



*Code 5500*



WARFARE CENTERS  
Carderock Division

*Seakeeping Division*

# ONR 3 Topsides Hull-forms

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# Basic Hull Design

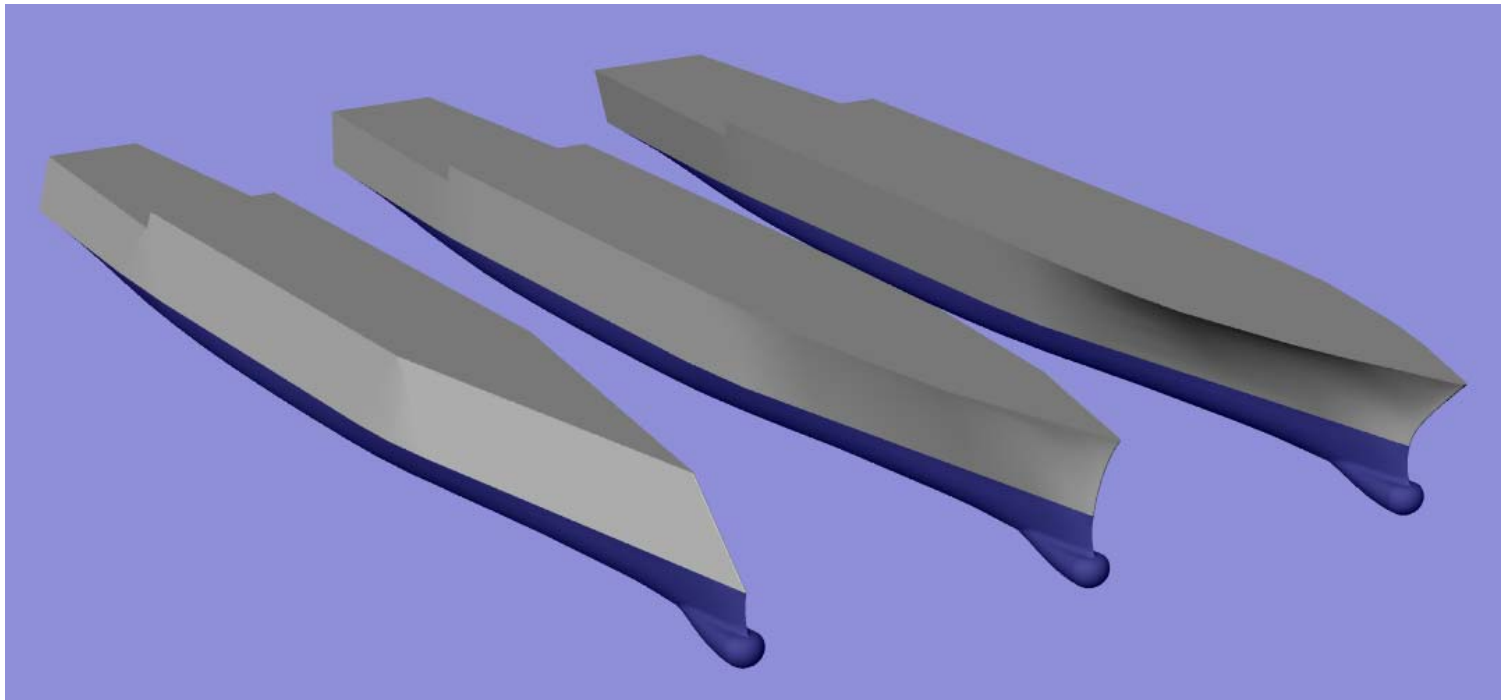
- Modern surface combatant-type underbody and sonar dome
- 3 topsides:
  - 10 deg flare
  - Wall-sided
  - 10 deg tumblehome
- Approximately sized to DDG51



## Basic Hull Design (cont.)

- Displacement 8,790 tonnes
- Length 154 m
- Beam 18.8 m
- Draft 5.5 m
- LCB (Aft of FP) 79.6 m

