出國報告（出國類別：洽公)

5,000 噸級油品化學品輪(平運輪)建造採購案(A2910T001)，船廠進度追蹤及品質查核

服務機關：台灣中油股份有限公司
姓名職稱：黃戊辰 組長
派赴國家：新加坡
出國期間：112 年 9 月 5 日至 8 日
報告日期：112 年 9 月 25 日

摘要

本公司新建環(離)島小油輪 5,000 噸級油品化學品輪平運輪(Hull No.1266) 平運輪自 111 年 9 月 30 日安放龍骨迄今，依照目前之整體建造進度雖已達 70.89%，ASL 船廠也確實趕工建造，但進度仍持續微幅落後 0.41%。

依據 112 年 8 月份之監工月報，本案目前正在進行壓艙水水艙之油漆噴砂塗裝階段，且主要結構均已完成只剩下部分住艙及船艏甲板，基於結構及油漆噴塗關係本輪未來之使用年限至關重要，經處務會議討論決議，有必要派員前往與船廠專案經理及船舶中心之技術服務團隊進行面對面之品質會議以及現場施工品質查核，以確保能如期如質交船。

此次出國主要任務除了現場了解監督建造案進行，協調施工船廠及監工技術服務單位之進度及品質控管，對於塗裝品質之管控及要求，進行實地查核、同時了解下水前之工作安排是否已確實完成規劃及按照進度進行，避免因趕工而忽略了工作之品質。

次要任務為協助釐清本輪使用潤滑油事業部之油品品名、數量及滑油交貨時程之確認，並建立船廠及事業部之聯絡窗口及管道，以確保可以配合裝備安裝時程，如期將油品交付船廠。

經三天的現場實地查核結果，本處依據現場之施工情形提出相關之意見供船廠及現場監工團隊參考及密切控管，另外品質會議針對三方之工作進度進行溝通及協調，並確立相關之報告問題釐清，做成紀錄藉以作為後續追蹤之依據。

本次訪查自 112 年 9 月 5 至 112 年 9 月 8 日止，共計 4 天，含交通往返。

目次

5,000 噸級油品化學品輪(平運輪)建造採購案(A2910T001)，船廠進度追蹤及品質查核

一 目的

本公司新建環(離)島小油輪 5,000 噸級油品化學品輪平運輪(Hull No.1266) 平運輪自 111 年 9 月 30 日安放龍骨迄今，依照目前之整體建造進度雖已達 70.89%，ASL 船廠也確實趕工建造，但進度仍持續微幅落後 0.41%。

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二 過程

(一) 出國行程

日期	行程
112 年 09 月 05 日	啟程，搭機前往新加坡
112 年 09 月 05 日	1430 抵達 ASL 船廠，與專案人員了解大致之建造情形
112 年 09 月 06 日	至 ASL 船廠，現場了解施工情形及船段現況
112 年 09 月 07 日	至新加坡 ASL 船廠，至現場了解施工情形及船段現況
112 年 09 月 08 日	先至船廠召開品質管控會議後直接前往機場，搭機返回台灣。

(二) 參加人員

1. 廠商(ASL 公司)代表:
   洪國良(Executive Director),
   Steve Ho (Technical Manager)

Nicholas Chia (Shipyard Manager)
Muthupandian Suthan (Project Manager)

