TRIAL REPORT FOR "CONTI PERIDOT"
57,000 DWT BULK CARRIERS

Testing : [redacted]

Analyzing : [redacted]

Auditing : [redacted]

FOR: **Taizhou Sanfu Ship Engineering Co.,LTD**

Taizhou, Jiangsu, P. R. Chine,

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CONTENT

1. Introduction

"CONTI PERIDOT" is a 57,000 DWT bulk carrier built in Taizhou Ssnfu Ship Engineering Co.,LTD.

Entrusted by Taizhou Ssnfu Ship Engineering Co.,LTD, WUHAN UNIVERSITY OF TECHNOLOGY carried out the sea trial on the maritime area of the East China Sea during December 14-18, 2010.

The test includes the measuring of ship speed, propeller shaft power, maneuverability, noise of compartment, local hull vibration, torsional vibration.

2. Principal dimensions of the ship

Length O.A.	:	189.99 M
Length B.P.	:	185.00 M
Breadth mld.	:	32.26 M
Depth mld.	:	18.00 M
Design Draft.	:	11.30 M

3. Parameters of main engine

Type	:	STX MAN 6S50MC-C7
MCR	:	9480 kW × 127 r/min

4. Parameters of propeller

Type	:	FIXED PITCH PROPELLER
Diameter	:	6000 mm
Number of blades	:	4
Rotation direction	:	Right-handed

5. Measuring instrument system

5.1 Trial speed and maneuvering measurement

DGPS (type: DG16) 1 set

France Sercel Co. Ltd

5.2 Propeller shaft power measurement

Torque Trak 10000 Digital Telemetry System 1 set

U.S.A.

Measuring shaft external diameter:	420 mm

5.3 Torsional vibration measurement

ZDCL-IV Torsional vibration meter	1 set
CCS	

5.4 Compartment noisemeasurement

Sound level meter HS 5633B	1 set
China	

5.5 Local hull vibration measurement

TV300 vibration analyzer	1 set
China	

6. Trial condition

6.1 Environment condition

Sea area	The East China Sea
Sea condition	State 4-5
Temperature of sea water	8℃
Density of sea water	1.025 t/m^3
Depth of the sea	About 50 m

6.2 Trial condition

Draught (forward)	5.00m
Draught (amidships)	5.80 m
Draught (aft.)	6.40 m

7. Ship speed and propeller shaft power test

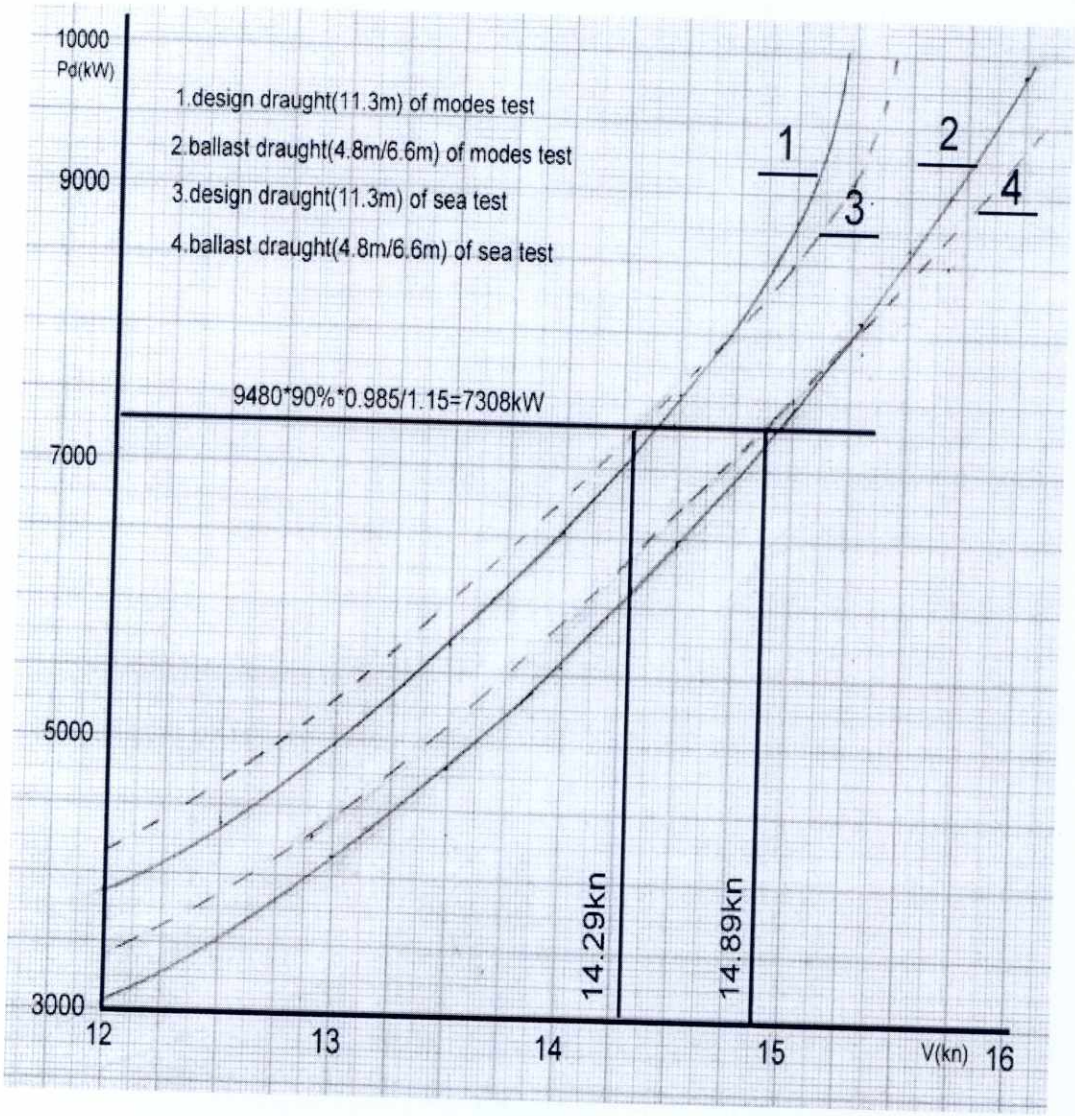
Speed measurement with DGPS (type: DG16) made by Sercel Co. of France. The maximum measurement error of the instrument's dynamic location is less than 5 m. According to the scheme of sea trial, the ship speeds were measured under four conditions (i.e. 50%MCR, 75%MCR, 90%MCR and 100%MCR) at design draught. Propeller shaft power measurements were conducted simultaneously with speed measuring. The results are shown in Table 1.

