



Republic of the Philippines  
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS  
**OFFICE OF THE SECRETARY**  
Manila

097.13 DPWH  
02-16. 2022

JAN 31 2022

DEPARTMENT ORDER )

NO: 27 )  
Series of 2022 )

**SUBJECT: Guidelines for the Preventive Maintenance Implementation of All DPWH Water-Based Equipment**

dt 2/16/2022

To ensure the highest efficiency and utilization of all Water-Based Equipment (WBE) thru strategic planning and timely implementation of Preventive Maintenance (PM), all concerned offices and personnel are hereby directed to strictly implement the guidelines set forth in this Order.

This Department Order is created to standardize the PM implementation process, which includes funding, execution, and monitoring, thru enhanced delegation of functions and responsibilities to the Bureau of Equipment (BOE), Regional Offices (RO), and the District Engineering Offices (DEO).

Attached as Annex A, Annex B, Annex C-I, and Annex J-M respectively are Guidelines for the PM Implementation of All DPWH WBE, PM Implementation Process Flow, required PM forms, and the prescribed PM manuals for each type of WBE.

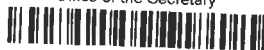
Any violation of this Order shall subject the erring accountable official or employee, after due notice and hearing, to immediate sanctions which may include relief, suspension, and/or dismissal in accordance with Civil Service rules and regulations and other pertinent laws and regulations.

This Order shall supersede Department Order (DO) No. 94, series of 2017, "Preventive Maintenance Manual of All DPWH Cutter Suction Dredge (CSD) and its support vessel," DO No. 53, series of 2017, "Preventive Maintenance Manual of All DPWH Amphibious Excavators," and DO No. 05, series of 2016, "Preventive Maintenance Manual of All DPWH Multi-Purpose Amphibious Dredge" and shall take effect immediately.



**ROGER G. MERCADO**  
Acting Secretary

Department of Public Works and Highways  
Office of the Secretary



WIN2T02234

- End: 1) Guidelines for the Preventive Maintenance Implementation of All DPWH Water-Based Equipment, Annex "A"
- 2) Preventive Maintenance Implementation Process Flow, Annex "B"
  - 3) PM Program of Work form, Annex "C"
  - 4) PM Detailed Unit Price Analysis form, Annex "D"
  - 5) PM Schedule form, Annex "E"
  - 6) PM Work Order form, Annex "F"
  - 7) PM Water Based Equipment Daily Checklist, Annex "G"
  - 8) History of Maintenance form, Annex "H"
  - 9) Monthly Maintenance Accomplishment Report, Annex "I"
  - 10) PM Manual for Multi-Purpose Amphibious Dredge, Annex "J"
  - 11) PM Manual for Amphibious Excavator, Annex "K"
  - 12) PM Manual for Cutter Suction Dredge, Annex "L"
  - 13) PM Manual for Support Vessel, Annex "M"

## **Guidelines for the Preventive Maintenance Implementation of All DPWH Water-Based Equipment**

Strategic planning and implementation of preventive maintenance aims to improve the overall performance, reliability, and safety in the use of equipment. It also reduces the likelihood of the occurrence of emergency repair or breakdown of equipment, thus increasing the availability and utilization of the equipment fleet.

The following guidelines are hereby issued for implementation.

### **I. Definition and Terms**

1. **End-User** – the accountable officer assigned with equipment or motor vehicle/s covered by a Property Acknowledgement Receipt (PAR).
2. **History of Maintenance (HOM)** – chronological list of all types of maintenance activities or procedures performed on an asset.
3. **Maintenance** – activities performed on an equipment to ensure that the equipment will continue to perform its intended function by keeping it in good condition or restoring to its serviceable condition.
4. **Preventive Maintenance (PM)** - maintenance carried out at determined intervals or according to prescribed criteria intended to reduce the probability of breakdown and keep the equipment performing its intended function.
5. **PM Manual** – details the prescribed PM activities, required labor, parts, materials, tools, PPE, and estimated work duration and interval.
6. **PM Program of Work (PM-POW)** – A maintenance plan which consists:
  - a. **PM Schedule** – planned timeline in the performance of the PM activities.
  - b. **PM Detailed Unit Price Analysis** – determines the scope of works based on PM Manuals and details the quantity and cost of parts, materials, supplies, and labor.
7. **Work Order** – document that provides information about the set maintenance activities, schedule, resources, and costs of parts and labor.

### **II. General Policy Guidelines**

1. The PM manuals attached herein shall be used as reference in the preparation of PM schedule and PM Detailed Unit Price Analysis for the respective types of WBE.
2. The PM-POW for the succeeding year shall be submitted to BOE every 2<sup>nd</sup> quarter of the current year. The PM-POW shall be supported by a Certification on Market Survey<sup>1</sup> as reference of the items' costs.
3. All PM activities shall be performed with an approved PM Work Order (PM-WO).

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<sup>1</sup> Form DPWH-GPGS-01-F02-Rev.01, Annex B, Department Order No. 86, Series of 2019

4. The Implementing Office (IO) shall keep an up-to-date inventory of PM parts, supplies, and materials to monitor delivered and consumed items.
5. The Monthly Maintenance Accomplishment Report shall be submitted to BOE thru the Head of IO not later than the 15<sup>th</sup> day of the succeeding reporting month. The following shall be attached on the said report:
  - a. PM Work Order (certified accomplished)
  - b. PM Water Based Equipment Daily Checklist
  - c. History of Maintenance (for the reporting month)
  - d. Waste Materials Report<sup>2</sup>

### **III. Duties and Responsibilities**

#### **1. Marine Engineman (ME) and Dredgeman Foreman (DF)**

- a. Conducts daily walk-around inspection and records any observations thru PM Water Based Equipment Daily Checklist and reports to the Dredge Master (DM);
- b. Performs the scheduled PM works such as lubrication, oil top-ups, changing filters, cleaning the engine room, etc.; and
- c. Performs other duties assigned by the DM.

#### **2. Dredge Master**

- a. Prepares the Annual PM-POW of the equipment, supported by a Certification on Market Survey;
- b. Prepares PM-WO and assigns work to crew in an effective manner;
- c. Supervises the execution of maintenance activities and ensures that these activities are performed on the target schedule;
- d. Monitors the working performance of the equipment and accordingly conducts inspections to identify any possible issues or defects;
- e. Submits Monthly Maintenance Accomplishment Report, with attached PM Work Order (certified accomplished) and PM Water Based Equipment Daily Checklist, to the Head of IO; and
- f. Performs related work assigned by the Head of IO.

#### **3. Implementing Office**

##### **3.1 Regional Office – Equipment Management Division**

###### **3.1.1 Chief, Equipment Management Division**

- a. Reviews and submits the Annual PM-POW to the Regional Director for approval;
- b. Forwards the approved PM-POW with attached Certification on Market Survey to BOE, thru the Regional Director, for funding;
- c. Receives the evaluated PM-POW and includes in the Project Procurement Management Plan (PPMP);
- d. Undertakes the procurement of the required resources on the evaluated PM-POW and the PPMP at least 3 months before the beginning of the quarter covered;
- e. Prepares the Purchase Request (PR) based on the evaluated PM-POW and PPMP;

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<sup>2</sup> Annex F, Department Order No. 126, Series of 2019

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- f. Reviews and approves the PM-WO prepared by the DM;
- g. Reviews the Monthly Maintenance Accomplishment Report of the DM;
- h. Prepares the History of Maintenance (for the reporting month) and Waste Materials Report, reflecting the actual PM parts, supplies, and materials used;
- i. Monitors the conduct of PM activities and submits to BOE, thru the Regional Director, all pertinent reports; and
- j. Performs related work assigned by the Head of IO.

### **3.2 District Engineering Office**

#### **3.2.1 District Engineer**

- a. Reviews and approves the Annual PM-POW;
- b. Forwards the approved PM-POW with attached Certification on Market Survey to BOE, thru the Regional Director, for funding;
- c. Receives the evaluated PM-POW and includes in the PPMP;
- d. Undertakes the procurement of the required resources on the evaluated PM-POW and the PPMP at least 3 months before the beginning of the quarter covered;
- e. Prepares the PR based on the evaluated PM-POW and PPMP;
- f. Reviews and approves the PM-WO prepared by the DM;
- g. Reviews the Monthly Maintenance Accomplishment Report of the DM;
- h. Prepares the History of Maintenance (for the reporting month) and Waste Materials Report, reflecting the actual PM parts, supplies, and materials used; and
- i. Monitors the conduct of PM activities and submits to BOE, thru the Regional Director, all pertinent reports.