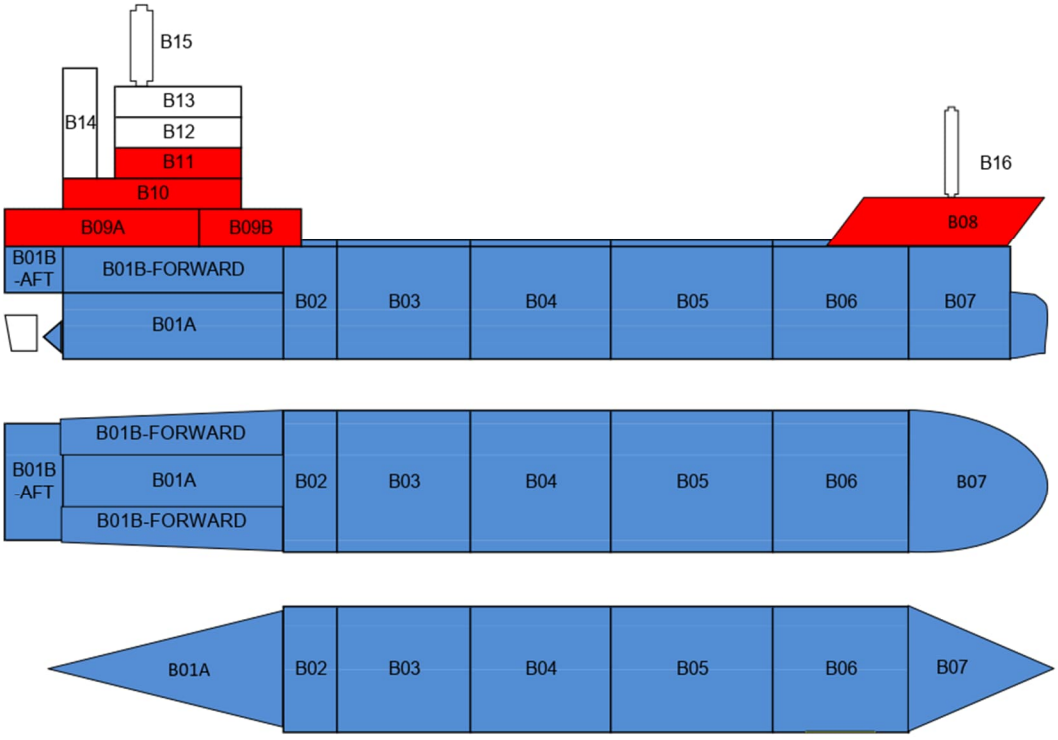
2. 船東：造船組黃戊辰組長

3. 中油委託技術服務廠商：財團法人船舶暨海洋產業研發中心
船舶產業處監造經理: 徐宗超經理

4. 永記油漆: 田竹華顧問，李俊興工程師

(三) ASL 船廠品質查核

本公司新建環(離)島小油輪 5,000 DWT 油品化學品輪平運輪(Hull No.1266) 平運輪係由新加坡 ASL Marine Holding Ltd 取得合約建造，目前船段於印尼 ASL 巴淡廠製作的部分已全部完成，最終將在新加坡 ASL 船廠做組裝，至 8 月底前組裝工作已大致剩下住艙及船艏甲板桅桿部分未完成。



H1266 Block Construction Board

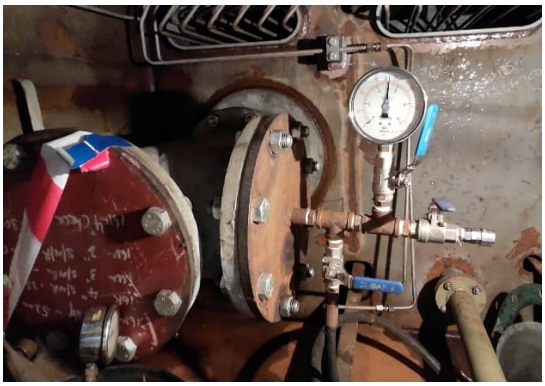
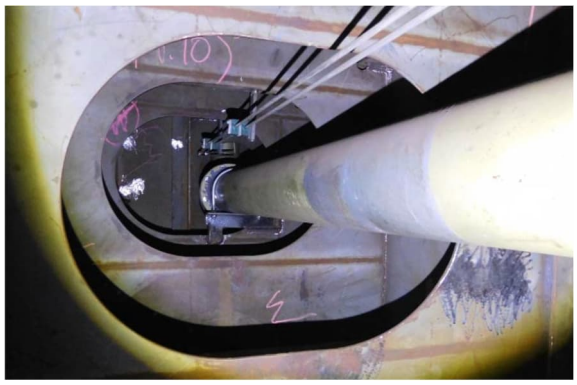
本次拜訪之重點在於了解壓水艙噴塗之施工品質，於抵達新加坡後直接至 ASL 船廠，先行了解工作安排及與船廠專案經理，船舶中心監工、永記油漆技術服務工程師、顧問進行初步之意見交換與工作狀況的掌握。

將 9 月 6 日及 7 日 2 天的主要工作重點放在配合壓水艙噴塗作業之現場查核檢查，以期能協助現場工作能更為順利進行。

1. 壓艙水管路測試

壓艙水管路壓力測試5 Bar，位於No.01(PS), 02(PS), 03(PS), 04(PS), 05(PS), Void Pump Trunk(PS) & Forepeak Tank，經確認壓力無變化，該測試點壓力表位於PUMP ROOM，有發現PUMP ROOM相當擁擠，管線排列密集，導致