# ONR Roll Response Series Renderings



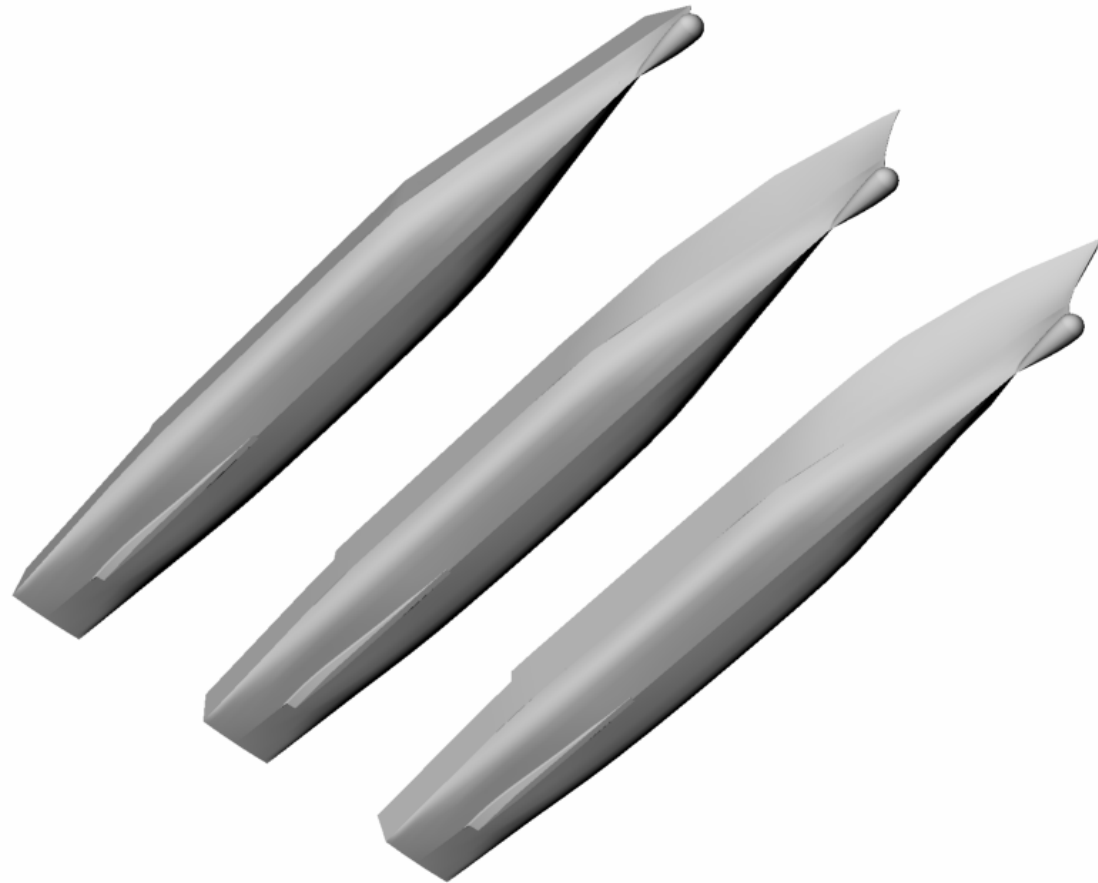


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# ONR Roll Response Series Renderings



