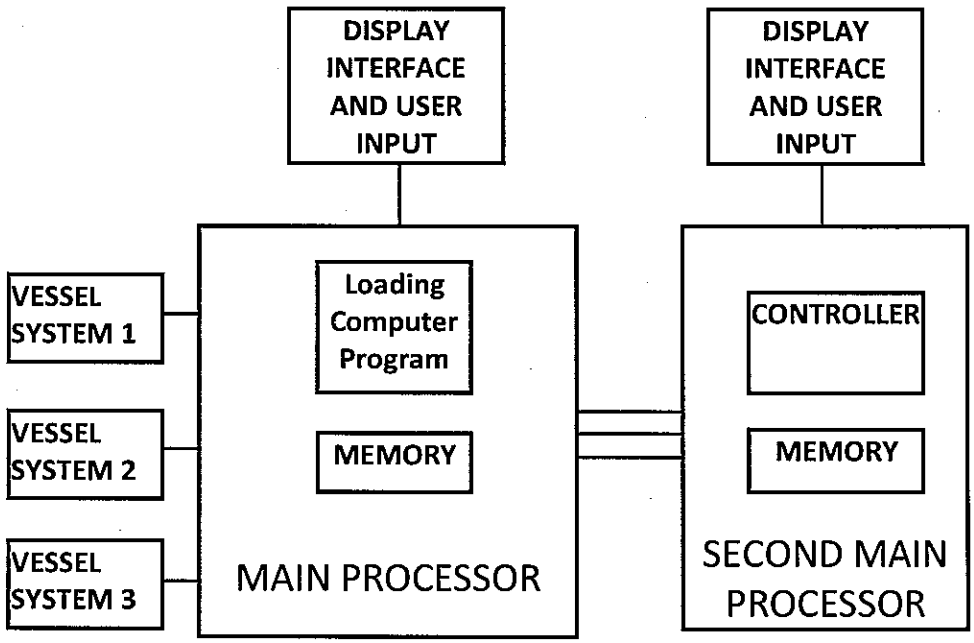

DISPLAY INTERFACE AND USER INPUT
DISPLAY INTERFACE AND USER INPUT
VESSEL SYSTEM 1
VESSEL SYSTEM 2
VESSEL SYSTEM 3
Loading Computer Program
MEMORY
MAIN PROCESSOR
CONTROLLER
MEMORY
SECOND MAIN PROCESSOR

Figure 1

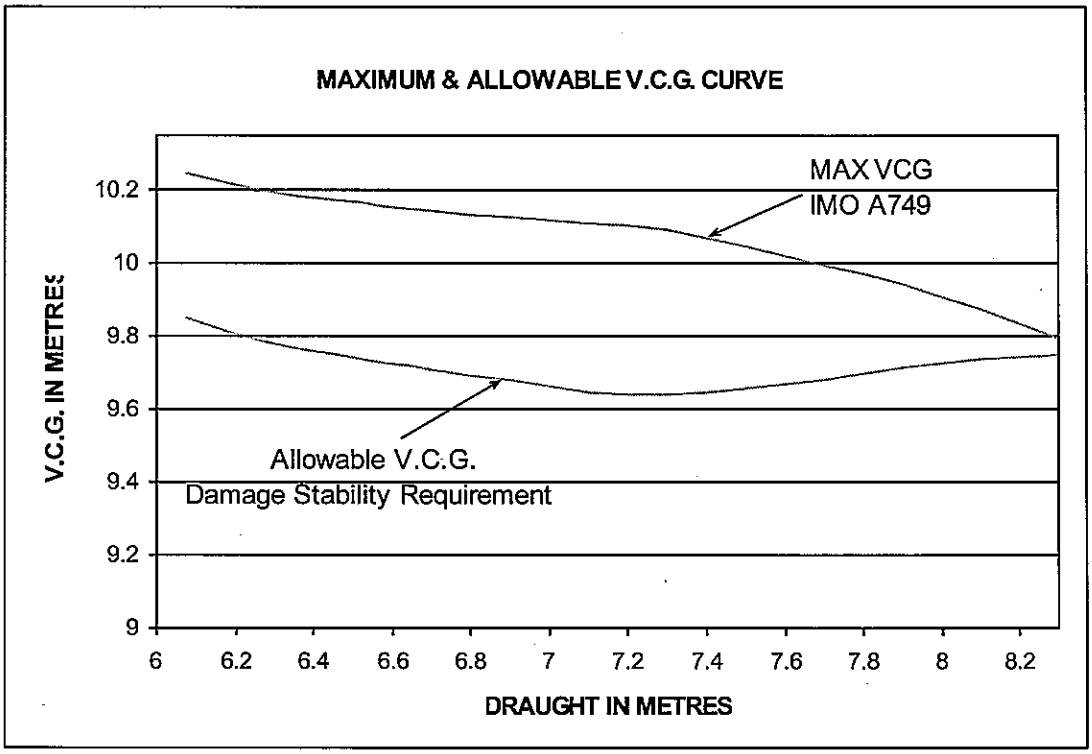

MAXIMUM & ALLOWABLE V.C.G. CURVE
MAX VCG
IMO A749
Allowable V.C.G.
Damage Stability Requirement
V.C.G. IN METRES
10.2
10
9.8
9.6
9.4
9.2
9
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
8.2
DRAUGHT IN METRES