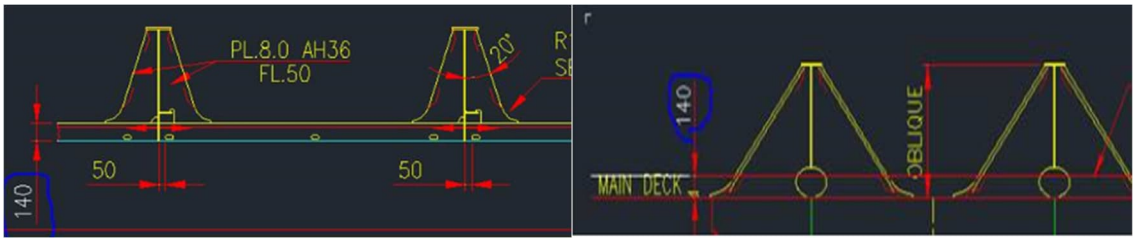
壓艙水泵之底座無法安裝，需要更改管線之佈置，該空間未來之保養空間會有不足之疑慮。

壓艙水管路試壓

2．甲板噴砂油漆

依據規範要求高度為 100 毫米需要塗第一道富鋅底漆，於 3 月份 ASL 訪查後經船廠同意覆蓋設計高度為 140 毫米的高度將 Deck Long. 完全包覆之方式施工噴塗，並應保持與“T”型結構及其他甲板配件項目標準相同的從主甲板 140 毫米高度噴 ZINC RICH PRIMER。



船廠同意主甲板施工噴塗範圍ZINC RICH PRIMER

船廠依據上述之要求進行主甲板噴砂及油富鋅底漆，但由於甲板仍有相當多的工作尚未完成，原本建議船廠應等甲板告一段落之後再進行甲板之噴塗作業，以避免後續之工作將甲板完成噴塗之位置破壞油漆，而導致重複工作之困擾，但船廠以下水後不宜於碼頭進行噴塗作業，故才計畫於現階段進行。

甲板噴砂作業建議應包含 CARGO TANK MANHOLE COVER，船廠應考量施工之順序及方式，避免使用人力已 POWER TOOLING 之方式進行，這部分需由現場監造人員依實際狀況與船廠持續溝通。


甲板噴砂檢查及清潔

在甲板檢查過程中，發現船廠再噴漆時，艙蓋之手把處，噴漆之人員未能將手把背面一起油漆以及甲板管路油漆被局部破壞之情形，將造成翻工之問題，應多加

注意。

甲板艙口蓋把手之油漆瑕疵

管路油漆局部破壞

由於上述之狀況，因而建議船廠將甲板之 OUTFITTING 集中後，進行噴砂再噴富鋅底漆，以節省施工時間及確保施工品質。

甲板OUTFITTING

3. 壓水艙噴塗檢查

9 月 6 日下午配合船廠之計畫檢查 Final Painting Inspection of Water Ballast Tank No.5P 及 1st Blasting Inspection of Water Ballast Tank No.3S。

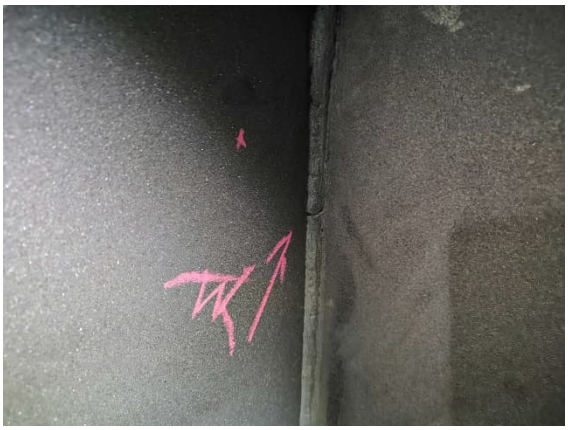
檢查結果發現 No.5P WBT 之油漆膜厚不是太厚(約 1500u)就是太薄(約 100u)，因而導致須將太厚之膜厚位置磨至約 500u 後再重新補漆，而太薄之位置須補 2-3 次的漆，才能達到 PSPC 之標準，所以建議建議船廠使用被認可之 PAINT MARK PEN 將量測之膜厚寫在量測點上，可以讓補漆人員方便判斷該如何補漆，同時亦

