From: [redacted]
To: [redacted]
Subject: Re: M.V. CONTI PERIDOT Document Request from NTSB Engineering
Date: Tuesday, July 07, 2015 2:20:54 AM
Attachments: 2.10 Trim and stability calculation.pdf
2.8 desighn criteria and loading instruction.pdf
2.9 Displacement Calculation from Draught Reading.pdf
Principal Dimensions.pdf

Dear Sir's

Good Day

Please find attached required sections from the final loading manual.

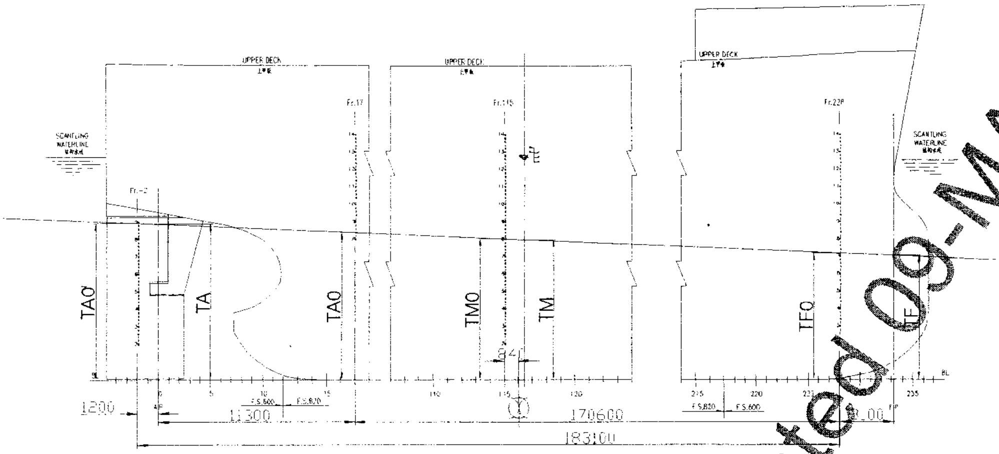
Brgds,
Master/Conti Peridot

-- Original message --
From: Wisniewski Luke [redacted] >
To: Henning Pulmer [redacted], CONTI Peridot [redacted]
Date: Mon, 6 Jul 2015 17:12:12 +0000
Subject: M.V. CONTI PERIDOT Document Request from NTSB Engineering
>Capt. Henning Pulmer, Master,
>
>Good day.
>
>In addition to the Loading Summary and Stability Report for the CONTI PERIDOT on
>the morning of 3/9/2015, respectfully request the following sections from the
>final loading manual onboard.
>1.2 Principal Dimensions
>2.8 Design criteria and loading instruction
>2.9 Displacement Calculation from Draught Reading
>2.10 Trim and Stability Calculation
>
>Thank you in advance for your assistance.
>
>Best Regards,
>
>Luke Wisniewski
>
>Marine Engineer
>Office of Marine Safety
>National Transportation Safety Board
>[redacted]
>
>From: Henning Pulmer [redacted]
>Sent: Friday, April 17, 2015 3:49 AM
>To: Wisniewski Luke
>Subject: AW: M.V. CONTI PERIDOT Document Request from NTSB Engineering
>

1.2 Principal Dimensions

Length overall .... 189.99 m
Length B.P. at Design Draft .... 185.00 m
Breadth moulded .... 32.26 m
Depth moulded .... 18.00 m
Designed draft moulded .... 11.30 m
Scantling draft moulded .... 12.80 m
Displacement at designed draft (even keel) .... 58897.9 t
Displacement at scantling draft (even keel) .... 67681.1 t
Deadweight at designed draft (even keel) .... 48217.9 t
Deadweight at scantling draft (even keel) .... 57001.1 t
Main Engine .... MAN-B&W 6S50MC-C 1 set
M.C.R .... 9480kW x 127r/min
C.S.R .... 8532kW x 122.6r/min
Service Speed (at designed draft) .... 14.20 Kn
Complement .... 27 Persons
Gross Tonnage 33036
Net Tonnage 19270
Light ship weight .... 10680.0 t
LCG .... 83.122 m from AP
TCG .... 0.000 m from CL
VCG .... 11.323 m above BL

2.9 Displacement Calculation from Draught Reading



(1). Read the draught at aft, midship and fore draught marks, then reduce the thickness of keel plate 0.018m, transfer to the draught moulded. (TA_0or TA_0', TM_0, TF_0)

(2). Calculate the draught at "AP" (TA), midship (TM) and "FP" (TF).