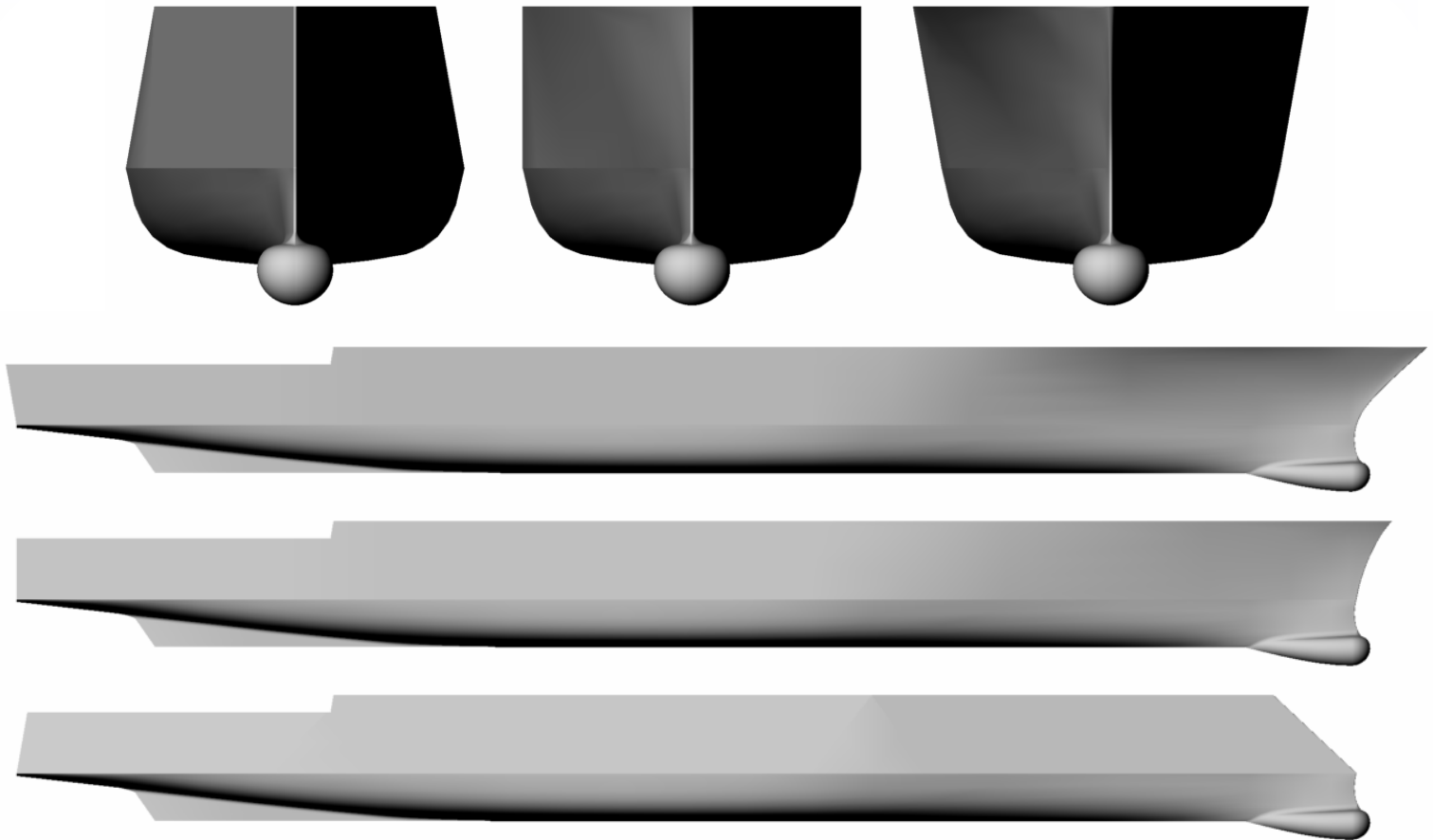


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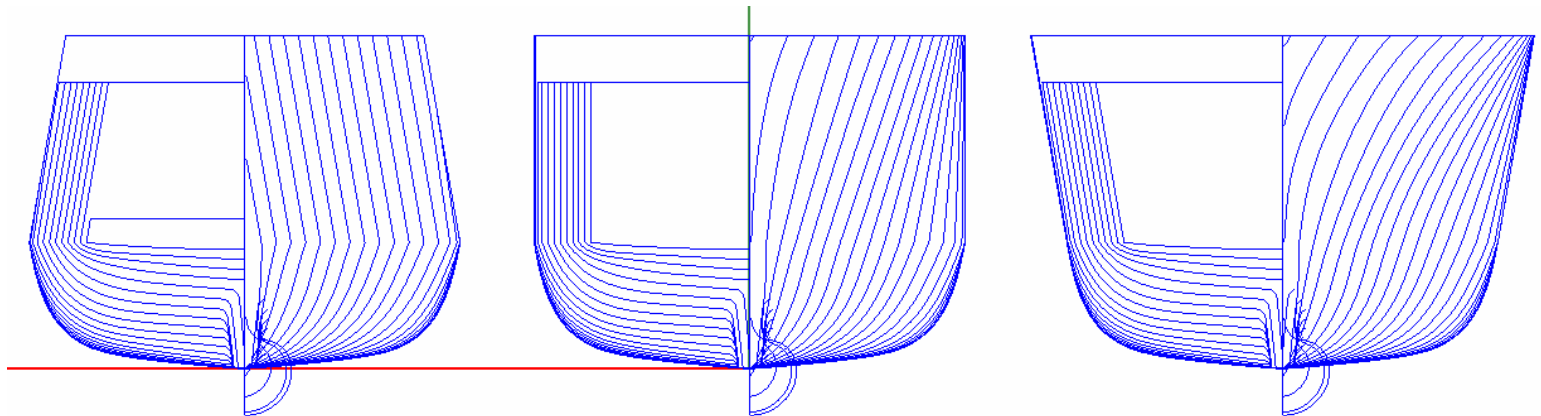