Figure 2

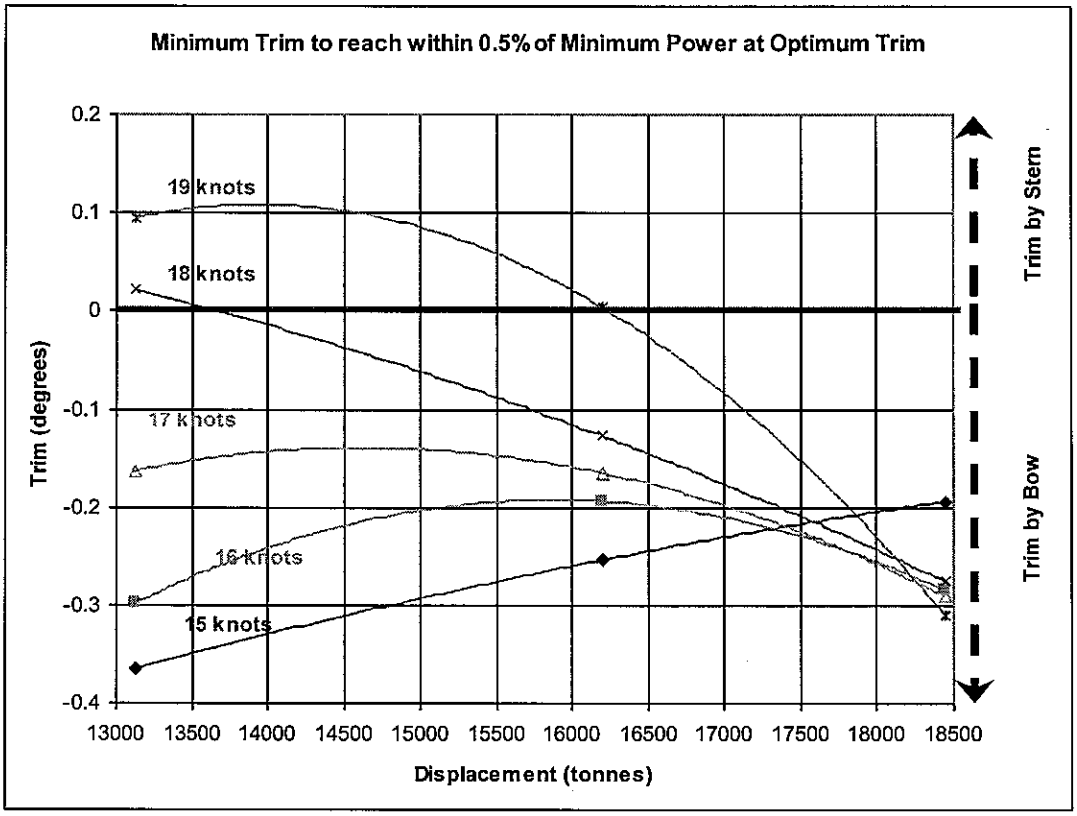

Minimum Trim to reach within 0.5% of Minimum Power at Optimum Trim
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
19 knots
18 knots
17 knots
16 knots
15 knots
Trim (degrees)
13000 13500 14000 14500 15000 15500 16000 16500 17000 17500 18000 18500
Displacement (tonnes)
Trim by Stern
Trim by Bow