有利於讓檢查人員進行抽檢，加速檢查之進行。

此外由於艙蓋下方之保護措施不夠，造成其邊緣之油漆狀況不良以及開孔處之隔柵板，被固定保護部分之會因翻動而造成塗裝需再補漆，都是忽略的重點，建議應注意天氣之變化及翻動隔柵板進行必要之補漆

WBT No.5 P 油漆檢查

BWT No.3S 為第 1 次噴砂完成厚之檢查，檢查重點為排水孔及邊邊角角與焊道，檢查重點為確認是否有未打到砂之 SCALE 或是焊道不良與孔洞與不連續之焊縫，要求船廠進行研磨或補焊，在進行完成後，重新檢查過後確認清潔度後才可同意噴第一道水艙油漆，因此噴第一道漆前之檢查相當的重要。



焊道瑕疵

焊道孔洞

9 月 7 日配合檢查 WBT No.4S 的 第二道 Stripe Coat 檢查，同樣有膜厚太厚或太薄之情況產生，狀況和 No.5P 差不多。

BWT No.4S 油漆檢查

另外檢查 BWT No.3P 的第二次噴砂後檢查，確認符合標準並在完成清潔後同意噴第一道油漆。

WBT No.3P噴漆前之檢查

在壓水艙檢查完成後，將相關人員集合於出口處討論檢查之結果，對於後續之工作進行會有相當之幫助，建議監工團隊與船廠品管人員應維持此方式之討論。

檢查完後之意見交流

4．檢討及品質管理進度會議

原定9月7日下午進行品質檢討會議，因配合壓水艙檢查，故延後至9月8日早上進行，會議結束後直接前往機場返國。

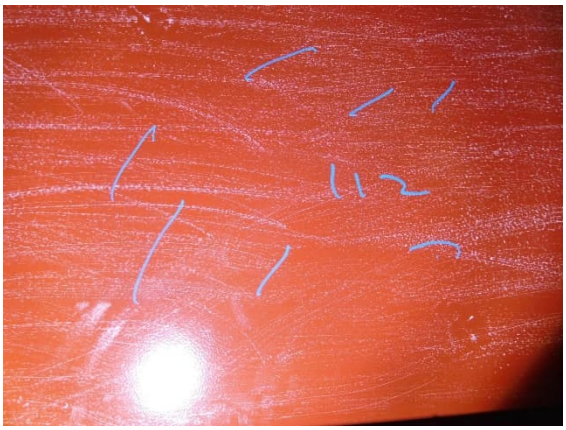
會議除了討論自9月5日至7日實際現場查核之觀察事項外，特別對於下水前之準備工作及瞴滑油供應事項作詳細之討論，並要求船廠需妥為準備下水典禮之工作並且兼顧良好品質之管控。

會議中之觀察及建議事項如下:(如附件一 Meeting Minutes)

中油公司提出意見

✓ 壓水艙噴塗後量測之乾膜厚(DFT)結果不是太厚(約1500u)或太薄(約100u)，為了避免造成膜厚不穩定及重複施工之問題不斷產生，建議船廠使用被認可之PAINT MARK PEN將量測之膜厚寫在量測點上，可以讓補漆人員方便判斷該如何補漆，同時亦有利於讓檢查人員進行抽檢，加速檢查之進行。

壓艙水艙膜厚量測



壓艙水艙膜厚量測

✓ IGG Blower 安裝之方向目前彼此相對，導致AIR出口在不同側，將不利於管線之安排，且可能干擾到控制箱之位置，建議將靠內側之鼓風機轉向，以利於後續之空間利用及管線佈置。

IGG BLOWER安裝位置

- ✓ 利用淨油機下方底座製作一個水箱，同時提供檢修孔以供維修及清潔之用，並將 LO 和 MGO/FO 淨油機配置隔板，使用由 Alfalval 提供的液位警報器和氣動泵以替代阿法拉伐提供較小的污泥清除套件，當觸發高液位警報時，該槽的排水連接將連接到機艙污泥槽。
  以上之修正可以增加淨油機之保養及走道空間，可以考慮淨油機之安裝位置略為移動。

- ✓ 由於技術規範要求對暴露在惡劣天氣下的防風雨水密門和艙口蓋需要鍍鋅，建議進行外板噴砂時，可以同時重新噴砂處理，並噴鋅粉漆，以符合規範需求。

- ✓ 請船廠提供一份全面的滑油清單以降低運輸成本，同時將協調潤滑油事業部辦理有關交貨之事宜，建立雙方之聯繫窗口。.