When $8.0m<TA_0<14.0m$ is read from the draught mark located at Fr17, then

$TA = TA_0 + 11.30\ (TA_0 - TF_0)\ /\ 170.60$

$TM = TM_0 - 0.84\ (TA_0 - TF_0)\ /\ 170.60$

$TF = TF_0 - 3.10\ (TA_0 - TF_0)\ /170.60$

When$5.0m<TA_0<9.0m$ is read from the draught mark located at Fr-2, then

$TA = TA_0'\text{-}1.2\ (TA_0' - TF_0)\ /\ 183.10$

$TM = TM_0 - 0.84\ (TA_0' - TF_0)\ /\ 183.10$

$TF = TF_0 - 3.10\ (TA_0' - TF_0)\ /183.10$

(3). Trim (tr), mean draught (TM) and deflection (δ d) are obtained as follows:

Trim	$= TF - TA$	in meter
Tm	$= (TA + TF)\ /\ 2$	in meter
δ d	$= TM - Tm$	in meter

Where:

Trim : (+) trim by the bow; (–) trim by the stern

δ_d : (+) sagging condition; (–) hogging condition

(4). Displacement ($Disp_1$), tons per cm immersion (TCP) and center of floating (LCA) corresponding to "Tm" are obtained from "3.2 Hydrostatic Data".

(5). Displacement correction due to trim and deflection:

a). Correction due to trim ($Disp_2$)

$Disp_2 = 100 \times TCP \times tr \times (LCA - Lpp/2)\ /\ Lpp$ in tons

b). Correction due to deflection ($Disp_3$)

$Disp_3 = 100 \times TCP \times (3/4) \times \delta\ d$ in tons

(6). Displacement correction due to specific gravity of seawater ($Disp_4$):

When the specific gravity (RHO) of seawater differs from standard of 1.025, displacement should also be corrected by following formula:

$Disp_4 = (\ Disp_1 + Disp_2 + Disp_3\ ) \times (\ RHO - 1.025\ )\ /\ 1.025$ in tons

(7). Final displacement (D) will be determined as follows.

$Disp = Disp_1 + Disp_2 + Disp_3 + Disp_4$ in tons

2.8 design criteria and loading instruction

The standard loading conditions described in this booklet are fully warranted for all of trim, longitudinal strength and stability. In case to make the loading conditions deviated from these standards conditions, the Master shall comply with the criteria of longitudinal strength and stability in any conditions, and following notices of 2.8.1-2.8.2

2.8.1 Instruction at loading condition

(1) Stability

It is necessary to comply with the requirement of stability criteria of IMO document about intact stability. To keep necessary righting lever and metacentric height, care should be taken on the following points.

a. Cargo weight distribution in vertical direction.

b. Filling up proper ballast water in tanks.

c. Minimizing free surface effect of ballast water and consumers.

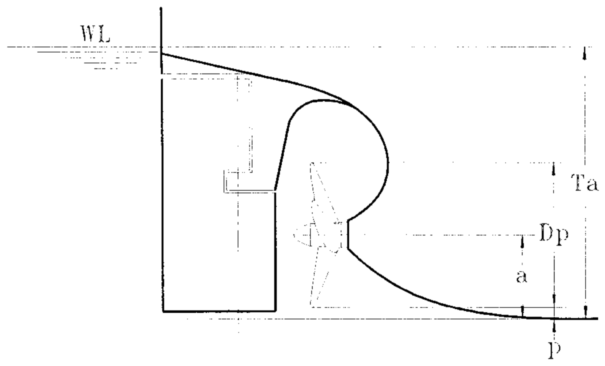
In any loading conditions, the GM value corrected for effect of free surface of liquids in tanks shall be above a GM limits curve obtained from the intact stability criteria. Besides intact stability, to keep the vessel at a satisfactory safety level in view of damage stability, the GM value shall also be above a GM limits curve obtained from the damage stability criteria. The GM limits curves are shown in '5.4 Stability Limits Curves'.