Figure 3

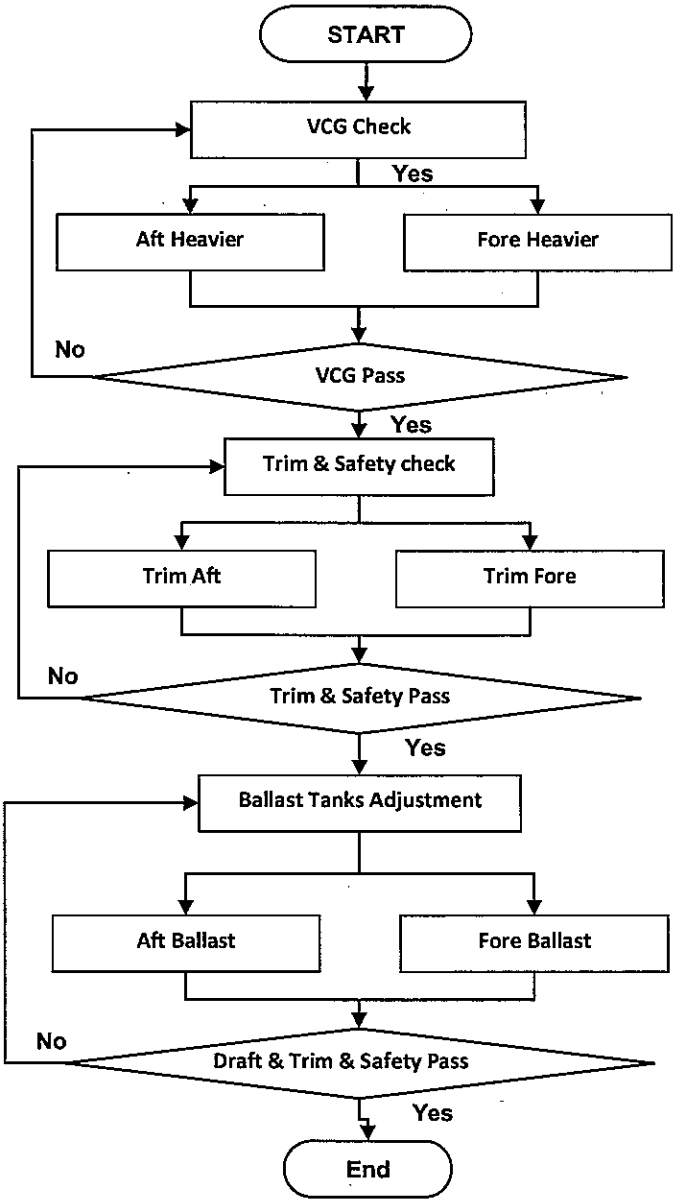
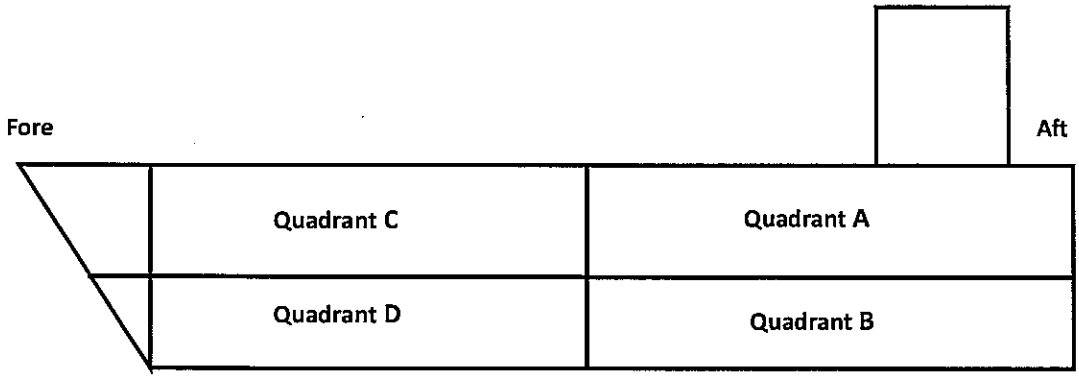

START
VCG Check
Yes
Aft Heavier
Fore Heavier
No
VCG Pass
Yes
Trim & Safety check
Trim Aft
Trim Fore
No
Trim & Safety Pass
Yes
Ballast Tanks Adjustment
Aft Ballast
Fore Ballast
No
Draft & Trim & Safety Pass
Yes
End