- ✓ 現場考察後，請在IGG商方之大型艙蓋噌間安裝一個小型維護艙口蓋，用於維護惰氣系統上方的燃油噴嘴及提供一小平台可以檢視相關之儀錶讀數。

- ✓ 為避免因新加坡天氣經常下陣雨，建議主甲板和舷側外板噴漆和噴砂會受到影響，建議準備頂部用帆布覆蓋，以減少受陣雨之影響而須重新噴砂及影響油漆。


外板噴砂前之保護及搭架

- ✓ 船廠提供之下水前之準備工作清單，請務必要妥善規劃 特別是所有壓載艙在下水前必須進行噴砂處理並塗上第一層塗層，建議必要時可以稍微延後下水時程，將水艙之油漆完成後再進行下水，可以避免很多事後需重新處理油漆表面之重複工作(如附件二 H1266 - Check list before External hull blasting/painting & Launching)。

✓ 壓載泵在泵房的安裝位置需重新排列附近之管線，因為該位置目前管線擁擠致使無法安裝泵浦底座。

✓ 主甲板滴水盤內的隔板無排水孔，請船廠改善，並注意安裝時之的管道傾斜度。

Drip Tray因下雨內部積水無法排出

5. 下水後付款準備事項之提醒

✓ 依據合約進造進度第三期請款為下水後，提醒船廠提前準備相關文件，本公司將於下水後盡速辦理請款作業。

A. 正式通知下水典禮之時間。

B. 預付款還款保證之相關文件須提前準備。

C. 妥善規劃下水前之準備事項，依照船廠提公之CHECK LIST共77項，逐步完成。

D. 取得驗船協會之下水證書。

E. 提供下水典禮之相關照片及文書。

三 心得及建議

中油公司 5,000 噸級油品化學輪(平運輪)目前實質工作進度已達 70.89%，但是壓水艙之噴塗作業仍明顯落後，雖然技術服務合約已由船舶中心已接續派駐 1 名監造專案經理及 1 名監造工程師進駐船廠，以及永記油漆派有技術人員及顧問進廠監督施工品質，並隨時保持聯繫，溝通船廠現狀，協助釐清問題，但為確保能夠確實達到品質監控，因而進行現場之品質查核。

此次配前往新加坡 ASL Shipyards Ptd. Ltd 船廠現場訪查建造現況，並於 9 月 8 日召開檢討會議，會議中面對面溝通了解專案進度及整體執行現況，討論本次實地查核之問題及建議事項，並於返國後於 9 月 21 日召開檢討追蹤會議，確認船廠依照相關建議事項辦理，期能確保本案執行能如期、如質完成。

透過現場查核及溝通確實有助於釐清問題及提升品質，有其必要性，綜合本次之出國查核，擬定以下建議。

1. 有關下水典禮之時間，建議船廠考量實際建造進度，尤其是壓水艙塗裝進度，能夠達到可壓水之狀況再辦理，可以避免後續施工之延誤急需重複進行清潔與研磨。

2. 能整合各項需要進行鍍鋅之 Outfitting 進行噴砂塗裝作業，有助於提升艏品之油漆品質。

3. 壓水艙噴塗作業之檢查，須請船廠之品管人員先行進行膜厚量測，並將其讀數標示於量測點之表面，以便讓噴塗人員了解油漆膜厚現況，並依現況進行後續補漆作業，同時亦於讓現場監工抽驗及檢查，改善膜厚偏差之問題。

4. 外板及主甲板油漆作業，應考量新加坡天氣變化，確實做好應變措施，以避免雨天影響噴塗作業而增加重複施工之風險，建議準備好帆布或塑膠布，隨時備用。

5. 建造過程請船廠考量將來之保養空間問題，如有發現問題，應盡速提出討論及修正。

6. 檢查完成後，相關人員應進行檢查建議及意見交流，以利後續工作之推動。

四 附件

(一) Meeting Minutes

(二) H1266-Check list before External hull blasting/painting & Launching.