Table 1: Speed and propeller shaft power test

load (MCR)	Test Code	Heading (°)	Wind		Depth (m)	RPM (r/min)	Power (kW)	Speed (kn)
			Direction(°)	Speed(m/s)				
50%	SP07	0	340	16	47	101	4318	12.27
	SP08	180	290	10	48	101	4321	13.53
	Mean	-	-	-	-	**101**	**4319**	**12.90**
75%	SP09	180	270	10	50	117	6824	15.24
	SP10	0	340	17	50	117	6853	13.78
	Mean	-	-	-	-	**117**	**6838**	**14.51**
85%	SP11	0	340	17	49	124	8129	14.74
	SP12	180	270	10	47	124	8091	15.81
	Mean	-	-	-	-	**124**	**8110**	**15.28**
100%	SP13	180	270	10	49	127	8511	16.14
	SP14	0	340	17	52	127	8503	15.24
	Mean	-	-	-	-	**127**	**8507**	**15.69**

The details of speed trial measurement can be seen Appendix.

P-V Curves


10000
Pd(kW)
9000
7000
5000
3000
1.design draught(11.3m) of modes test
2.ballast draught(4.8m/6.6m) of modes test
3.design draught(11.3m) of sea test
4.ballast draught(4.8m/6.6m) of sea test
1
2
3
4
9480*90%*0.985/1.15=7308kW
14.29kn
14.89kn
12
13
14
15
V(kn)
16

8. Ship maneuvering test

8.1 Turning circle test

The turning circle tests were conducted at both full speed (90% MCR). Each turning circle was measured for port and starboard rudder with the angle of 35°. The trace and speed of ship were measured with DGPS, and the results are shown in Table 2.

Table 2: Turning circle test

Test condition	Full speed	
Rudder angle	Hard port	Hard stbd.
Test code	T03	T04
Initial heading (°)	180	180
Initial speed (kn)	15.29	15.18
Time required when turn 90° (s)	92	94
Time required when turn 180° (s)	185	189
Time required when turn 270° (s)	294	289
Time required when turn 360° (s)	394	393
Time required when turn 450° (s)	497	504
Time required when turn 540° (s)	606	613
Advance (m)	617	619
Transfer (m)	158	104
Tactical diameter (m)	598	578
Diameter of turning circle (m)	511	561

Note: 1. the details report of turning circle test can be seen Appendix.

2. According the IMO 751, the advance should not exceed 4.5 ship lengths(L) and the tactical diameter should not exceed 5 ship lengths. **(Loa=190m)**

3. So, from the test result, the turning ability of the ship is considered satisfactory.

8.2 Zig-zag maneuvering test

The Zigzag maneuvering test was conducted at full speed (90%MCR). Portside rudder 10°was taken (first operation) when the ship ran steadily at zero yawing rate. When the ship's heading changed to left 10°relative to initial heading. Starboard rudder10°was taken (second operation). The ship continuously turned to the left at decreasing turning speed, then the ship heading changed to the right in response to the rudder, took portside 10°(third operation) while the ship heading changed to right 10°relative to initial heading. The trace and speed of ship were measured with DGPS, and the results are shown in Table 3.