Figure 4

Figure 5



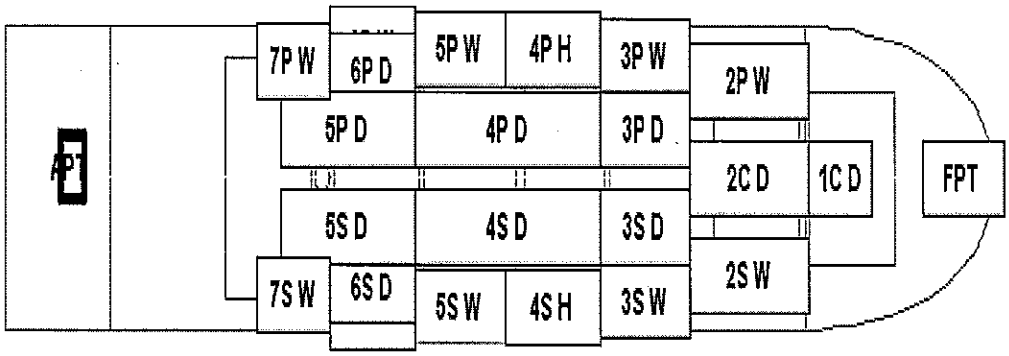

7P W
6P D
5P W
4P H
3P W
2P W
5P D
4P D
3P D
2C D
1C D
FPT
5S D
4S D
3S D
2S W
7S W
6S D
5S W
4S H
3S W

Figure 6

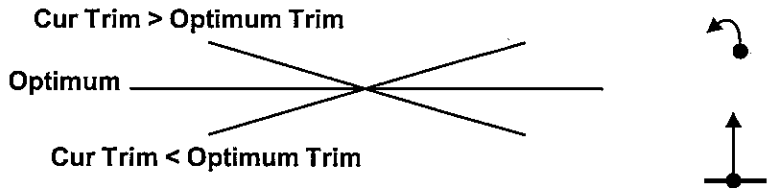


Figure 7a

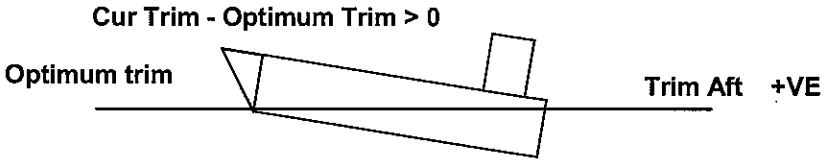


Figure 7b

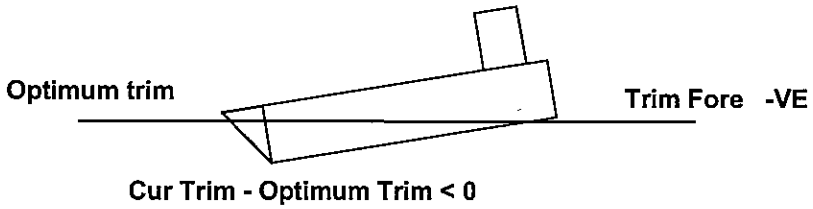


Figure 7c

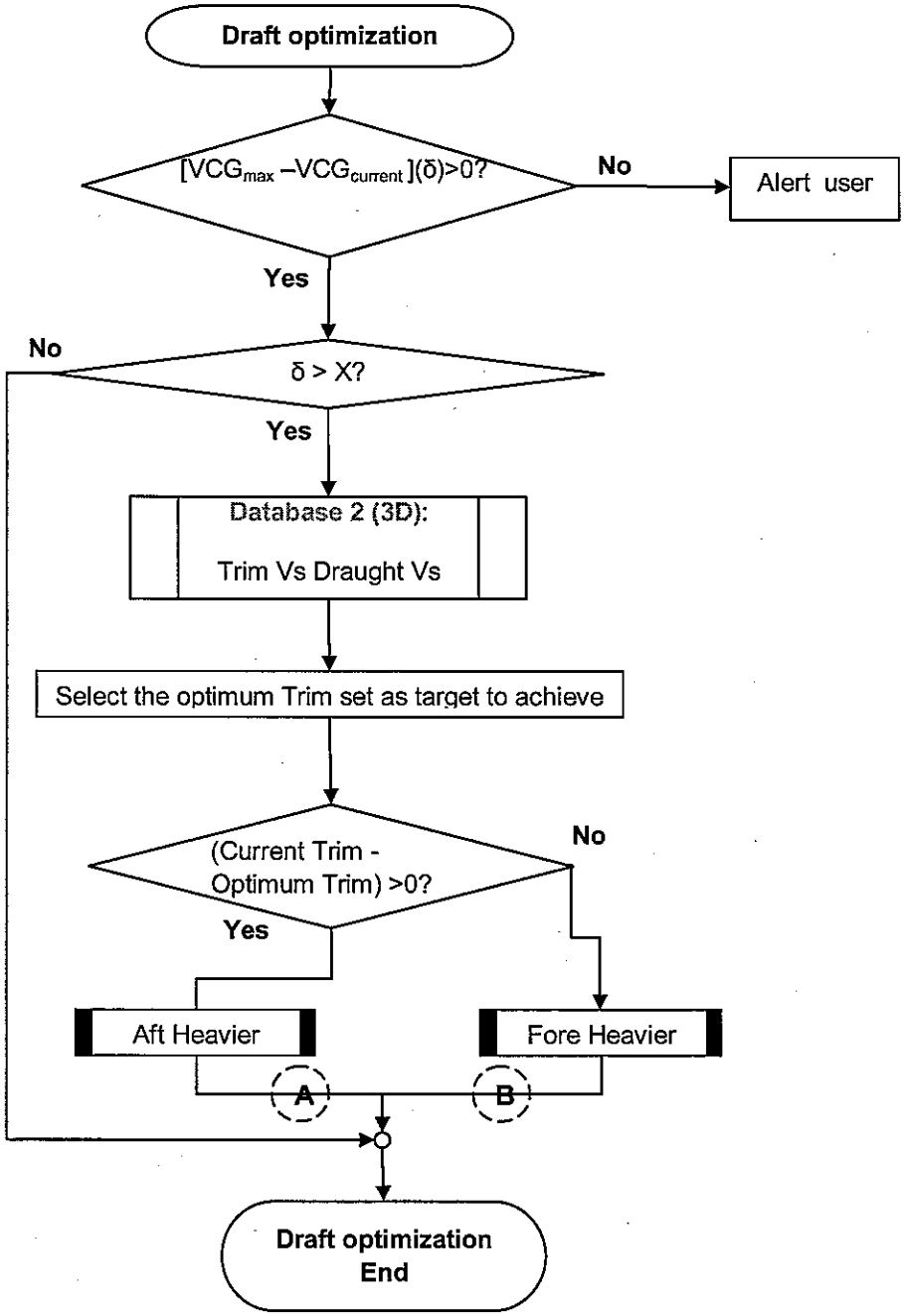

Draft optimization
[VCG$_{max}$ –VCG$_{current}$](δ)>0?
No
Alert user
Yes
No
δ > X?
Yes
Database 2 (3D):
Trim Vs Draught Vs
Select the optimum Trim set as target to achieve
(Current Trim -
Optimum Trim) >0?
No
Yes
Aft Heavier
Fore Heavier
A
B
Draft optimization
End