### **4. Chief, Floating Equipment Division (FED)**

- a. Evaluates the Annual PM-POW submitted by the IO for their respective equipment;
- b. Furnishes the IO a copy of the evaluated PM-POW for the preparation of PPMP;
- c. Submits the evaluated PM-POW to Finance Service for budget earmarking;
- d. Evaluates Monthly Maintenance Accomplishment Reports submitted by the DM thru the Head of the IO;
- e. Ensures proper PM implementation; and
- f. Performs related work assigned by the BOE Director.

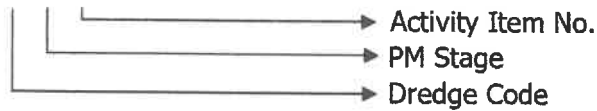
## **IV. PM Manual**

The PM Manual details the activities, including inspection, cleaning, testing, oil top-up, calibration, adjustment, alignment, removal, and replacement of parts/components of an equipment. The list of tools and materials required in performing the PM activities for each type of equipment is also provided. Similarly, the safety hazards and corresponding precautionary measures are identified.

Further, PM activities are grouped in stages indicating the PM activities to be done and the corresponding interval of performing such activities. The execution of these stages is determined either by the dredge's service hours or by a pre-determined period (in calendar days), whichever comes first. Also, activity code is assigned for the identification of each maintenance activity.



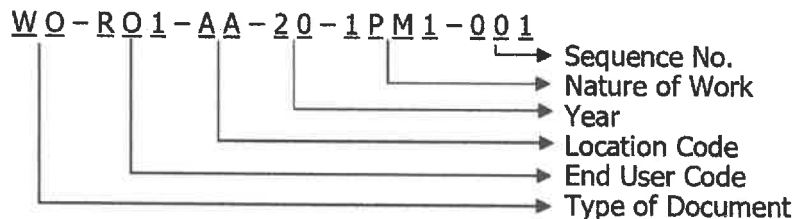
Ex. **A 1.01** – Inspection of Hull



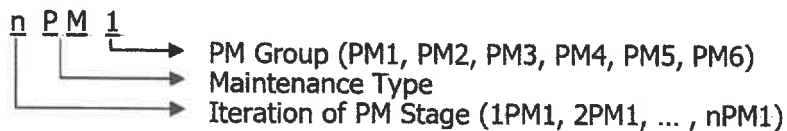
Dredge Code	Dredge Class
A	Multi-Purpose Amphibious Dredge
B	Amphibious Excavator
C	Cutter Suction Dredge
D	Support Vessel

Lastly, in view of this Bureau's continuing maintenance reliability program, the attached PM Manuals shall be periodically reviewed by BOE-FED based on the actual equipment maintenance requirements of the Department's fleet. Based on the PM Reports submitted by the IOs, the BOE-FED shall then make necessary adjustments/modifications subjected to the approval of the Undersecretary for Technical Services. Likewise, BOE-FED shall develop a PM manual for new types of Water Based Equipment added in the fleet, also subject to the approval of the Undersecretary for Technical Services.

## V. Work Order Control Coding



Nature of Work:



End-User Code:

BOE – Bureau of Equipment  
 R01, NCR, R4A, ..., R13 – Regional Offices

Location Code:

This identifies the Implementing Office which released the Work Order.

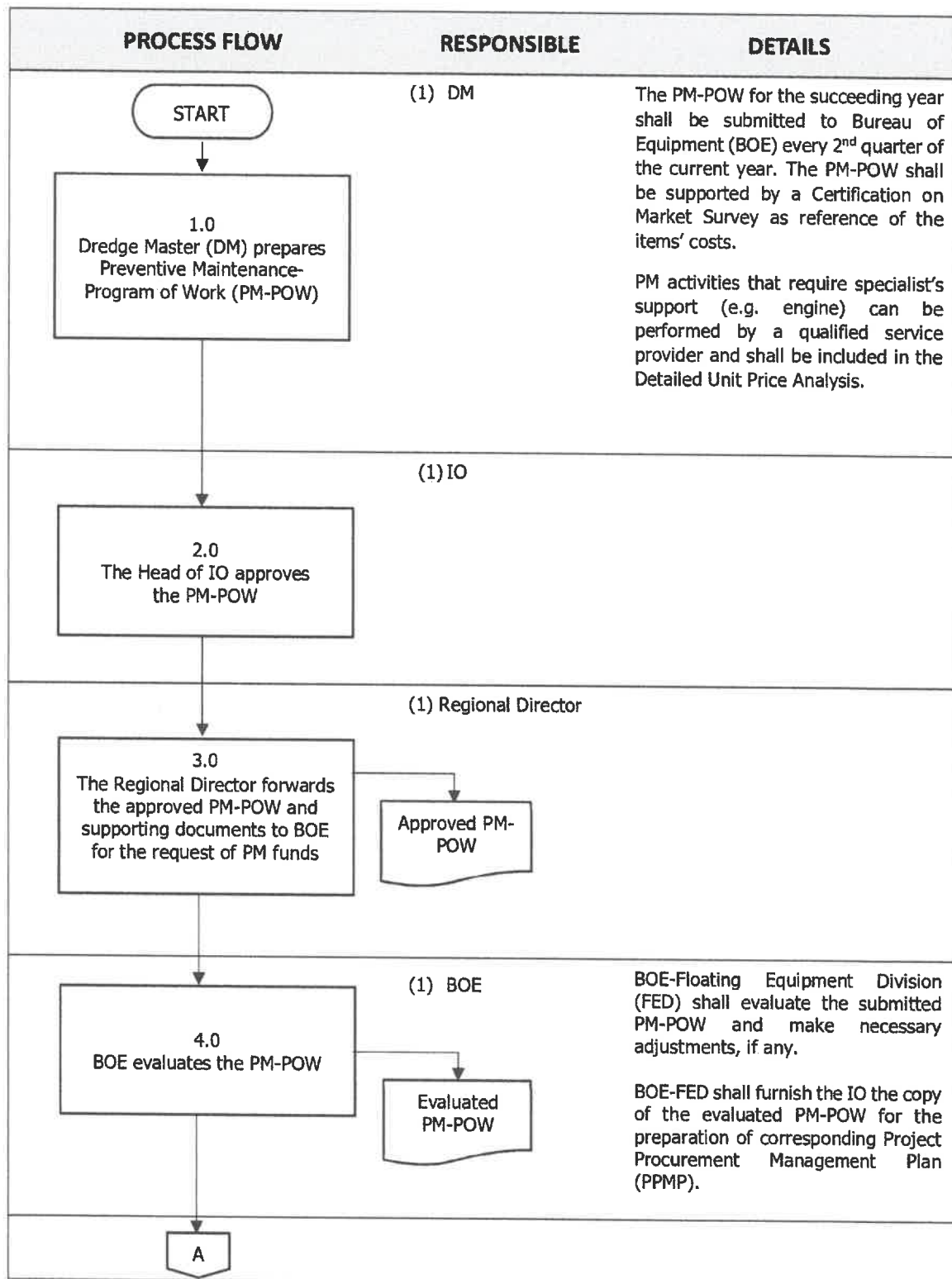
BO - EOS/Base Shop  
 A1 - AES 1  
 A2 - AES 2  
 AA - DEO 1  
 BB - DEO 2  
 CC - DEO 3