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# ONR Roll Response Series Renderings



# ONR Roll Response Series Body Plans





# Stability Calculations

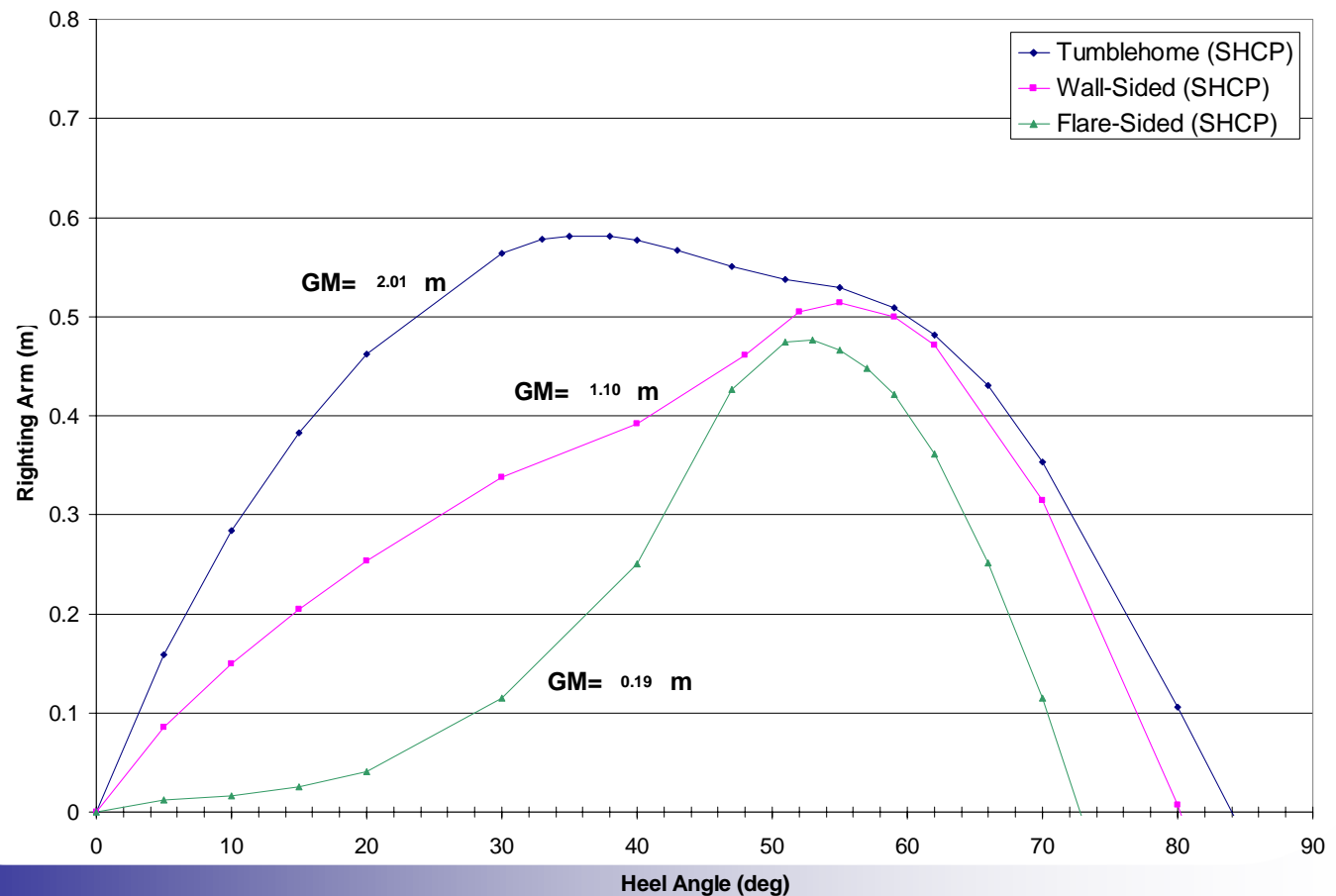
- $GM_T$  limits using Sarchin and Goldberg criteria