(2) Bridge visibility

The view to the sea surface from the conning positions in wheel house should not be protected more than by two ship lengths, forward of the bow to 10° on either side irrespective of the ship's draft, trim.

(3) Propeller immersion

To keep efficiency of propeller, draft aft should be deep enough to take sufficient propeller immersion of more than 100%. Propeller immersion ratio:



Propeller Immersion Ratio:

I/ Dp = (Ta-a) / Dp

Where:

Ta: Draft at A.P. (m)

a: Height of shaft above B.L. (m)

a = 3.30 m

Dp: Propeller Diameter (m)

Dp = 6.00 m

Dp may be changed according to final propeller design.

(4) Load on Inner Bottom (Max)

in No.1,3&5 Cargo Holds 25t/m2

in No.2&4 Cargo Holds 20t/m2

(5) Designed permissible bending moment and shear force at sea

Bending Moment

Fr NO	Sea Going		Flooding		Harbour	
	Hogging	Sagging	Hogging	Sagging	Hogging	Sagging
	tm	tm	tm	tm	tm	tm
35	69622.8	-14434.3	122200	-129700	103001.6	-49253.9
53	135000	-46890.9	170900	-152700	189268.1	-103501.5
71	172986.7	-81549.4	219700	-233300	248144	-159951
90	181447.5	-101936.8	230377.2	-244648.3	284775.5	-203339.9
109	181447.5	-124362.9	230377.2	-244648.3	284775.5	-232151.2
127	181447.5	-124362.9	230377.2	-244648.3	284775.5	-232151.2
145	181447.5	-124362.9	230377.2	-244648.3	284775.5	-232151.2
164	174006.1	-118960.2	221400	-235100	259989.1	-208654.8
183	132996.9	-91396.5	169900	-180400	193780.2	-154803.7
200	97094.8	-66391.4	123800	-131500	135331	-106278.2
217	9031.6	-11366	14261	-16819.6	24720.7	-27732.3

Shear Force

Fr NO	Sea Going		Flooding		Harbour	
	Positive	Negative	Positive	Negative	Positive	Negative
	t	t	t	t	t	t
35	4526.0	-4464.8	4831.9	-4783.9	5443.6	-5422.1
53	—	—	—	—	—	—
71	8020	-7479.9	9459.9	-7959.9	9440.4	-8961.7
90	—	—	—	—	—	—
109	6510	-7290	6879.9	-7979.9	7637.4	-8417.4
127	—	—	—	—	—	—
145	5657.5	-5657.5	7320	-6059.9	6898	-6882.4
164	—	—	—	—	—	—
183	7989.9	-7449.9	8520	-10655.1	9600.5	-8993.9
200	—	—	—	—	—	—
217	3761.5	-3792.0	3951.8	-3974.5	4332.3	-4339.3

In the flooding condition,"*"means that the permeability of volum left in loaded cargo spaceabove any cargo is 0.95,other is 0.3.

(6) Cargo mass load curves will be provided in final loading manual.

2.8.2 Minimum draught forward

The scantling is approved for operation in heavy weather with a draught at the F.P. of not less than 4.50 meters. If, in the opinion of the master, sea conditions are likely to cause regular slamming, then other appropriate measures such as a change in speed, heading or an increase in the draught forward may also need to be taken.

2.8.3 Instruction of Shear Force Corrcetion

The shear force correction ΔQ_C is to be taken into account, in accordance with 2.8.3.1. The shear force correction need not to be considered at the fore end of foremost hold and aft end of aftermost hold.

As an alternative to this procedure, the shear stresses induced by the vertical shear forces Q_{SW} and Q_{WV} in intact condition and, for **BC-A** and **BC-B** ships by the vertical shear forces $Q_{SW,F}$ and $Q_{WV,F}$ in flooded condition may be obtained through the simplified procedure in 2.8.3.1 and 2.8.3.2 respectively.