**VI. Source of Funds**

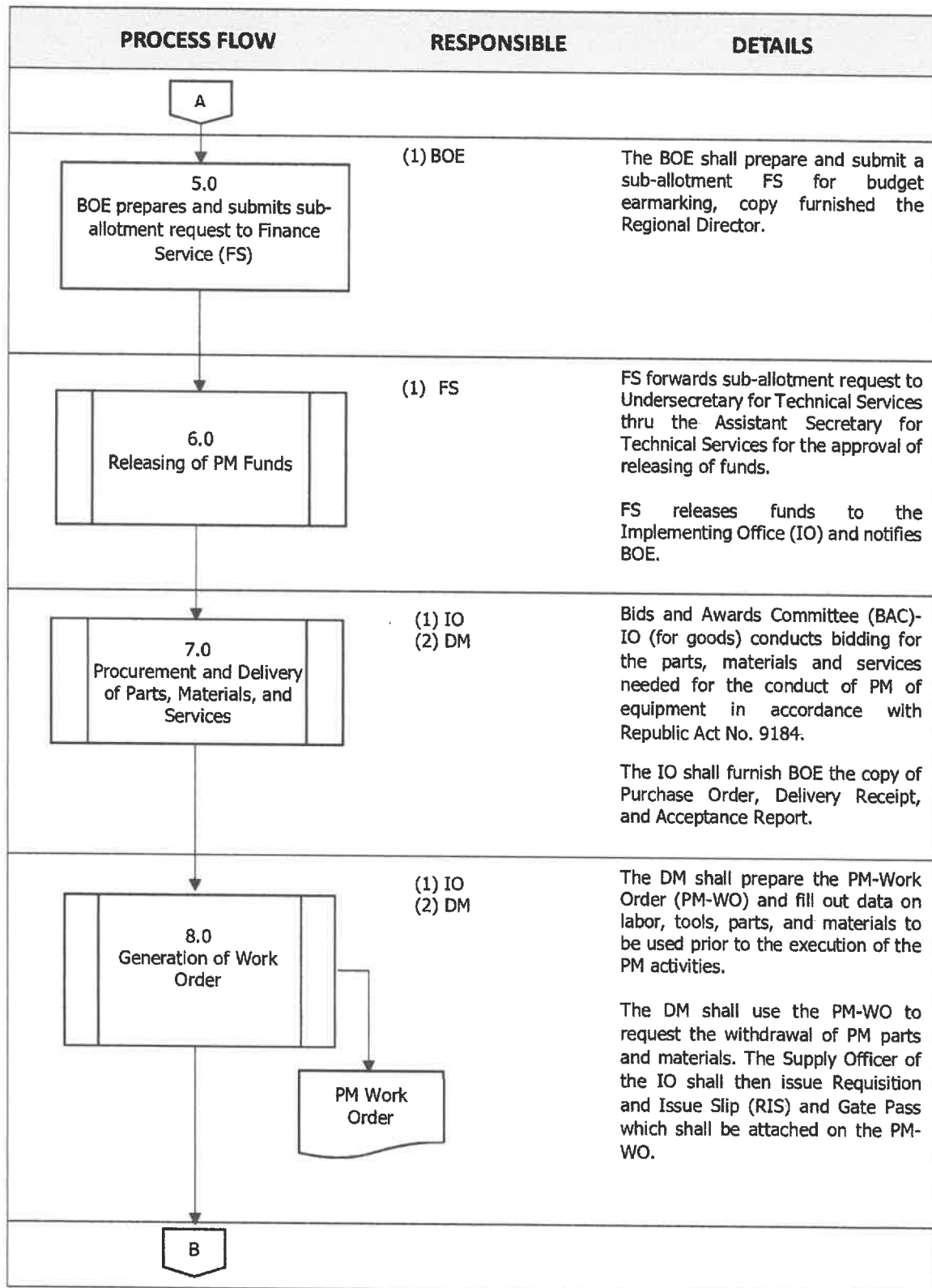
All funds for the maintenance of DPWH Water Based Equipment shall be charged against the appropriate Maintenance and Other Operating Expenses (MOOE) of this Department.

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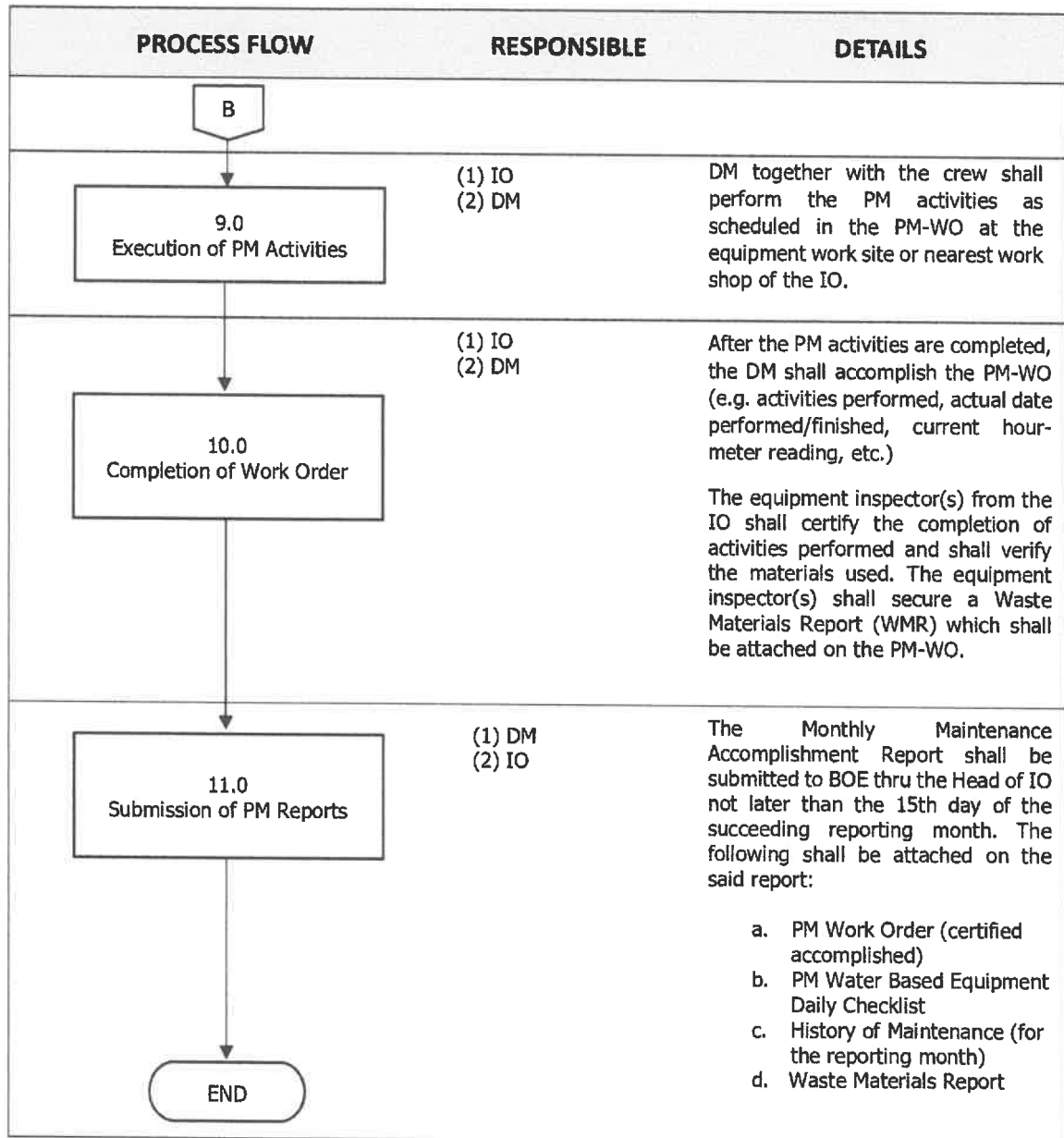
**Preventive Maintenance Implementation Process Flow**

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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS  
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[Office Location]

Annex "C"

**PM PROGRAM OF WORK**

Form No: \_\_\_\_\_

Item Description: [Procurement of PM Supplies, Materials, Parts, and Services] DPWH No: \_\_\_\_\_  
Implementing Office : \_\_\_\_\_ Period: [January 1 - December 31, 2021]

**UNIT COST OF PROPOSED WORK**

UNIT COST OF PROPOSED WORK							
Item No.	DESCRIPTION OF WORK	QUANTITY	UNIT	DIRECT UNIT COST		% Deviation	
				As Submitted	As Evaluated		
A.	Perform PM1d - Daily or every 10 hours	1	Lump Sum				
B.	Perfrom PM1w - Weekly or every 50 hours	1	Lump Sum				
C.	Perform PM1m - Monthly or every 250 hours	1	Lump Sum				
D.	Perform PM2 - Quarterly or every 500 hours	1	Lump Sum				
E.	Perform PM3 - Semi Annually or every 1000 hours	1	Lump Sum				
F.	Perform PM4 - Annually or every 2000 hours	1	Lump Sum				
Breakdown of Expenditure		As Submitted		As Evaluated		EQUIPMENT	
		Total	% of Total	Total	% of Total	DESCRIPTION	No. of Units Required
1	Labor	-	-	-	-		
2	Materials	-	-	-	-		
3	Equipment	-	-	-	-		
4	Total	-	-	-	-		

TOTAL ESTIMATED COST	As Submitted	As Evaluated

PREPARED:

REVIEWED & SUBMITTED:

APPROVED:

NAME  
[Position Title]  
[Office]

NAME  
[Position Title]  
[Office]

NAME  
[Head of IO]



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[Office Location]

Annex "D"