- Tumblehome:  $GM = 2.01 \quad m$
- Wall-sided:  $GM = 1.10 \quad m$
- Flare:  $GM = 0.19 \quad m$



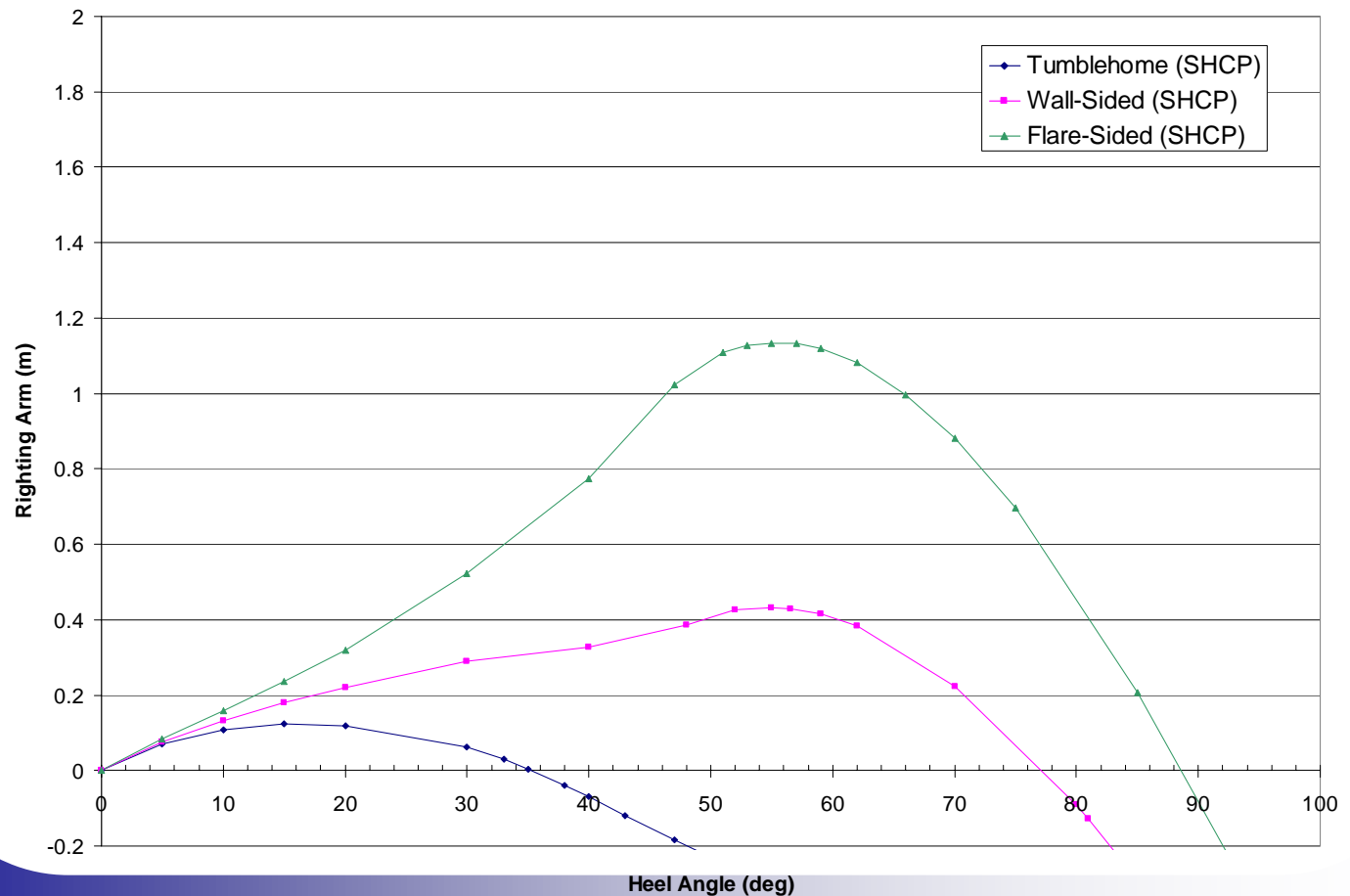
# Stability Calculations (cont.)