2.8.3.1 Simplified calculation of shear stresses induced by vertical shear forces

The shear stresses induced by the vertical shear forces in the calculation point are obtained, in N/mm^2, from the following formula:

$$\tau_1 = \left(Q_{SW} + Q_{WV} - \varepsilon \Delta Q_C\right) \frac{\overline{S}}{I_Y t} \delta$$

where:

t : Minimum net thickness, in mm, of side and inner side plating, as applicable according to Tab 1

δ : Shear distribution coefficient defined in Tab 1

$\varepsilon = \mathrm{sgn}(Q_{SW})$

ΔQ_C : Shear force correction (see Fig 2), which takes into account, when applicable, the portion of loads transmitted by the double bottom girders to the transverse bulkheads:

- for ships with any non-homogeneous loading conditions, such as alternate hold loading conditions and heavy ballast conditions carrying ballast in hold(s):

  $$\Delta Q_C = \alpha \left| \frac{M}{B_H \ell_H} - \rho T_{LC} \right|$$

- for other ships:

  $\Delta Q_C = 0$

$\varphi = 1.38 + 1.55 \frac{\ell_0}{b_0}$, to be taken not greater than 3.7

$$\alpha = g \frac{\ell_0 b_0}{2 + \varphi \frac{\ell_0}{b_0}}$$

ℓ_0, b_0 : Length and breadth, respectively, in m, of the flat portion of the double bottom in way of the hold considered; b_0 is to be measured on the hull transverse section at the middle of the hold

ℓ_H : Length, in m, of the hold considered, measured between the middle of the transverse corrugated bulkheads depth

B_H : Ship's breadth, in m, measured at the level of inner bottom on the hull transverse section at the middle of the hold considered

M : Total mass of cargo, in t, in the hold of the section considered

T_{LC} : Draught, in m, measured vertically on the hull transverse section at the middle of the hold considered, from the moulded baseline to the waterline in the loading condition considered.

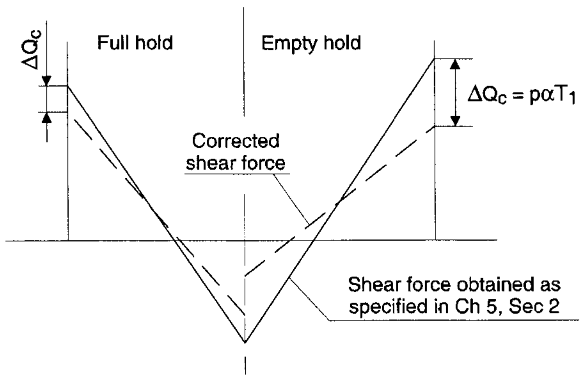


Figure 2: Shear force correction ΔQ_C

Table 1: Shear stresses induced by vertical shear forces

Ship typology	Location	t, in mm	δ
Single side ship	Sides	t_S	0,5
Double side ship	Sides	t_S	$0.5(1-\phi)$
	Inner sides	t_{IS}	0.5ϕ

where:

t_S, t_{IS} : Minimum net thicknesses, in mm, of side and inner side, respectively

t_{SM}, t_{ISM} : Mean net thicknesses, in mm, over all the strakes of side and inner side , respectively. They are calculated as $\Sigma(\ell_i\, t_i) / \Sigma\ell_i$, where ℓ_i and t_i are the length, in m, and the net thickness, in mm, of the i[th] strake of side and inner side.

ϕ : Coefficient taken equal to: $\phi = 0.275 + 0.25\dfrac{t_{ISM}}{t_{SM}}$

2.8.3.2 Shear stresses in flooded conditions of BC-A or BC-B ships

This requirement applies to **BC-A** or **BC-B** ships, in addition to 2.8.3.1 and 2.8.3.2.

The shear stresses, in the flooded conditions specified in Ch 4, Sec 3, are to be obtained at any point, in N/mm^2, from the following formula:

$$\tau_1 = \left(Q_{SW,F} + Q_{WV,F} - \varepsilon \Delta Q_C\right)\frac{S}{I_Y t}\delta$$

$$\varepsilon = \mathrm{sgn}\,(Q_{SW,F})$$

ΔQ_C : Shear force correction, to be calculated according to 2.8.3.2, where the mass M is to include the mass of the ingressed water in the hold considered and the draught T_{LC} is to be measured up to the equilibrium waterline

t : Net thickness, in mm, of the side plating.