Form No: \_\_\_\_\_

PM Detailed Unit Price Analysis					
<b>Item Description :</b>		Procurement of PM Supplies, Materials, Parts, and Services for dredge with DPWH No. [##]			
<b>Work Description:</b>		Perform PM2 activities			
[B2.09] Change engine oil and filter.					
X-X-X-X-X					
<b>Unit of Measurement:</b>		Lump Sum			
<b>Occurrence per Schedule:</b>		4.0			
<b>A.</b>	<b>Designation (Labor/Technical Support)</b>	<b>No. of Person</b>	<b>No. of Hours</b>	<b>Hourly Rate</b>	<b>Amount</b>
<b>A.1</b>	[Engineer]	[1]	[1]	[by Admin]	
		[2]	[1]	[by Admin]	
	[Laborer]	[2]	[1]	[00.00]	
	X-X-X-X-X				
	Sub-Total for A.1 - As Submitted				-
<b>A.2</b>					
	Sub-Total for A.2 - As Evaluated				-
<b>B.</b>	<b>Name and Capacity (Equipment/Shop/Service Support)</b>	<b>No. of Units</b>	<b>No. of Hours</b>	<b>Hourly Rate</b>	<b>Amount</b>
<b>B.1</b>	[B2.10 Pressure washer]	[1]	[4]	[50]	[200]
	X-X-X-X-X				
	Sub-Total for B.1 - As Submitted				-
<b>B.2</b>					
	Sub-Total for B.2 - As Evaluated				-
<b>C.</b>	<b>Name and Specification (Parts/Supplies/Materials)</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Amount</b>
<b>C.1</b>	[B2.09.1 Engine Oil, SAE 15W-40]	[li]	[18 x Occ]	[00.00]	[Qty. x Unit Cost]
	[B2.09.2 Engine oil filter, CAT 1R-1808]	[pc]	[1 x Occ]	[00.00]	[Qty. x Unit Cost]
	X-X-X-X-X				
	Sub-Total for C.1 - As Submitted				-
<b>C.2</b>	<b>Materials</b>				
	Sub-Total for C.2 - As Evaluated				-
<b>D.1</b>	Total Direct Cost - As Submitted	A.1+B.1+C.1			-
<b>D.2</b>	Total Direct Cost - As Evaluated	A.2+B.2+C.2			-

PREPARED:

REVIEWED & SUBMITTED:

NAME  
[Position Title]  
[Office]

NAME  
[Position Title]  
[Office]





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[OFFICE NAME]

[Office Location]

**PM SCHEDULE**

[Dredge Class with DPWH No. \_\_\_\_]

[Location]

Form No: \_\_\_\_\_

Year	CY _____																											
Month	January				February				March				April				May				June							
Week	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th				
PM Stage	1w	2w	3w	4w	1w	2w	3w	4w	1w	2w	3w	4w	1w	2w	3w	4w	1w	2w	3w	4w	1w	2w	3w	4w				
			1m				1m				1m				1m				1m				1m					
Month	July				August				September				October				November				December							
Week	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th				
PM Stage	1w	2w	3w	4w	1w	2w	3w	4w	1w	2w	3w	4w	1w	2w	3w	4w	1w	2w	3w	4w	1w	2w	3w	4w				
			1m				1m				1m				1m				1m				1m					

**PREPARED****REVIEWED & SUBMITTED**

NAME

[Position Title]

[Office]

NAME

[Position Title]

[Office]

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Annex "F"

Form No: \_\_\_\_\_

Work Order No: \_\_\_\_\_ Nature of Work: \_\_\_\_\_ Status: \_\_\_\_\_  
Date of Inspection: \_\_\_\_\_ Service Type: \_\_\_\_\_ Current Meter Reading: \_\_\_\_\_

**PM WORK ORDER**

Asset Details: \_\_\_\_\_ Downtime: \_\_\_\_\_ Drop Off Date: \_\_\_\_\_  
Accountable Person: \_\_\_\_\_ Asset Assignment: \_\_\_\_\_ Date Started: \_\_\_\_\_  
Region: \_\_\_\_\_ Workshop: \_\_\_\_\_ Date Completed: \_\_\_\_\_  
Date of PAR: \_\_\_\_\_ Work Location: \_\_\_\_\_ Date Closed: \_\_\_\_\_

**WORK DETAILS**

	Service Checklist	Question Category	Written Remarks
1			
2			
3			
4			
5			
6			

Last PM Performed: \_\_\_\_\_ Date: \_\_\_\_\_

**CONSUMABLES, PARTS, SUPPLIES AND MATERIALS**

Index	Item Description	Qty	Unit	PART No.	Rental Hour	Estimated		Actual	
						Unit Cost/Rate	Total Cost	Unit Cost/Rate	Total Cost
1									
2									

**SUMMARY OF EXPENSES (Last 5 Years)**

Year	Cost	No. of Work Orders	PM - Total Downtime
2017			
2018			
2019			
2020			
2021			

**LABOR**

Service Hours	Name	Designation	Labor Cost	Total Cost

**REMARKS**

--

**SIGNATORIES**

Prepared by:	APPROVED:	Work Checked/ Acknowledged by:
[Signature]	[Signature]	[Signature]
Name Position Title	Name Position Title	Name Position Title
Date	Date	Date



## PM1: Water Based Equipment Daily Checklist

Annex "G"

Form No:

DPWH Property No.: \_\_\_\_\_ Month and Year: \_\_\_\_\_

Equipment Name: \_\_\_\_\_

Location : \_\_\_\_\_

## LEGEND



Poor/Needs Corrective Actions



Missing



Good Condition/ Meets Standard Requirements



# Quantity

Hour-Meter Reading																																Findings / Recommendations
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
CHECK level and top up, if necessary.																																
Engine oil level (li)																																
Lubricating oil level (li)																																
Gear oil level (li)																																
Hydraulic Oil Level (li)																																
Water Tank level (li)																																
Grease consumed (kg)																																
A. ENGINE SYSTEM																																
Alternator																																
...																																
B. BOOM SIDE:																																
Arm condition																																
...																																
C. DREDGING SIDE:																																
Cutter Teeth																																
...																																
D. PILOT HOUSE:																																
Air-conditioning unit																																
...																																
E. MAIN FRAME PARTS AND ACCESSORIES:																																
Body Paint																																
...																																
F. HYDRAULIC SIDE:																																
Directional valve, cutter																																
...																																
Operator's Initial →																																







## Form No:

**NAME**  
[Position Title]  
[Office]

## **ANNEX "J"**

# **PREVENTIVE MAINTENANCE MANUAL MULTI-PURPOSE AMPHIBIOUS DREDGE (MPAD)**

Make and Model: Aquamec, Watermaster (Classic II, III, IV, and V)

PM Stage: **PM1 (Break in period)**

Maintenance Interval: **For first 50 operating hours**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
n/a	Inspect/adjust engine belts	Dredge crew	25.00	n/a	n/a	n/a	Wrench, Screw Driver, Ruler

PM Stage: **PM1 (Break in period)**

Maintenance Interval: **For first 250 operating hours**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles**

Note: (\*) See manual for the recommended specifications; and

(\*\*) See manual for the recommended quantity

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
n/a	Change engine oil and filter.	Dredge crew/ Technical Service	17.00	1	l	Oil, flushing, engine	Rags
				**	l	*Oil, engine	
				1	pc	*Filter, oil, engine	
n/a	Check and adjust engine valve lash/clearance.	Dredge crew/ Technical Service	n/a	1	lot	Check and adjust engine valve lash/clearance.	n/a
n/a	Change fuel/water separator filter element .	Dredge crew	15.00	1	pc	*Fuel-water separator filter element	n/a

Make and Model: Aquamec, Watermaster (Classic II, III, IV, and V)

PM Stage: **PM1d**

Maintenance Interval: **Every 10 hours or Daily**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles**

Note: **(\*) See manual for the recommended specifications;**

**(1) Applicable if the progressive central greasing system is functional;**

**(2) Applicable if the progressive central greasing system is not functional;**

**(3) Apply this maintenance when bucket assembly is attached or stored;**

**(4) Apply this maintenance when cutter head assembly is attached or stored; and**

**(5) Applicable for Watermaster Classic II only; Apply this maintenance when pump bucket is attached or stored**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
A1d.1	Walk around inspection before operation.	Dredge crew	5.00	n/a	n/a	n/a	n/a
HYDRAULIC SYSTEM							
A1d.2	Check hydraulic reservoir level, top up if necessary.	Dredge crew	6.00	0.1	l	*Oil, hydraulic	n/a
A1d.3	Check hydraulic oil filter service indicator.	Dredge crew	1.00	n/a	n/a	n/a	n/a
A1d.4	Check hydraulic cylinders and piping for leaks and tighten if necessary.	Dredge crew	5.00	n/a	n/a	n/a	Wrench
				n/a	n/a	n/a	Plier
A1d.5	(1) Check the progressive central greasing system and refill grease, if necessary.	Dredge crew	5.00	1	kg	Grease, molybdenumn/adisulfide (NLGI No. 2)	Grease gun
	(2) Grease pivot points of front structure until excess shows.						
A1d.6	(3) Grease the bucket linkage pivot points and check the condition of its seals.	Dredge crew	2.00	0.5	kg	Grease, watern/aresistant or marine (NLGI No. 2)	Grease gun
A1d.7	(4) Check the condition of cutter pump and cutter bearings (Check for axial and radial play).	Dredge crew	2.00	n/a	n/a	n/a	n/a
A1d.8	(4) Check condition of dredge pump seals and bearings	Dredge crew	2.00	n/a	n/a	n/a	n/a
A1d.9	(5) Grease the rotating coupling of the discharge pipe of the pump bucket.	Dredge crew	5.00	0.5	kg	Grease, watern/aresistant or marine (NLGI No. 2)	Grease gun