Table 3: Zigzag maneuvering test

Test condition	Full speed	
Rudder angle	rudder 10°	
Test code	Z01	Z02
Initial heading (°)	180	180
Initial speed (kn)	15.99	16.54
First overshoot angle (°)	3	5
Second overshoot angle (°)	7	5
Required time (s)	351	381
Total distance (m)	2859	3130

Note: 1. the details report of Zigzag maneuvering test can be seen Appendix.

2. So, from the test L/V=22.32seconds **(V=8.51m/s, L=190m)**

3. According to the IMO 751. The 1st overshot angle should not exceed: 16.18° and the 2nd overshot angle should not exceed the above criterion values for the 1st overshot by more than 15°, that means 2nd overshot angle criterion values =31.18°

8.3 Stop inertia & Crash stop astern test

Stop inertial: When the vessel runs straight ahead at service speed (90%MCR), along straight line and speed of vessel is stable for 2-3 minutes, the test is start, once a "M/E STOP" order is issued the bridge telegraph handle is to be moved to "STOP" position right away, then relevant data are to be measured and recorded successively until the vessel is slowed down to about 4 knots in speed, test is finished. During test hold rudder stable (0 degree).

Crash stop astern: When the vessel runs straight ahead at service speed (90%MCR) , along straight line and speed of vessel is stable for 2-3 minutes, the test is start, once a "FULL ASTERN" order is issued in bridge, the telegraph handle is to be moved to FULL ASTERN at once, when speed of vessel slow down to about 0 knot, the test is finished. During test hold rudder stable (0 degree).

The trace and speed of ship were measured with DGPS, and the results are shown in Table 4.

Table 4: Stop inertia & Crash stop astern test

Test condition	Full speed → Stop	Full speed →Full astern
Test code	G01	J01
Initial heading Initial (°)	0	0
Initial speed (kn)	14.11	13.93
End heading (°)	316	310
End speed (kn)	4.95	0.88
Time length (s)	302	411
Track reach (m)	1390	1575
Lateral deviation (m)	146	203
Head reach (m)	1359	1532

Note: 1. the details report of Stop inertia & Crash stop astern test can be seen Appendix.

2. According to the IMO 751, the track reach in the full astern stopping test should not exceed 15 ship lengths. **(Loa=190m)**

3. So, from the test result, the Stopping ability of the ship is considered satisfactory.

8.4 Course stability of route test

Kept the rudder angle unchanged: The test was carried out at full speed (90% MCR) ahead, then kept the rudder angle unchanged for 3 minutes.

Kept the course unchanged: The test was carried out at full speed (90% MCR) ahead, then kept the course unchanged for 3 minutes.

The tests with two opposite courses were conducted. The trace and speed of ship were measured with DGPS, and the results are shown in Table 5.

Table5: Results of dynamic stability of route test

State	Kept the rudder angle unchanged		Kept the heading angle unchanged	
Test code	CK01	CK02	DH01	DH02
Initial heading (°)	350	180	350	180
Initial speed (kn)	14.66	15.89	14.84	15.54
End heading (°)	341	169	350	180
Time length (s)	180	180	180	180
Track reach (m)	1369	1458	1382	1456
Lateral deviation (m)	43	73	10	18
Head reach (m)	1362	1450	1378	1451
Max rudder (^{0})	---	---	5	3
Steering num	---	---	1	1

Note: The details report of Results of dynamic stability of route test can be seen Appendix.

8.5 Williamson test

The test was carried out at trial condition when the engine load was 90% MCR.

a) When the main engine runs ahead, keeping the rudder angle indicator at "0" position and with stable speed, throwing out a buoyage from the middle of vessel at starboard side.

b) Give an order "hard starboard rudder angle 35 degrees" rapidly, until the heading angle reaches 60 degrees to 90 degrees, give an order "hard port rudder angle 35 degrees" rapidly.

c) When the heading angle closes to opposite with the original course (normally 60 degrees advance) back to "0" position.

d) When the heading angle reverses to the original course, keep the rudder angle indicator at "0" position and slow down.

e) When the vessel closes to the buoyage, stop M/E until the speed log indication becomes "zero" speed, then end the test.

The trace and speed of ship were measured with DGPS, and the results are shown in Table 6.

Table6: Williamson test

Test code	W01	W02
Initial speed (kn)	17.21	16.58
Initial heading (^{0})	180	180
Test time (s)	672	678
End heading (^{0})	0	0
Track reach (m)	3859	3760
Head reach (m)	1635	1468
Lateral deviation	31	69

Note: The details report of Williamson test can be seen Appendix