

EX-SARATOGA (CV 60) Stability Evaluation

References:

- (a) Tom.Deegan@.navy.mil Email, Subj: FW: CV60 LiqLd 2007.xls, 8/25/2008

Tom Deegan, requested a stability evaluation for the EX-SARATOGA (CV 60) via reference (a). The current liquid load distribution on EX-SARATOGA was also provided by reference (a). The current draft readings at Naval Station, Newport, RI were provided by per reference (a).

The **information** provided for the evaluation is as follows;

- The ship is to have adequate stability for an open ocean tow.
- No specific draft or trim requirements have been requested. The ship has a current trim of about 7.60 feet by the stern. USN Towing Manual recommendations for 1 foot of trim per 100 feet length imply a trim of about 9.90 feet by the stern.
- Reference (a) provided the ships liquid loads.
- Reference (a) provided the associated observed starboard drafts and ship attitude for the as-is condition:

Draft Forward Calculative	24.50 Feet
Draft Aft Calculative	31.50 Feet
List (assumed, not provided)	1.50 Degrees Port

The **assumptions** used for the evaluation are as follows;

- Based on the drafts noted above, the ship displaces 59315 tons which is about 3900 tons less than the last tracked lightship displacement of 61339 tons. This difference is considered appropriate given the accuracy to which the drafts have been read and the items that may have been removed from this ship.
- The righting arms were derived from the Flooding Casualty Control Software (FCCS), Version 5.6.0.0, for the CV 59 Class Hull form.
- The wind heeling arm was derived from the Wind Program, Version 3.02.02 for the CV 59, adjusted for current draft and displacement.
- No additional ballasting is required to improve ship stability or desired to adjust ship trim.

The **USN Towing Manual Appendix H** information we calculated for the ship in the “as-is” condition is as follows for Salt Water:

Length Overall:	1067.00 Feet
Beam (extreme):	252.00 Feet
Displacement:	59315.52 Tons
Draft fwd:	24.50 Feet (Stbd)
Draft aft:	31.50 Feet (Stbd)
Mean draft:	28.30 Feet (centerline)
Freeboard fwd:	xx.xx Feet
Freeboard aft:	xx.xx Feet
Freeboard mid:	xx.xx Feet
MTI:	11609.00 Ft-tons
TPI:	216.05 Tons/Inch
KG:	51.45 Ft above keel
GM:	8.54 Feet
List:	1.50 degrees Port
LCG:	23.80 Feet aft midships
Trim:	7.60 Feet by Stern
Maximum Ht above WL:	

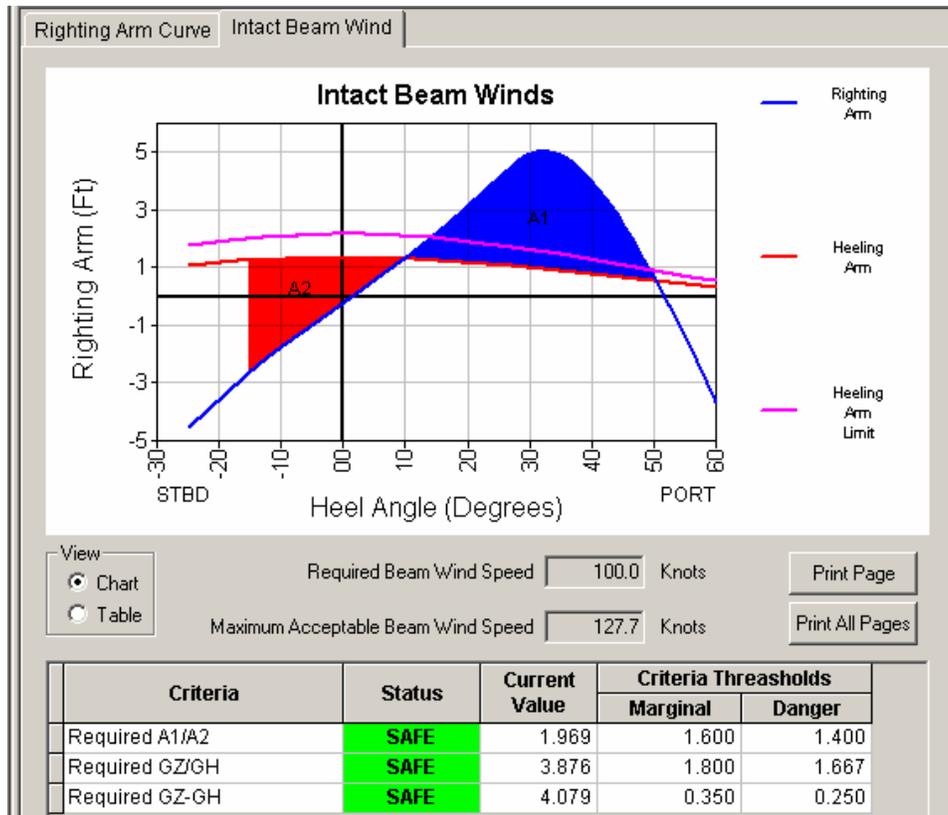
Maximum Navigational Draft (include sonar domes, propellers, etc.):
 CV 60 Class does not have any appendages
 that project below the ship's keel.

Note that:

- KG is virtual (includes the virtual rise in KG due to the effect of free surface).
- GM is 'corrected' (reduced for the effects of free surface).
- Items in yellow above may or may not be completed by Code 244.

Note that according to the USN Towing Manual, a trim of approximately 9ft 10in by the stern would be preferable.

Stability Evaluation: Based on the above we calculate that the EX-SARATOGA has adequate stability for tow in open ocean conditions and is capable of withstanding the effects of a 100 knot beam wind combined with rolling. Included below is a copy of our stability evaluation incorporating the above data and assumptions. The entire scenario should be re-evaluated before tow if there is any significant deviation from the above assumptions and loads provided.



Fresh Water Drafts:

Draft fwd: 25.38 Feet (Stbd)
 Draft aft: 31.89 Feet (Stbd)
 Mean draft: 28.94 Feet (centerline)
 List: 1.55 degrees Port
 Trim: 7.15 Feet by Stern