(Continued on next page)

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
A1d.10	Check engine oil level, fuel level, and engine coolant level (50% antifreeze, 50% softwater), top up if necessary.	Dredge crew	8.00	0.1	li	*Oil, engine	n/a
				0.1	li	Water, distilled	n/a
				0.1	li	Coolant, antin/acorrosiye (40% Ethylene glycol)	n/a
A1d.11	Check engine air cleaner service indicator.	Dredge crew	1.00	n/a	n/a	n/a	n/a
A1d.12	Check fueln/awater separator. Drain water and bleed fuel if necessary.	Dredge crew	2.00	n/a	pc	Rags	n/a
A1d.13	Check/adjust/lubricate power taken/aoff clutch.	Dredge crew	2.00	n/a	n/a	n/a	n/a
A1d.14	Check and clean fuel/water/trash buildn/aup in the engine compartment.	Dredge crew	4.00	n/a	n/a	n/a	n/a
HULL SYSTEM							
A1d.15	Check and clean propulsion unit and pivot bolts.	Dredge crew	3.00	n/a	pc	Rags	n/a
A1d.16	Inspect the hull and side pontoon for tightness.	Dredge crew	6.00	n/a	n/a	n/a	n/a
A1d.17	Inspect front stabilizer and rear stabilizer for leaks.	Dredge crew	6.00	n/a	n/a	n/a	n/a
A1d.18	Listen for any abnormal sounds and check operation of all controls.	Dredge crew	2.00	n/a	n/a	n/a	n/a
A1d.19	Clean the unit after daily operation.	Dredge crew	10.00	n/a	li	Water, fresh	n/a
				n/a	pc	Rags	n/a

Make and Model: Aquamec, Watermaster (Classic II, III, IV, and V)

PM Stage: **PM1w**

Maintenance Interval: **Every 50 hours or Weekly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles**

Note: <sup>(4)</sup> **Apply this maintenance when cutter head assembly is attached or stored;**

<sup>(6)</sup> **Applicable for Watermaster Classic V only**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
A1w.1	<sup>(4)</sup> Check the condition of impeller, suction ring, cutter bearings, and lubrication oil level, top up if necessary.	Dredge crew	4.00	1	li	Oil, gear (SAE 80Wn/a90)	n/a
ENGINE SYSTEM							
A1w.2	Test the oil tank breather.	Dredge crew	1.00	n/a	n/a	n/a	n/a
A1w.3	Check and clean the batteries and electrical connections.	Dredge crew	10.00	n/a	n/a	n/a	n/a
HULL SYSTEM							
A1w.4	Inspect and clean the discharge pipes and floaters.	Dredge crew	20.00	n/a	n/a	n/a	n/a
A1w.5	<sup>(6)</sup> Check the swing frame pivot bolts and retight expander bolt to 350 Nm.	Dredge crew	20.00	n/a	n/a	n/a	Torque Wrench

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Make and Model: Aquamec, Watermaster (Classic II, III, IV, and V)

PM Stage

Maintenance Interval: **Every 250 hours or Monthly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
A1m.24	Drain water from the hydraulic oil tank.	Dredge crew	2.00	n/a	n/a	n/a	n/a
A1m.25	Check and clean the hydraulic oil coolers.	Dredge crew	5.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
A1m.26	Drain water and sediments from the fuel tank.	Dredge crew	2.00	1	li	Water, electrolyte/distilled	n/a
A1m.27	Check the battery electrolyte level, top up if necessary.	Dredge crew	1.00	1	btl	Parts cleaner (Canister type)	Air compressor with nozzle (30 psi)
A1m.28	Check and clean the radiator.	Dredge crew	10.00	n/a	n/a	n/a	n/a
A1m.29	Clean engine crankcase breather.	Dredge crew	10.00	n/a	n/a	n/a	n/a
A1m.30	Check the crack, wear and correct tension of engine belts, adjust if needed.	Dredge crew	10.00	n/a	n/a	n/a	Wrench, Screw Driver, Ruler
A1m.31	Clean engine primary air cleaner element.	Dredge crew	25.00	1	li	Oil	Soft brittle brush, Air compressor
				5	li	Water	
A1m.32	Clean fueln/awater separator filter element.	Dredge crew	5.00	1	li	Oil	Soft brittle brush, Air compressor
				5	li	Water	
HULL SYSTEM							
A1m.36	Clean the cabin air conditioning filters (innern/aouter).	Dredge crew	5.00	n/a	n/a	n/a	n/a
A1m.37	Inspect the water pump for leaks and abnormal noise.	Dredge crew	5.00	n/a	n/a	n/a	n/a
A1m.38	Inspect and clean pins and bushing of the propulsion unit shaft.	Dredge crew	5.00	n/a	n/a	n/a	n/a



Make and Model: Aquamec, Watermaster (Classic II, III, IV, and V)

PM Stage: **PM2**

Maintenance Interval: **Every 500 hours or 3 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles, and Diver's suit (For wet location)**

Note: **(\*) See manual for the recommended specifications**

**(\*\*) See manual for the recommended quantity**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
A2.1	Check the movement of the pilot control valves.	Dredge crew	3.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
A2.2	Change the engine oil and filter.	Dredge crew	17.00	1	li	Oil, flushing, engine	n/a
				**	li	*Oil, engine	n/a
				1	pc	*Filter, oil, engine	n/a
A2.3	Change fuel-water separator filter element.	Dredge crew	5.00	**	pc	*Fuel-water separator filter element	n/a
A2.4	Change engine secondary fuel filter.	Dredge crew	5.00	**	pc	*Filter, fuel, secondary	n/a
				1	btl	Cleaner, parts	n/a
A2.5	Change the auxiliary fuel filter element (Hi-Temp Gulf Coast Filters)	Dredge crew	5.00	1	pc	*Element, filter, fuel, auxiliary	n/a
HULL SYSTEM							
A2.6	Check the condition of shaft sealing and bearing of the propulsion unit.	Dredge crew	15.00	n/a	n/a	n/a	n/a
A2.7	Check the condition of spud and its linings.	Dredge crew	15.00	n/a	n/a	n/a	n/a
A2.8	Inspect the discharge pipes and floaters. Replace damaged bolts.	Dredge crew	60.00	60	pcs	*Bolts and Nuts with washer	Wrench

Make and Model: Aquamec, Watermaster (Classic II, III, IV, and V)

PM Stage: **PM3**Maintenance Interval: **Every 1000 hours or 6 months**PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles**Note: **(\*) See manual for the recommended specifications****(\*\*) See manual for the recommended quantity****(4) Apply this maintenance when cutter head assembly is attached or stored;**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
A3.1	<sup>(4)</sup> Change the dredge pump's bearing housing oil.	Dredge crew	5.00	**	li	*Oil, hydraulic	n/a
ENGINE SYSTEM							
A3.2	Replace engine primary and secondary air cleaner elements.	Dredge crew	10.00	1	pc	*Element, cleaner, air, primary	n/a
				1	pc	*Element, cleaner, air, secondary	n/a
A3.3	Lubricate fan drive bearing.	Dredge crew	5.00	3	li	*Lubricant, bearing (or equivalent)	n/a
A3.4	Check/tighten cylinder head grounding stud and coat it with grease.	Dredge crew	6.00	1	mix	Baking soda and water	n/a
				0.1	li	MPGM grease or petroleum jelly	n/a
A3.5	Replace Hydraulic filters (one [1] drain circuit filter, one [1] pilot pressure filter, and one [1] oil reservoir breather filter).	Dredge crew	15.00	1	pc	*Filter, circuit, drain	n/a
				1	pc	*Filter, pilot pressure	n/a
				1	pc	*Filter, breather, reservoir, oil	n/a
	Replace two (2) main hydraulic return filters.  (NOTE: The machine has four (4) main hydraulic return filters, mark the two (2) pieces filter that have been changed in order for the next servicing, the ones unmarked will be changed)	Dredge crew	5.00	2	pcs	*Filter, return, main	n/a

Make and Model: Aquamec, Watermaster (Classic II, III, IV, and V)