Figure 8

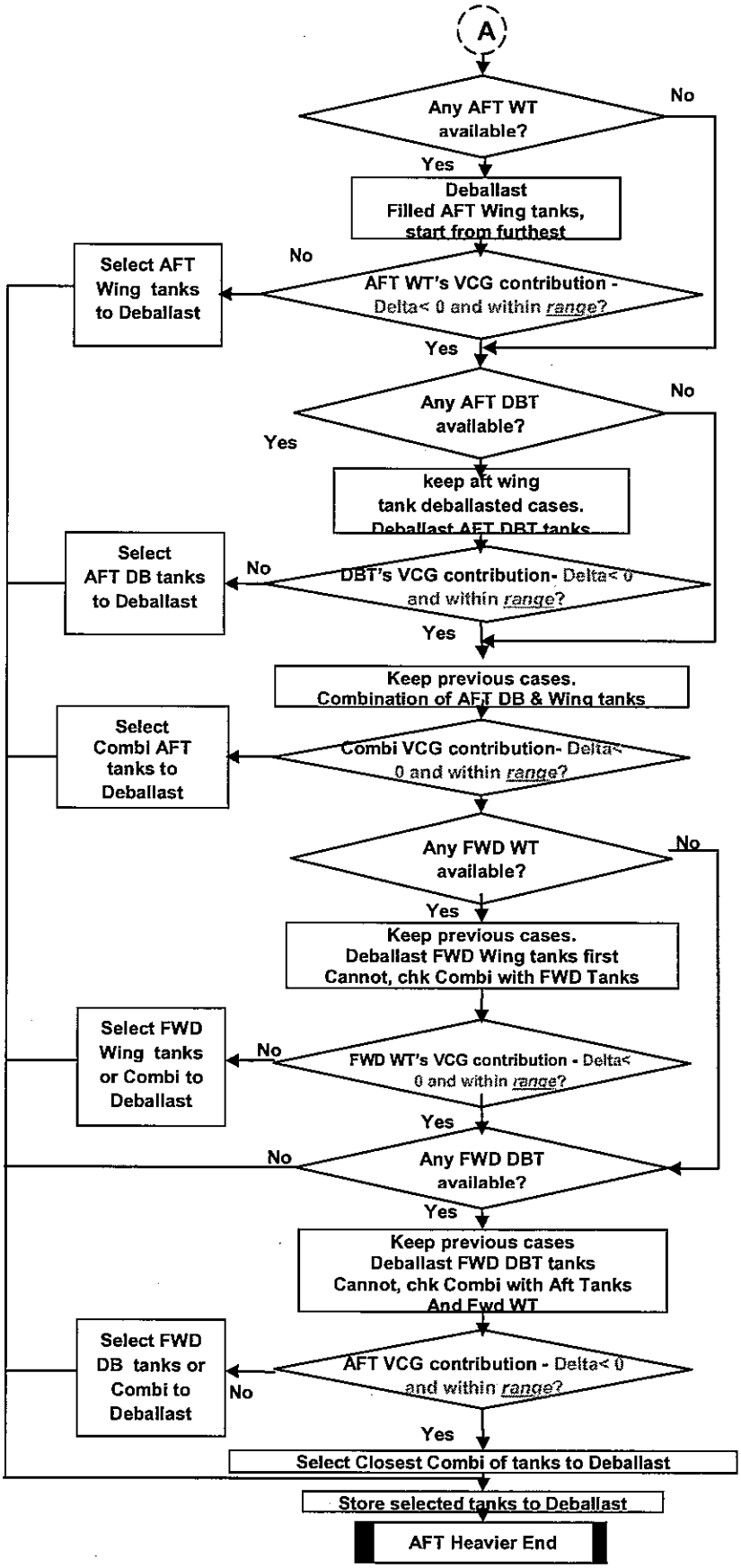

A
Any AFT WT available?
No
Yes
Deballast Filled AFT Wing tanks, start from furthest
Select AFT Wing tanks to Deballast
No
AFT WT's VCG contribution - Delta< 0 and within range?
Yes
Any AFT DBT available?
No
Yes
keep aft wing tank deballasted cases. Deballast AFT DBT tanks
Select AFT DB tanks to Deballast
No
DBT's VCG contribution- Delta< 0 and within range?
Yes
Keep previous cases. Combination of AFT DB & Wing tanks
Select Combi AFT tanks to Deballast
Combi VCG contribution- Delta< 0 and within range?
Any FWD WT available?
No
Yes
Keep previous cases. Deballast FWD Wing tanks first Cannot, chk Combi with FWD Tanks
Select FWD Wing tanks or Combi to Deballast
No
FWD WT's VCG contribution - Delta< 0 and within range?
Yes
No
Any FWD DBT available?
Yes
Keep previous cases Deballast FWD DBT tanks Cannot, chk Combi with Aft Tanks And Fwd WT
Select FWD DB tanks or Combi to Deballast
AFT VCG contribution - Delta< 0 and within range?
No
Yes
Select Closest Combi of tanks to Deballast
Store selected tanks to Deballast
AFT Heavier End