ASL Marine

Meeting Minutes

Meeting Title	H1266 – Meeting with CPC
Meeting Date	08.09.2023
Meeting Time	10:00am – 10:45am

Attendees:

Present (CPC)	Harry, W.C. Huang
	Tien, Chu-Hua
Present (SOIC	Hsu Tsung Chao
Present (ASL):	Muthupandian Suthan
	Win Myint Zaw
Apologies:	-

No.	Minutes	ASL Response
1.	In view of the air flow, CPC requested that the direction of the IG blower be changed from its existing position. The blower motors are currently facing each other.	ASL has agreed to change the orientation.
2.	CPC requested to fabricate a tank below all purifiers with the partition (optional) for LO and MGO/FO purifiers and use the level alarm, pneumatic pump that was supplied by Alfalval. The sludge removal kit is currently supplied by Alfalaval is smaller. The tank can be fabricated by covering the plate with the existing purifier foundations. Access holes to be provided for maintenance purpose. The drain connection from this tank to be connected to the engine room sludge tank when the high level alarm is triggered.	ASL will provide a tank underneath the purifiers with an access hatch for future maintenance. ASL will study about Alfalaval supplied lever alarm and pneumatic pump to install in the newly fabricated tank. The current position of purifiers cannot be relocated to the forward side as the lifting beam has already been installed over the purifiers.
3.	CPC requested for re-blasting the weathertight doors and hatches that are exposed to weather since the technical specification calls for the need of galvanisation.	ASL will try one piece of door and show to the owner for inspection. It is not possible to blast the internal surface of the doors because the doors are equipped with components. The interior surface of the hatches on ballast and cargo tanks will be blasted and painted in accordance with the tank's paint specifications. The main deck paint spec shall be followed on the exterior side of the hatches.
4.	CPC requested for a comprehensive oil list to reduce the shipping cost. Currently, there is a small quantity of oil listed.	According to ASL, the current oil list is for pre-launching tasks such as inspecting the steering gears, stern tube seals and bearings, bow thruster, CPP propeller. The complete oil list is being prepared and will be submitted asap.
5.	Following a site visit, CPC requested for a flush hatch with a small maintenance hatch in the middle to be installed for the maintenance of the guns above the IG generator.	ASL looked into it and discovered that a flush hatch with a small hatch in the middle can be installed without coaming. In this instance, ASL has also advised that we are unable to meet the 200mm maintenance spacing that was mentioned by Kangrim. The revised hatch arrangement drawing has been submitted and approved.

ASL Marine

No.	Minutes	ASL Response
6.	Following a tank painting inspection, CPC required that low and high DFT readings be marked with a paint marker to make it easy for the responsible painter to identify and fix any DFT issues for both ballast and cargo tanks.	According to ASL, the DFT markings made with a marker cannot be removed. According to CPC, it's not a problem if the markings are still visible after final painting. We will try to implement this system.
7.	CPC concerned about the main deck and side shell being painted and blasted If it starts to rain and requested to cover with canvas in top in order to reduce re-blasting.	ASL will try to implement this proposal.
8.	CPC concerned about the list of pre-launching activities to be completed before launching. In particular, all ballast tanks must be blasted and applied with first coat before launching.	ASL will expedite to complete all pre-launching activities including the ballast tank blasting and application of one coat. Cargo tank blasting will be commenced by 3rd week of September.
9.	CPC concerned about the ballast pump location/installation in the pump room as the location is currently congested by the piping.	ASL will find out a way to install ballast pumps by modifying the pipe routing.
10.	According to CPC, the piping from the main deck drip trays should be sloped to drain oil into the slope tanks.	ASL will look into it. The revised drip tray arrangement drawing will be submitted in response to SOIC site rep comments and will include the necessary slop for the pipeline.
- END -		