## S & G Limit Righting Arm Curves



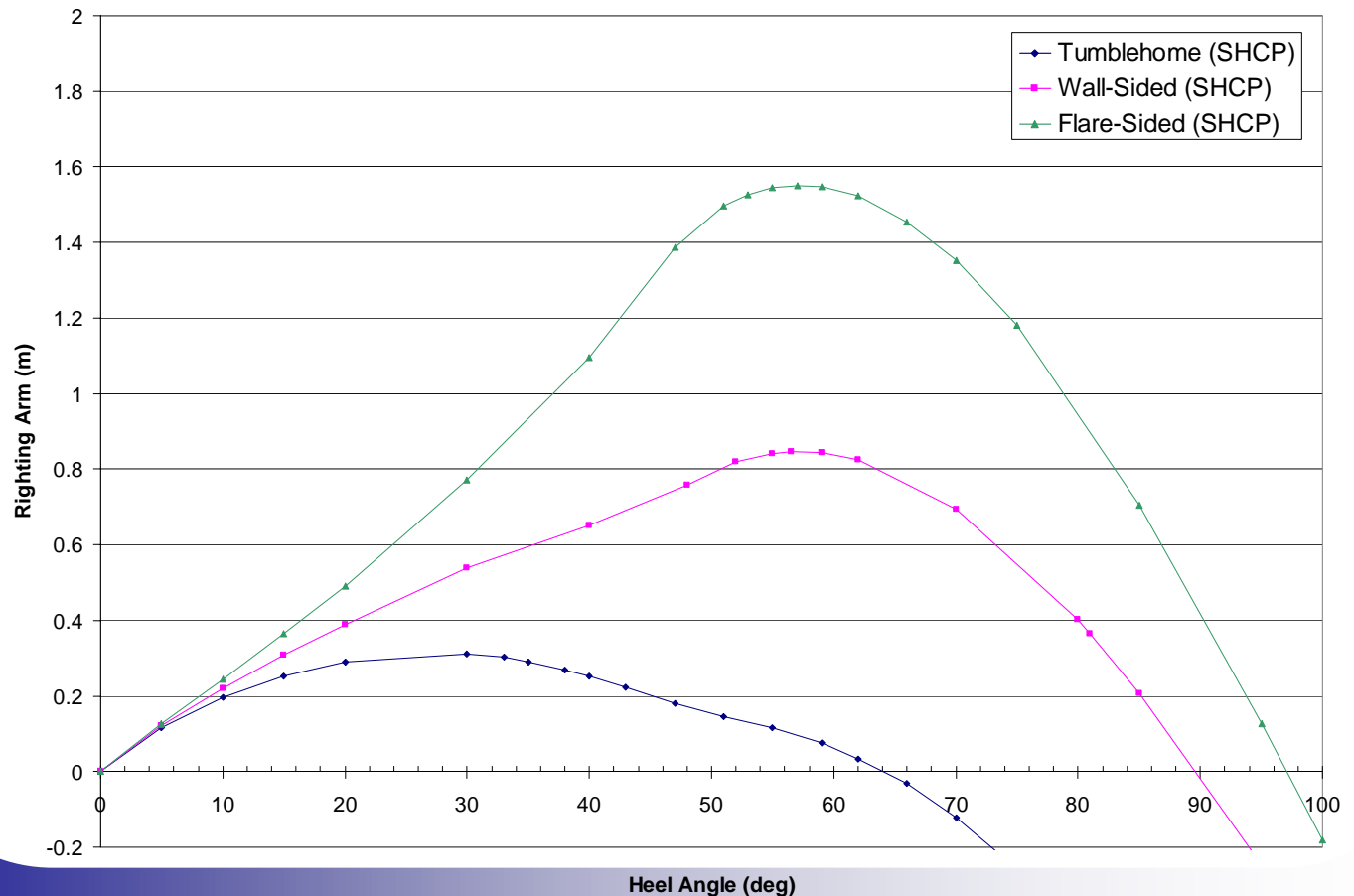
# Stability Calculations (cont.)