Figure 9

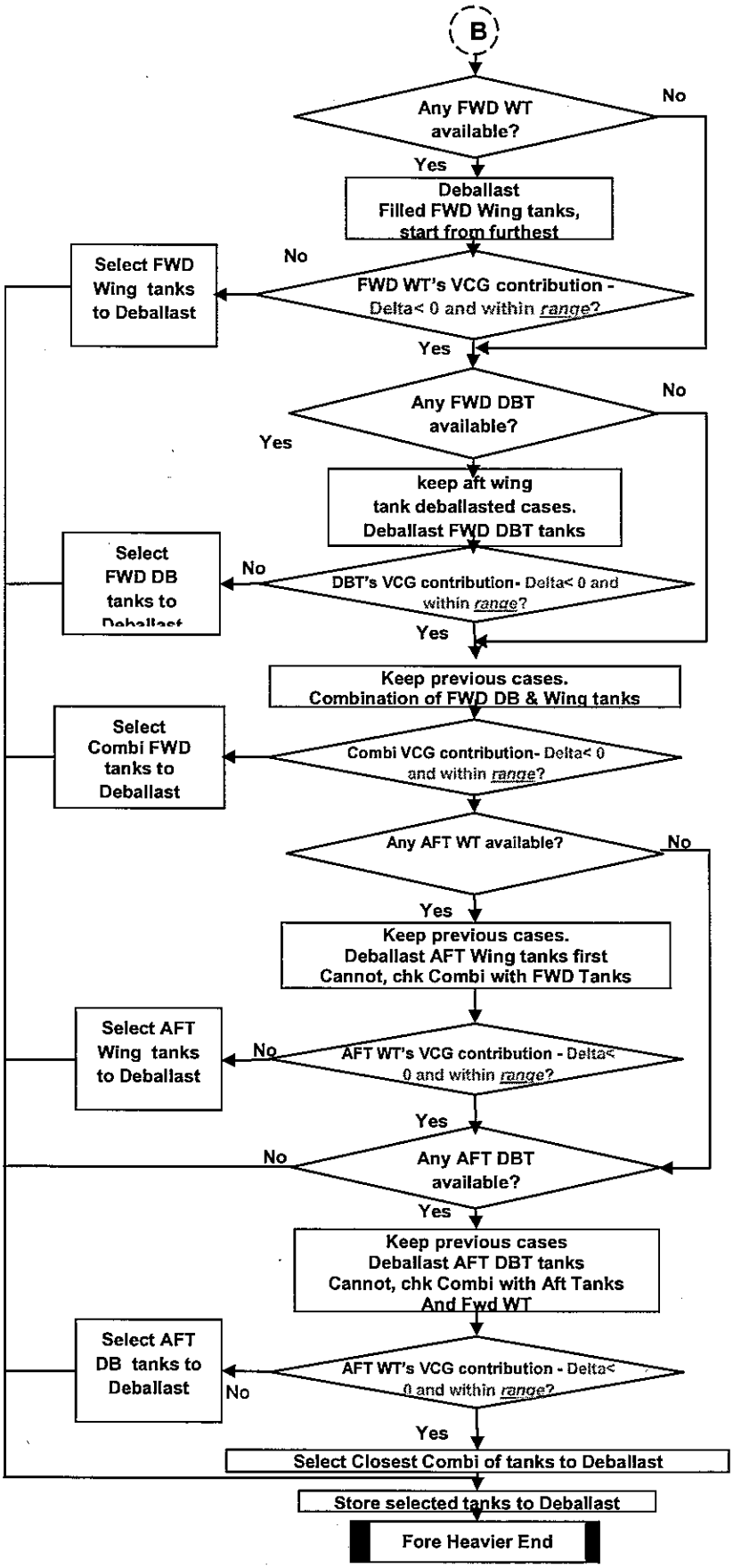

B
Any FWD WT available?
No
Yes
Deballast Filled FWD Wing tanks, start from furthest
Select FWD Wing tanks to Deballast
No
FWD WT's VCG contribution - Delta< 0 and within range?
Yes
Any FWD DBT available?
No
Yes
keep aft wing tank deballasted cases. Deballast FWD DBT tanks
Select FWD DB tanks to Deballast
No
DBT's VCG contribution- Delta< 0 and within range?
Yes
Keep previous cases. Combination of FWD DB & Wing tanks
Select Combi FWD tanks to Deballast
Combi VCG contribution- Delta< 0 and within range?
Any AFT WT available?
No
Yes
Keep previous cases. Deballast AFT Wing tanks first Cannot, chk Combi with FWD Tanks
Select AFT Wing tanks to Deballast
No
AFT WT's VCG contribution - Delta< 0 and within range?
Yes
No
Any AFT DBT available?
Yes
Keep previous cases Deballast AFT DBT tanks Cannot, chk Combi with Aft Tanks And Fwd WT
Select AFT DB tanks to Deballast
AFT WT's VCG contribution - Delta< 0 and within range?
No
Yes
Select Closest Combi of tanks to Deballast
Store selected tanks to Deballast
Fore Heavier End

