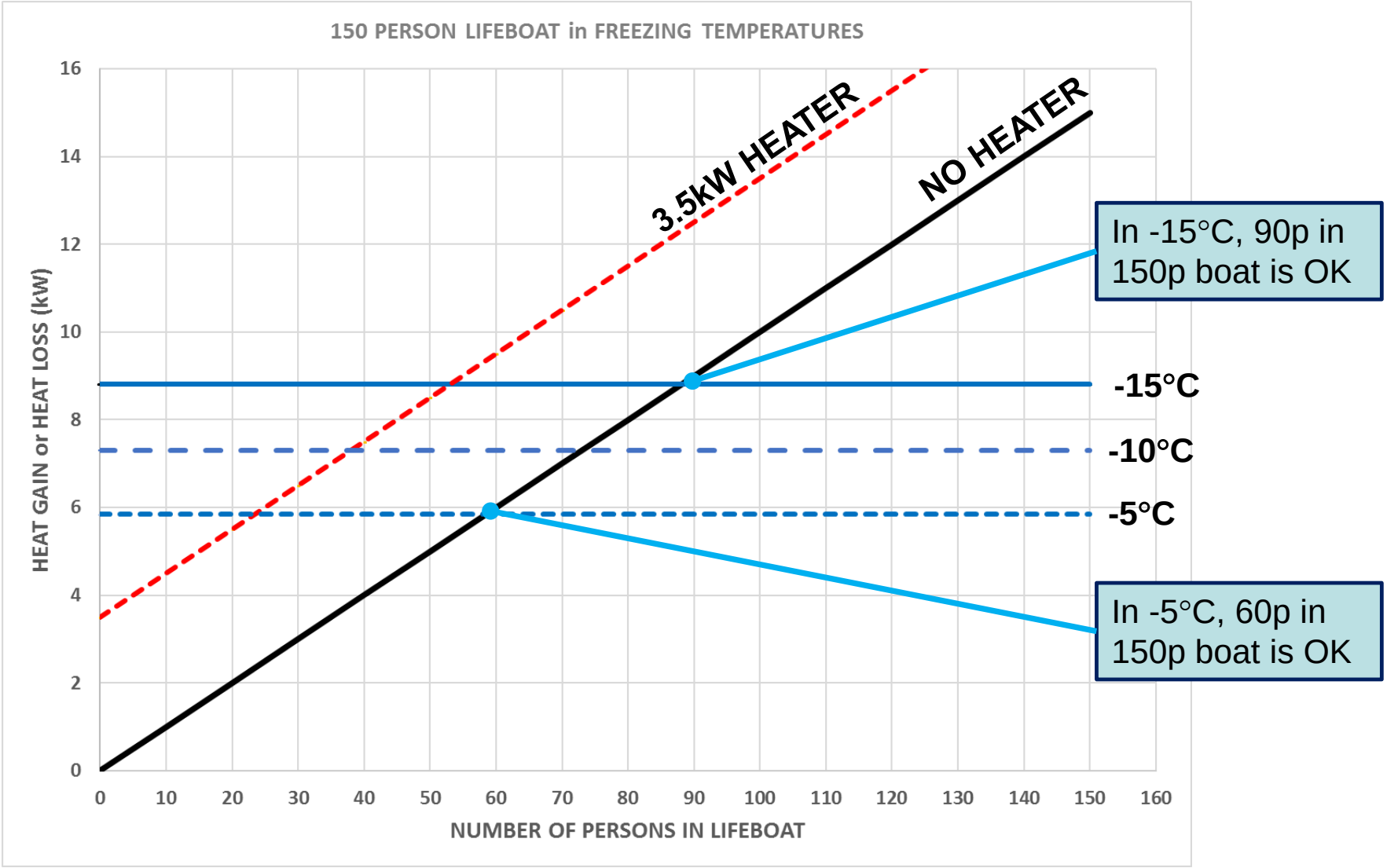
2 x 105 p in boats + 70 p in rafts
= 280 person

Heavy Duty Polar Code Boat (150p -> 105p assumed), no Life Rafts



2 x 105 p in boats
= 210 person

Example: is heating needed in Lifeboats?



Summary

- Polar Code is a goal and risk based regulation, which gives more freedom to design ships according to actual, expected risks.
- For a passenger ship operating in Polar regions during summer period effects of Polar Code don't need to be that significant.