PM Stage: **PM4**Maintenance Interval: **Every 2000 hours or yearly**PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles**Note: **(\*) See manual for the recommended specifications****(\*\*) See manual for the recommended quantity****(4) Apply this maintenance when cutter head assembly is attached or stored,****(7) For dredging locations with ambient conditions such as high relative humidity and salinity, apply this maintenance every 6 months or 1000 hours of operation.**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
A4.1	Change hydraulic oil.	Dredge crew	10.00	**	li	*Oil, hydraulic	n/a
A4.2	<sup>(4)</sup> Change cutter pump bearing's lubrication oil and check its bearing and sealing.	Dredge crew	5.00	6	li	*Oil, gear	n/a
ENGINE SYSTEM							
A4.3	Perform engine tune-up.	Dredge crew	n/a	1	lot	Engine compression pressure test	n/a
				1	lot	Nozzle injection pressure test	n/a
				1	lot	Injection timing test	n/a
				1	pc	Gasket, cover, valve	n/a
				1	lot	Cylinder head bolts check & retorque	n/a
A4.4	Check and adjust engine valve lash/clearance.	Technical Service	n/a	1	lot	Check and adjust engine valve lash/clearance	n/a
A4.5	Change radiator coolant (50% antifreeze, 50% softwater).	Dredge crew	5.00	12.5	li	Coolant, antin/acorrosive (40% Ethylene glycol)	n/a
				12.5	li	Water, distilled	n/a
A4.6	Replace engine crankcase breather filter element.	Dredge crew	5.00	1	btl	Cleaner, parts	n/a
				1	pc	*Element, filter, breather, crankcase, engine	n/a
A4.7	Clean/test aftercooler core.	Dredge crew	7.00	1	btl	Cleaner, brake	Air compressor with nozzle (30 psi)

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HULL SYSTEM							
A4.8	Inspect and grease the propeller bearing housing.	Dredge crew	5.00	2	li	Grease, watern/aresistant or marine (NLGI No. 2)	n/a
A4.9	Change cabin airn/aconditioning (innern/aouter) filter.	Dredge crew	5.00	2	pc	Filter, air cabin	n/a
A4.10	Replace zinc anodes.	Dredge crew	15.00	3	pcs	Anode, zinc	n/a
A4.11	(7) Paint the front, structure, deck, side hull, main pontoon, side pontoon, stabilizer, spuds and other attachments.	Dredge crew	60.00	8	gal	Paint, marine red lead primer (2n/acoat)	n/a
				8	gal	Paint, marine GREEN (2n/acoat)	n/a
				1	gal	Paint, marine BLACK (2n/acoat)	n/a
				17	gal	Paint, lacquer thinner	n/a
				2	pc	Brush, steel cup	n/a
				2	pc	Brush, steel	n/a
				1	pc	Roller, paint brush 4"	n/a
				1	pc	Brush, paint 4"	n/a
				1	pc	Brush, paint 2"	n/a
				10	kg	Rags	n/a
				30	pcs	Sandpaper #120	n/a
				2	gal	Remover, paint	n/a



Make and Model: Aquamec, Watermaster (Classic II, III, IV, and V)

PM Stage: **PM5**

Maintenance Interval: **Every 3000 hours or 1 year and 6 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
A5.1	Replace batteries and check the electrical connections.	Dredge crew	10.00	2	pcs	Battery, 12v, 2D	Wrench
				4	pcs	Clamp, terminal, battery	
				4	pcs	Lug, terminal, battery	
A5.2	Change fan belts.	Dredge crew	10.00	1	pc	Belts, fan	Wrench

Make and Model: Aquamec, Watermaster (Classic II, III, IV, and V)

PM Stage: **PM6**

Maintenance Interval: **Every 4000 hours or 2 years**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles**

Item No.	Work Description	Labor	Materials/Supplies/Technical Services				Tools/ Equipment
			Estimated Time (min)	Qty.	Unit	Item Description	
ENGINE SYSTEM							
A6.1	Clean engine and inspect mounts.	Dredge crew	30.00	n/a	n/a	n/a	n/a
A6.2	Check the condition of alternator, starter motor and voltage regulator.	Dredge crew	30.00	n/a	n/a	n/a	n/a
A6.3	Inspect the Crankshaft Vibration Damper.	Dredge crew	30.00	n/a	n/a	n/a	n/a
A6.4	Replace cooling system water temperature regulator.	Dredge crew	30.00	1	pc	Regulator, water temperature, cooling system	n/a
A6.5	Inspect turbocharger and water pump.	Dredge crew	30.00	n/a	n/a	n/a	n/a
A2.6	Check and clean, if there is dirt on the cooling fins.	Dredge crew	30.00	1	pc	brush	Air compressor
HULL SYSTEM							
A6.7	Inspect equipment to check for cracked or broken welds or other damage.	Dredge crew	30.00	n/a	n/a	n/a	n/a
A6.8	Service the cabin airn/aconditioning unit.	Dredge crew / Technical Service	90.00	1	lot	Dryer, air (Material and Service)	n/a
				1	lot	Valve, expansion (Material and Service)	n/a
				1	lot	Freon 134-A (material and service)	n/a

## **ANNEX "K"**

# **PREVENTIVE MAINTENANCE MANUAL AMPHIBIOUS EXCAVATOR (AE)**





Make and Model: Doosan, DX140LC

PM Stage: **PM1d**

Maintenance Interval: **Every 10 hours or Daily**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

**Safety Hazard:**

1. Make sure to lock out the hydraulic controls and post a notice (Warning Tag) that the machine is being serviced to prevent any unauthorized operation.
2. Make sure to clean up any fluid spills, especially around the engine.
3. Inspect all fuel lines to make sure that fittings, lines, filters and O-rings, etc., are tight and are not showing signs of wear or damage.
4. If the inspection or test procedure requires that the engine be running, make sure to keep all unauthorized personnel away from the machine, and that all industry standard safety precautions are followed.

**Preliminary Work Machine Setup for Maintenance:**

1. Park on firm, level ground.
2. Lower bucket to ground.
3. Set safety lever on "LOCK" position.
4. Allow engine to run at low idle for a minimum of five minutes to allow engine to cool. If this is not done, heat surge may occur.
5. Shut down engine by turning key to "O" (OFF) position. Remove key from starter switch.
6. Before starting maintenance work, hang up a tag, "Do Not Touch When Performing Inspection or Maintenance" on cabin door or work lever.

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B1d.01	Grease boom, arm, front attachment pins & bushings and hydraulic cylinder shaft of supplementary pontoons	Dredge crew	10.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B1d.02	Grease swing bearing	Dredge crew	10.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B1d.03	Grease swing reduction device/gear hydraulic cylinders and piping for leaks and tighten if necessary.	Dredge crew	5.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B1d.04	Check level the window washer liquid.	Dredge crew	5.00	0.2	lj	Washer Fluid	n/a
B1d.05	Inspect bucket teeth and side cutters for signs of wear.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.06	Inspect seat belt for proper operation.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.07	Cleaning/washing of AE after daily operation (Undercarriage and front structure).	Dredge crew	15.00	1	drum	Fresh Water	n/a

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
B1d.08	Check level of hydraulic oil tank.	Dredge crew	5.00	0.2	l	Oil, Hydraulic ISO VG. 68	n/a
B1d.09	Check for leaks in hydraulic system.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.10	Check oil level of swing reduction device.	Dredge crew	5.00	0.2	l	Oil, Gear, 80W-90	n/a
ENGINE SYSTEM							
B1d.11	Check engine oil level.	Dredge crew	5.00	0.2	l	Oil, engine lube, 15W40	n/a
B1d.12	Check fuel level.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.13	Check for leaks in fuel system.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.14	Check water separator & pre fuel filter and drain water as required.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.15	Clean dust net in front of oil cooler & intercooler.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.16	Check cooling system and refill as required.	Dredge crew	5.00	0.2	l	Coolant, Anti-Corrosive, Propylene Glycol	n/a
B1d.17	Inspect cooling fan blade.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.18	Check air intake system.	Dredge crew	5.00	n/a	n/a	n/a	n/a
UNDERCARRIAGE SYSTEM							
B1d.19	Inspect structure for cracks and faulty welds.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.20	Check operation of all switches.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.21	Check the operation of pilot cut-off switch.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.22	Check operation of all exterior lights, horns & control console indicator & monitor lights.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.23	Start engine, check starting ability and observe exhaust color. Listen for any abnormal sounds.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.24	Check operation all controls.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.25	Inspect undercarriage for signs of wear, missing parts and oil leakage (travel motors, sprockets, track chain assemblies, hydraulic system, etc.)	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.26	Check the track chain condition before and after traveling.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.27	Check the slacking of track tension ( Maintain: G= 1 1/2 to 2 1/2 Gap)	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.28	Ensure that the bottom and the top track chains of the pontoon are in the tension or flat.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.29	Lubricate track rollers after daily operation.	Dredge crew	10.00	2	l	Used Oil	n/a