H1266 - Check list before External hull blasting/painting & Launching

No.	Activities	To be completed	Status	Trade Incharge		QC Inspection Report			Remarks
				Trade	Signature	Report No.	Date	QC Signature	
1	Ship external hull final visual inspection	Before hull blasting	Completed	Hull		H-1266S/H/QC-296 H-1266S/H/QC-304	31/8/2023 4/9/2023		
2	Hull X ray inspection	Before hull blasting	Completed	Hull		230539-1A 230539-2A GSI/RT-H.1266/04/23/001 GSI/RT-H.1266/04/23/001 GSI/RT-H.1266/04/23/001R1	11/4/2023 17/05/2023 13/04/2023 15/04/2023 15/04/2023		
3	All structural tanks air testing inspection	Before hull blasting	Completed	Hull		N.A	N.A		See the tank status report attached
4	Vacuum test for weld seams - Bow thruster room & ER	Before hull blasting	Completed	Hull		H-1266S/H/QC-130 H-1266S/H/QC-130	13/09/23 26/04/23		
5	Welding of echo sounder housing	Before hull blasting	Completed	Hull, Electrical		H-1266S/H/QC-246	2023/7/29		
6	Welding of speedlog housing	Before hull blasting	Completed	Hull, Electrical		H-1266S/H/QC-313	2023/9/6		
7	Welding of ICCP anode shields	Before hull blasting	Completed	Hull, Electrical		H-1266S/H/QC-281	2023/8/25		
8	NDT for echo sounder, speedlog and ICCP anodes weld seams	Before hull blasting	Completed	Hull, Electrical		221513-27E	2023/9/5		
9	Install permanent lifting lugs for propeller and rudder	Before hull blasting	Completed	Hull		H-1266S/H/QC-321	2023/9/8		
10	Anchor pocket installation incld hawse and spurling pipe	Before hull blasting	Completed	Hull		H-1266S/H/QC-347			
11	Sea chest hot works	Before hull blasting	Completed	Hull		H-1266S/H/QC-091	2023/3/14		
12	Install anode doubler plates - Sea chests, Bow thruster tunnel	Before hull blasting	Completed	Hull		H-1266S/H/QC-323	2023/9/8		
13	Draft mark inspection - Aft, Mid, Fwd	Before hull blasting	Completed	Hull		H-1266S/H/QC-291	29/07/23		
14	Plimsoll mark inspection (Port & Stbd)	Before hull blasting	Completed	Hull		H-1266S/H/QC-291	29/07/23		
15	Ship name, port name inspection	Before hull blasting	Completed	Hull		H-1266S/H/QC-304	2023/9/4		
16	Tank name and other hull markings inspection	Before hull blasting	Completed	Hull		H-1266S/H/QC-296 H-1266S/H/QC-304	31/07/23		
17	Drain/Bottom plugs vacuum testing after installation	After hull painting	Completed	Hull					
18	Bow thruster fairing plate NDT	Before hull blasting	Completed	Hull		221513-27D	2023/9/5		
19	Complete bow thruster grating hot works	Before hull blasting	Completed	Hull		N.A	N.A		

H1266 - Check list before External hull blasting/painting & Launching

No.	Activities	To be completed	Status	Trade Incharge		QC Inspection Report			Remarks
				Trade	Signature	Report No.	Date	QC Signature	
20	NDT of all sea chest pipe penetrations	Before hull blasting	Completed	Piping		230774-1A 221513-16A 221513-22A 230774-2A	17/05/2023 17/05/2023 14/07/2023 14/07/2023		Third Party Reports (Poly NDT)
21	Vacuum test for draft sensor pipe penetrations	Before hull blasting	Completed	Piping		230774-2A 230774-3A	14/7/2023 07/08/2023		Third Party Reports (NDT Only) (Poly NDT)
22	Installation of overboard valve penetrations	Before hull blasting	Completed	Piping		H-1266S/PI/QC-048 H-1266S/PI/QC-058 H-1266S/PI/QC-059 H-1266S/PI/QC-070	16/05/2023 13/07/2023 10/07/2023 07/08/2023		Final Visual inspection & NDT completed
23	NDT for overboard valve weld seams	Before hull blasting	Completed	Piping		230774-1A 221513-16A 221513-22A 230774-2A 230774-3A 221513-23A	17/05/2023 17/05/2023 14/07/2023 14/07/2023 07/08/2023 07/08/2023		Third Party Reports (Poly NDT)
24	Inspection of external hull blasting/painting including markings	After hull painting		Painting					
25	Painting inspection of ICCP anode area	During hull painting	Completed	Painting					
26	Painting inspection of Speedlog and Echo sounder housing	During hull painting		Painting					
27	Mooring fittings installation - Bollards, Fairleads, Chocks, etc.,	After hull painting	Completed	Hull		H-1266S/H/QC-314 H-1266S/H/QC-330	06/09/2023 12/09/2023		
28	Hatches, Doors installation	After hull painting		Hull					In progress
29	Installation of zinc anodes - Sea chest, Bow thruster tunnel	After hull painting		Hull					
30	Sea chest grating/wire tighten to bolts	After hull painting		Hull					
31	Install bow thruster gratings	After hull painting		Hull					
32	Blasting and Painting of Ballast tanks - 11 tks	After hull painting		Painting					
33	Batch up all ballast tank underneath openings and vacuum test	After hull painting		Hull					In progress