Figure 10

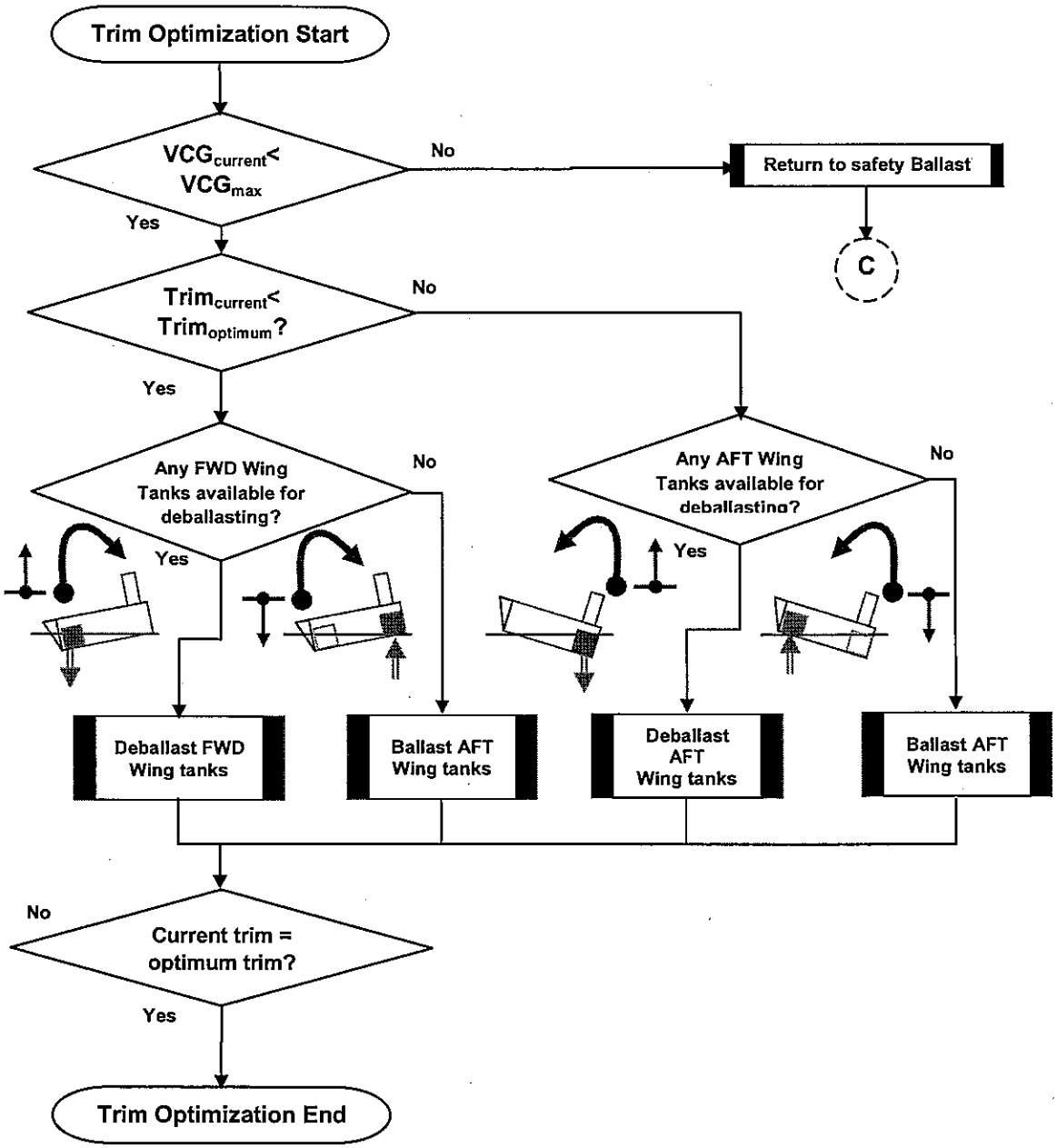

Trim Optimization Start
VCG$_{current}$< VCG$_{max}$
No
Return to safety Ballast
Yes
C
Trim$_{current}$< Trim$_{optimum}$?
No
Yes
Any FWD Wing Tanks available for deballasting?
No
Yes
Any AFT Wing Tanks available for deballasting?
No
Yes
Deballast FWD Wing tanks
Ballast AFT Wing tanks