Make and Model: Doosan, DX140LC

PM Stage: **PM1w**

Maintenance Interval: **Every 50 hours or Weekly**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B1w.01	Perform all daily service checks	Dredge crew	170.00	n/a	n/a	Refer to PM1	n/a
B1w.02	Grease axle bearing	Dredge crew	10.00	2	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
ENGINE SYSTEM							
B1w.03	Drain water and sediment from fuel tank	Dredge crew	10.00	n/a	n/a	n/a	n/a
B1w.04	Change engine oil and filter (First 50 operating hours only)	Dredge crew	20.00	22	l	Oil, Engine Lube, 15W40	n/a
				1	pc	Element, Filter, Engine Oil	n/a
UNDERCARRIAGE SYSTEM							
B1w.05	Inspect the undercarriage assembly	Dredge crew	1000%	n/a	n/a	n/a	n/a
B1w.06	Check engine fan belt for cracks, wear and correct tension (First 50 hours only)	Dredge crew	10.00	n/a	n/a	n/a	n/a

Make and Model: Doosan, DX140LC

PM Stage: **PM1m**

Maintenance Interval: **Every 250 hours or Monthly**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Materials/Supplies/Technical Services				Tools/ Equipment
			Estimated Time (min)	Qty.	Unit	Item Description	
<b>GENERAL</b>							
B1m.01	Perform all Daily and 50 Hours Service Checks.	Dredge crew	230.00	n/a	n/a	Refer to PM1 and PM2	n/a
B1m.02	Inspect pins and bushing of the front attachment for signs of wear.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.03	Check electrolyte levels in batteries and charging ammeter.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.04	Inspect for any loose or missing nuts and bolts.	Dredge crew	5.00	n/a	n/a	n/a	n/a
<b>ENGINE SYSTEM</b>							
B1m.05	Check engine fan belt tension and check for signs of wear.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.06	Inspect fuel system hose clamps.	Dredge crew	5.00	n/a	n/a	n/a	n/a
<b>HYDRAULIC SYSTEM</b>							
B1m.07	Check the gear oil condition of the hydraulic travel motor.	Dredge crew	5.00	2	l	Gear Oil, SAE 80W-90 (API GL5)	n/a
B1m.08	Change swing reduction device oil <i>(Drain and refill after first 250 hour only)</i>	Dredge crew	20.00	2	l	Oil, gear, SAE 80W-90 (API GL5)	n/a
B1m.09	Change oil in travel reduction device [one on each side of unit] <i>(First 250 hours only)</i>	Dredge crew	20.00	4.2	l	Oil, gear, SAE 80W-90 (API GL5)	n/a
B1m.10	Replace hydraulic oil return filter <i>(After first 250 hours)</i>	Dredge crew	20.00	1	pc	Element, return filter, hydraulic oil	n/a
B1m.11	Change pilot filter <i>(after first 250 hours)</i>	Dredge crew	20.00	1	pc	Element, pilot filter, hydraulic oil	n/a
<b>UNDERCARRIAGE SYSTEM</b>							
B1m.12	Inspect and replace deteriorated wearing plates.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.13	Inspect and replace deteriorated track pins.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.14	Check track chain slack and adjust tension.	Dredge crew	5.00	n/a	n/a	n/a	n/a

Make and Model: Doosan, DX140LC

PM Stage: **PM2**

Maintenance Interval: **Every 500 hours or 3 months**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Materials/Supplies/Technical Services				Tools/ Equipment
			Estimated Time (min)	Qty	Unit	Item Description	
GENERAL							
B2.01	Perform Daily, 50, 250 Hour Service Checks.	Dredge crew	355.00	n/a	n/a	Refer to PM1, PM2 and PM3	n/a
B2.02	Grease swing gear and pinion.	Dredge crew	10.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B2.03	Clean air-conditioning outer filter.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.04	Clean air-conditioning inner filter.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.05	Clean radiator, oil cooler, intercooler, fuel cooler and a/c condenser core.	Dredge crew	20.00	n/a	n/a	n/a	n/a
B2.06	Clean outer filter of Air Cleaner.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.07	Painting of all pontoon, track roller & front attachment.	Dredge crew	180.00	3	gal	Paint, marine red lead primer (2-coat), pontoon L-R	n/a
				3	gal	Paint, Marine Gray (2-coat), pontoon L-R	n/a
				2	gal	Paint, marine Ditzler Orange (2-coat), Boom, Arm, Bucket	n/a
				3	gal	Paint, marine lacquer thinner	n/a
				2	pc	Brush, steel cup	n/a
				2	pc	Brush, steel	n/a
				2	pc	Roller, paint brush 4"	n/a
				2	pc	Brush, paint 4"	n/a
				5	kg	Rags, main deck	n/a
				30	pc	Sandpaper #120	n/a
				1	pail	Rust Remover	n/a
				2	gal	Solvent, industrial (Paint Remover)	n/a

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Item No.	Work Description	Labor	Materials/Supplies/Technical Services				Tools/ Equipment
			Estimated Time (min)	Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
B2.08	Check the oil level in travel reduction device.	Dredge crew	5.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
B2.09	Change engine oil and filter.	Dredge crew	20.00	22	l	Oil, Engine Lube, 15W40	n/a
				1	pc	Element, Filter, Engine Oil	n/a
B2.10	Change water separator & pre fuel filter.	Dredge crew	20.00	1	pc	Element, filter, prefuel	n/a
B2.11	Change main fuel filter.	Dredge crew	20.00	1	pc	Element, filter, main fuel	n/a
				1	pc	Element, filter, fuel cap	n/a
UNDERCARRIAGE SYSTEM							
B2.12	Inspect rollers and bushings.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.13	Inspect and test all pontoon compartments.	Dredge crew	20.00	n/a	n/a	n/a	n/a
B2.14	Check track chain slack and adjust tension.	Dredge crew	20.00	1	job	Track chain tension adjustment ( ZCA= 1½ to 2½ inches)	n/a

Make and Model: Doosan, DX140LC

PM Stage: **PM3**

Maintenance Interval: **Every 1000 hours or 6 months**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Materials/Supplies/Technical Services				Tools/ Equipment
			Estimated Time (min)	Qty.	Unit	Item Description	
GENERAL							
B3.01	Perform Daily, 50, 250 and 500 Hour Service Checks	Dredge crew	710.00	1	pc	Refer to PM1, PM2, PM3 and PM4	n/a
B3.02	Change air-conditioning outer filter.	Dredge crew	15.00	1	job	Element, air-con outer filter	n/a
B3.03	Check air-conditioner refrigerant.	Dredge crew	5.00	1	job	Freon 134A, charging works	n/a
B3.04	Check electrical system and control panels.	Doosan Dealer	15.00	1	job	Voltage Regulator, reconditioning (to be performed by authorized DOOSAN dealer)	n/a
B3.05	Replace batteries.	Dredge crew	10.00	2	pc	Battery, 12 V, 180 Ah	n/a
		Dredge crew		4	pc	Clamp, battery terminal	n/a
		Dredge crew		4	pc	Lug, battery terminal	n/a
ENGINE SYSTEM							
B3.06	Change air breather filter.	Dredge crew	15.00	1	pc	Element, air breather filter	n/a
B3.07	Check and adjust engine and inspect for defective parts.	Doosan Dealer	15.00	1	job	Engine compression pressure test (service only)	n/a
		Doosan Dealer		1	job	Injection pressure test (to be performed by authorized DOOSAN dealer)	n/a
		Doosan Dealer		1	job	Injection timing test (to be performed by authorized DOOSAN dealer)	n/a
HYDRAULIC SYSTEM							
B3.08	Replace hydraulic oil return filter.	Dredge crew	15.00	1	pc	Element, return filter, hydraulic oil	n/a
B3.09	Change pilot filter of hydraulic oil.	Dredge crew	15.00	1	pc	Element, pilot filter, hydraulic oil	n/a
B3.10	Change oil in travel reduction device.	Dredge crew	20.00	4.2	ll	Oil, gear, SAE 80W-90 (API GL5)	n/a



Make and Model: Doosan, DX140LC

PM Stage: **PM4**

Maintenance Interval: **Every 2000 hours or yearly**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Materials/Supplies/Technical Services				Tools/ Equipment
			Estimated Time (min)	Qty.	Unit	Item Description	
GENERAL							
B4.01	Perform Daily, 50, 250 and 500 Hour Service Checks.	Dredge crew	710.00			Refer to PM1, PM2, PM3, PM4 and PM5	n/a
B4.02	Replace outer & inner air cleaner element	Dredge crew	15.00	1	pc	Filter, outer air cleaner	n/a
		Dredge crew		1	pc	Filter, inner air cleaner	n/a
B4.03	Inspect machine to check for cracked or broken welds and other damage	Dredge crew	15.00	n/a	n/a	n/a	n/a
HYDRAULIC SYSTEM							
B4.04	Change hydraulic oil & clean suction strainer	Dredge crew	15.00	99	l	Oil, hydraulic VG. 68	n/a
B4.05	Change swing reduction device oil	Dredge crew	20.00	2	l	Oil, gear, SAE 80W-90 (API GL5)	n/a
B4.06	Perform and record the results of the cycle time tests	Dredge crew	15.00	n/a	n/a	n/a	n/a
B4.07	Check undercarriage hydraulic hoses	n/a	10.00	n/a	n/a	n/a	n/a
B4.08	Check boom, arm & bucket cylinder line hoses	n/a	10.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
B4.09	Change radiator coolant	Dredge crew	20.00	20	l	Coolant, Anti-Corrosive, Propylene Glycol	n/a
B4.10	Check alternator and starter	Dredge crew	30.00	1	job	Alternator, reconditioning (to be performed by authorized DOOSAN dealer	n/a
B4.11	Check adjust valve clearance	Dredge crew	30.00	1	job	Valve clearance adjustment (to be performed by authorized DOOSAN dealer	n/a
B4.12	Check head bolts torques	n/a	10.00	n/a	n/a	n/a	n/a
B4.13	Check engine major component hoses	n/a	10.00	n/a	n/a	n/a	n/a