H1266 - Check list before External hull blasting/painting & Launching

No.	Activities	To be completed	Status	Trade Incharge		QC Inspection Report			Remarks
				Trade	Signature	Report No.	Date	QC Signature	
34	Echo sounder, Speedlog, ICCP anodes - vacuum test after installation	After hull painting		Electrical					
35	Install MGPS	After hull painting		Electrical					
36	Install ICCP	After hull painting		Electrical					
37	Install draft sensors	After hull painting		Electrical					
38	Install steering gear	After hull painting		Mechanical					
39	Install bow thruster and motor	After hull painting		Mechanical		H-1266S/H/QC-227	14/07/2023		Motor will be installed this week
40	Check clearance between the bow thruster blades and	After hull painting		Mechanical					
41	Install stern tube and chock-fasting	After hull painting		Mechanical, Goltens					
42	Laser alignment after chock-fast	After hull painting		Goltens					
43	Install propeller shaft and blade	After hull painting		Mechanical					
44	Install stern tube seals	After hull painting		Mechanical					
45	Install rudder stock	After hull painting		Mechanical					
46	Install rudder blade/flap	After hull painting		Mechanical					
47	Install/Weld rudder auxiliary door after rudder installation	After hull painting		Hull, Mechanical					
48	Installl rudder stopper	After hull painting		Hull, Mechanical					
49	Pressure test & Flushing of hydraulic oil system for CPP propeller	After hull painting		Piping					
50	Pressure test & Flushing of LO system for stern tube seals and bearings	After hull painting		Piping					
51	Pressure test & Flushing of hydraulic oil system for Steering gear	After hull painting		Piping					
52	Pressure test & Flushing of LO system for bow thruster unit	After hull painting		Piping					
53	Fill up hydraulic oil for CPP propeller and check for leakage	After hull painting		Commissionin					
54	Fill up LO for stern tube seals and bearings and check for leakage	After hull painting		Commissionin g					
55	Fill up hydraulic oil for steering gear and check for leakage	After hull painting		Commissionin					
56	Fill up LO for bow thruster unit and check for leakage	After hull painting		Commissionin					
57	Fill grease on the propeller hub			Mechanical					

H1266 - Check list before External hull blasting/painting & Launching

No.	Activities	To be completed	Status	Trade Incharge		QC Inspection Report			Remarks
				Trade	Signature	Report No.	Date	QC Signature	
58	Apply grease for steering gear and rudder - If required	After hull painting		Mechanical					
59	Steering gear actuator test	After hull painting		Commissionin					
60	Rudder angle turning test - Max. electrical rudder angle 2X65 Deg, Max. mechanical rudder angle 2X72 deg, Rudder angle limitation 2X35 deg, Rudder flab 2X100 Deg,	After hull painting		Commissionin g					
61	In water survey - Rudder bearing clearance check and verification of hydraulic nut security without dismantling the rudder	After hull painting		Mechanical					
62	Check seal installation and bearing clearance	After hull painting		Commissionin					
63	Measure gap on the circumference on the Fwd & Aft seals	After hull painting		Mechanical					
64	Check wear down check on the bearings using wear down gauge	After hull painting		Mechanical					
65	Check clearance between rudder and propeller bulb	After hull painting		Mechanical					
66	Check propeller pitch	After hull painting		Commissionin					
67	Check propeller shaft rotation - Must be free to turn	After hull painting		Commissionin					
68	Check bow thruster shaft rotation	After hull painting		Commissionin					
69	Check bow thruster blade pitch	After hull painting		Commissionin					
70	Protection grease to be applied on propeller blade if needed	After hull painting		Mechanical					
71	In water survey - Take all photos incld markings	After hull painting		Project					
72	All tank manholes, hatches to be covered and tighten	After hull painting		Hull					
73	Ensure all onboard equipments to be secured/fastened properly	After hull painting		All					
74	All overboard sea valves fully closed/shut-off and locked	After hull painting		Piping					
75	Apply cement for bottom plugs and anodes	After hull painting		Hull					
76	Propeller blade, Steering gear and bow thruster to be locked before launching	Before launching		Mechanical					
77	Secure Main engine, Gear box, Shaft generator, Steering gear before launching	Before launching		Mechanical					