## Small GM (1.0m) Righting Arm Curves



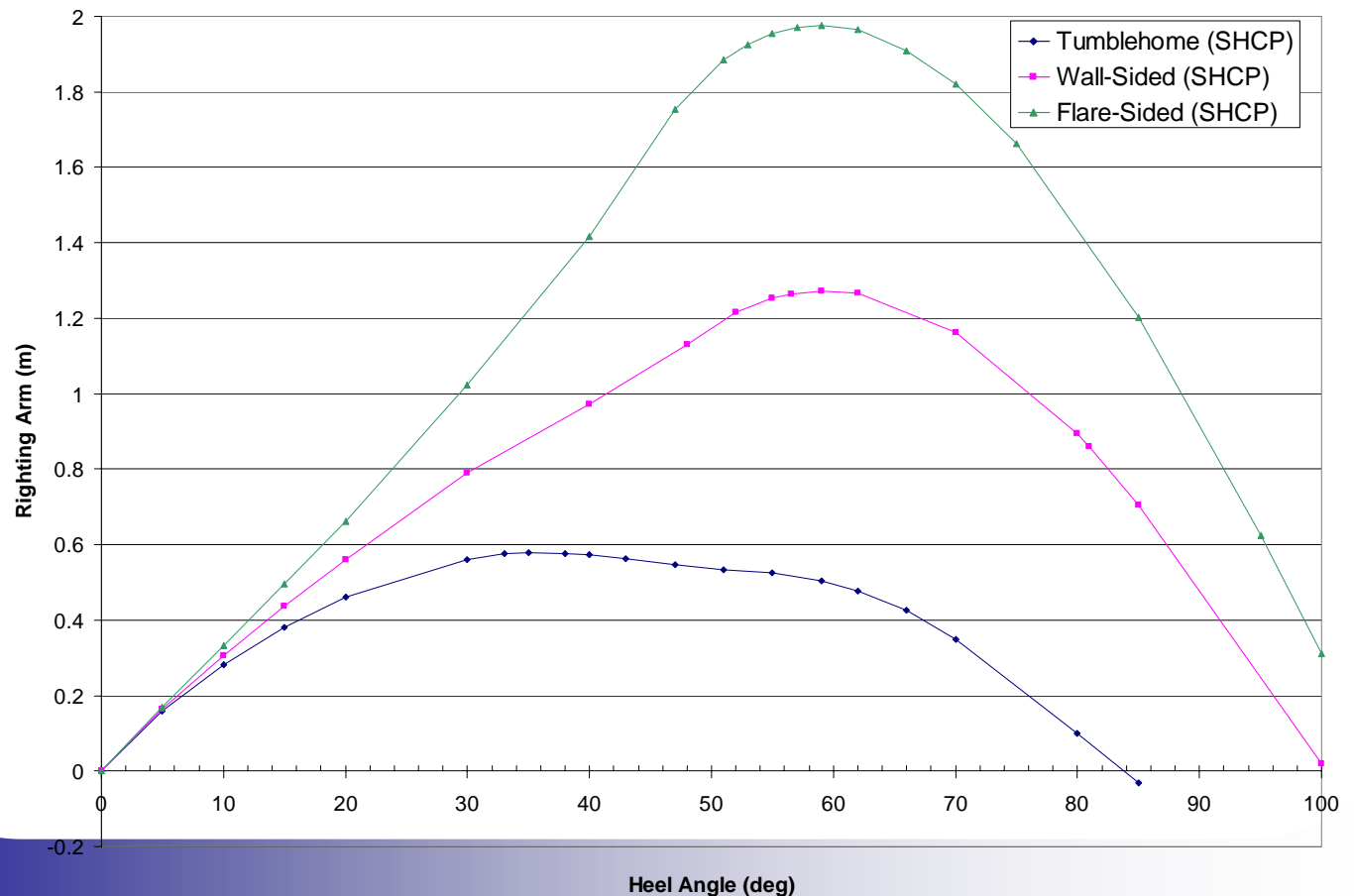
# Stability Calculations (cont.)

## Medium GM (1.5m) Righting Arm Curves



# Stability Calculations (cont.)

## Large GM (2.0m) Righting Arm Curves





# Bilge Keels

- Extents of Bilge Keels
  - Station 6.68 to Station 13.33 (51.23 meter span)
- Bilge Keel Span
  - Capsize Model
    - 1.5m
  - Seakeeping Models
    - 1.25m
    - 1.75m