Deballast AFT Wing tanks
Ballast AFT Wing tanks
No
Current trim = optimum trim?
Yes
Trim Optimization End

Figure 11

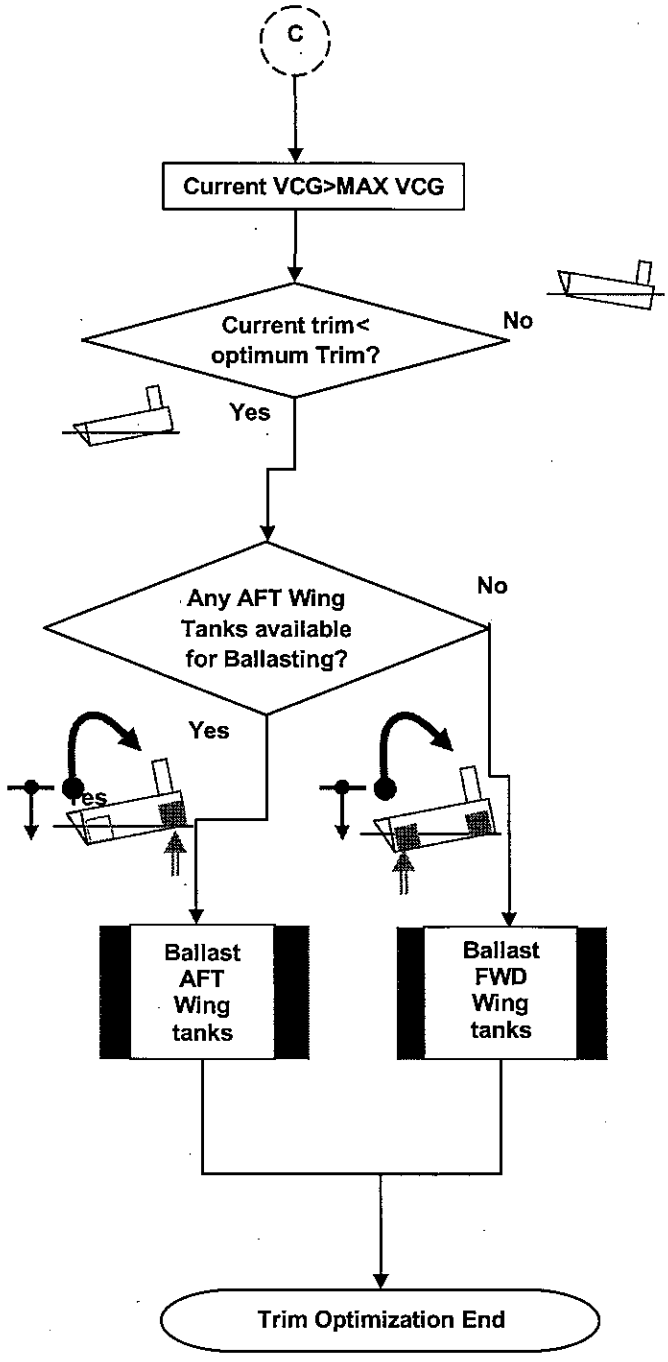

C
Current VCG>MAX VCG
Current trim< optimum Trim?
No
Yes
Any AFT Wing Tanks available for Ballasting?
No
Yes
Yes
Ballast AFT Wing tanks
Ballast FWD Wing tanks
Trim Optimization End

Figure 12