**Make and model: Doosan DX225LC**

PM Stage: **PM1d**

Maintenance Interval: **Every 10 hours or Daily**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Safety Hazard:

**Safety Hazard:**

1. Make sure to lock out the hydraulic controls and post a notice (Warning Tag) that the machine is being serviced to prevent any unauthorized operation.
2. Make sure to clean up any fluid spills, especially around the engine.
3. Inspect all fuel lines to make sure that fittings, lines, filters and O-rings, etc., are tight and are not showing signs of wear or damage.
4. If the inspection or test procedure requires that the engine be running, make sure to keep all unauthorized personnel away from the machine, and that all industry standard safety precautions are followed.

**Preliminary Work Machine Setup for Maintenance:**

1. Park on firm, level ground.
2. Lower bucket to ground.
3. Set safety lever on "LOCK" position.
4. Allow engine to run at low idle for a minimum of five minutes to allow engine to cool. If this is not done, heat surge may occur.
5. Shut down engine by turning key to "O" (OFF) position. Remove key from starter switch.
6. Before starting maintenance work, hang up a tag, "Do Not Touch When Performing Inspection or Maintenance" on cabin door or work lever.

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B1d.01	Grease boom, arm, front attachment pins & bushings and hydraulic cylinder shaft of supplementary pontoons	Dredge crew	10.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B1d.02	Grease swing bearing	Dredge crew	10.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B1d.03	Grease swing reduction device/gear hydraulic cylinders and piping for leaks and tighten if necessary.	Dredge crew	5.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B1d.04	Check level the window washer liquid.	Dredge crew	5.00	0.2	l	Washer Fluid	n/a
B1d.05	Inspect bucket teeth and side cutters for signs of wear.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.06	Inspect seat belt for proper operation.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.07	Cleaning/washing of AE after daily operation (Undercarriage and front structure).	Dredge crew	15.00	1	drum	Fresh Water	n/a

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
B1d.08	Check level of hydraulic oil tank.	Dredge crew	5.00	0.2	l	Oil, Hydraulic ISO VG. 68	n/a
B1d.09	Check for leaks in hydraulic system.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.10	Check oil level of swing reduction device.	Dredge crew	5.00	0.2	l	Oil, Gear, 80W-90	n/a
ENGINE SYSTEM							
B1d.11	Check engine oil level.	Dredge crew	5.00	0.2	l	Oil, engine lube, 15W40	n/a
B1d.12	Check fuel level.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.13	Check for leaks in fuel system.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.14	Check water separator & pre fuel filter and drain water as required.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.15	Clean dust net in front of oil cooler & intercooler.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.16	Check cooling system and refill as required.	Dredge crew	5.00	0.2	l	Coolant, Anti-Corrosive, Propylene Glycol	n/a
B1d.17	Inspect cooling fan blade.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.18	Check air intake system.	Dredge crew	5.00	n/a	n/a	n/a	n/a
UNDERCARRIAGE SYSTEM							
B1d.19	Inspect structure for cracks and faulty welds.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.20	Check operation of all switches.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.21	Check the operation of pilot cut-off switch.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.22	Check operation of all exterior lights, horns & control console indicator & monitor lights.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.23	Start engine, check starting ability and observe exhaust color. Listen for any abnormal sounds.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.24	Check operation all controls.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.25	Inspect undercarriage for signs of wear, missing parts and oil leakage (travel motors, sprockets, track chain assemblies, hydraulic system, etc.)	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.26	Check the track chain condition before and after traveling.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.27	Check the slacking of track tension ( Maintain: G= 1 1/2 to 2 1/2 Gap)	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.28	Ensure that the bottom and the top track chains of the pontoon are in the tension or flat.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.29	Lubricate track rollers after daily operation.	Dredge crew	10.00	2	l	Used Oil	n/a

Make and model: Doosan DX225LC

PM Stage: **PM1w**

Maintenance Interval: **Every 50 hours or Weekly**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B1w.01	Perform all daily service checks	Dredge crew	170.00	n/a	n/a	Refer to PM1	n/a
B1w.02	Grease axle bearing	Dredge crew	10.00	2	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
ENGINE SYSTEM							
B1w.03	Drain water and sediment from fuel tank	Dredge crew	10.00	n/a	n/a	n/a	n/a
B1w.04	Check engine fan belt for cracks, wear and correct tension (First 50 hours only)	Dredge crew	10.00	n/a	n/a	n/a	n/a
UNDERCARRIAGE SYSTEM							
B1w.05	Inspect the undercarriage assembly	Dredge crew	10.00	n/a	n/a	n/a	n/a
B1w.06	Change engine oil and filter (First 50 hours only)	Dredge crew	20.00	27	l	Oil, Engine Lube, 15W40	n/a
				1	pc	Element, Filter, Engine Oil	n/a

Make and model: Doosan DX225LC

PM Stage: **PM1m**

Maintenance Interval: **Every 250 hours or Monthly**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B1m.01	Perform all Daily and 50 Hours Service Checks.	Dredge crew	230.00	n/a	n/a	Refer to PM1 and PM2	n/a
B1m.02	Inspect pins and bushing of the front attachment for signs of wear.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.03	Check electrolyte levels in batteries and charging ammeter.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.04	Inspect for any loose or missing nuts and bolts.	Dredge crew	5.00	n/a	n/a	n/a	n/a
HYDRAULIC SYSTEM							
B1m.05	Check the gear oil condition of the hydraulic travel motor.	Dredge crew	5.00	4	l	Gear Oil, SAE 80W-90 (API GL5)	n/a
B1m.06	Change swing reduction device oil (Drain and refill after first 250 hour only)	Dredge crew	20.00	5	l	Oil, gear, SAE 80W-90 (API GL5)	n/a
B1m.07	Replace hydraulic oil return filter (After first 250 hours)	Dredge crew	20.00	1	pc	Element, return filter, hydraulic oil	n/a
B1m.08	Change oil in travel reduction device (one on each side of unit) (First 250 hours only)	Dredge crew	20.00	10.8	l	Oil, gear, SAE 80W-90 (API GL5)	n/a
B1m.09	Change pilot filter (after first 250 hours)	Dredge crew	20.00	1	pc	Element, pilot filter, hydraulic oil	n/a
ENGINE SYSTEM							
B1m.10	Check engine fan belt tension and check for signs of wear.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.11	Inspect fuel system hose clamps.	Dredge crew	5.00	n/a	n/a	n/a	n/a
UNDERCARRIAGE SYSTEM							
B1m.12	Inspect and replace deteriorated wearing plates.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.13	Inspect and replace deteriorated track pins.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.14	Check track chain slack and adjust tension.	Dredge crew	5.00	n/a	n/a	n/a	n/a

Make and model: Doosan DX225LC

PM Stage: **PM2**

Maintenance Interval: **Every 500 hours or 3 months**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B2.01	Perform Daily, 50, 250 Hour Service Checks.	Dredge crew	355.00	n/a	n/a	Refer to PM1, PM2 and PM3	n/a
B2.02	Grease swing gear and pinion.	Dredge crew	10.00	2	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B2.03	Clean air-conditioning outer filter.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.04	Clean air-conditioning inner filter.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.05	Clean radiator, oil cooler, intercooler, fuel cooler and a/c condenser core.	Dredge crew	20.00	n/a	n/a	n/a	n/a
B2.06	Clean outer filter of Air Cleaner.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.07	Painting of all pontoon, track roller & front attachment.	Dredge crew	180.00	3	gal	Paint, marine red lead primer (2-coat), pontoon L-R	n/a
				3	gal	Paint, Marine Gray (2-coat), pontoon L-R	n/a
				2	gal	Paint, marine Ditzler Orange (2-coat), Boom, Arm, Bucket	n/a
				3	gal	Paint, marine lacquer thinner	n/a
				2	pc	Brush, steel cup	n/a
				2	pc	Brush, steel	n/a
				2	pc	Roller, paint brush 4"	n/a
				2	pc	Brush, paint 4"	n/a
				5	kg	Rags, main deck	n/a
				30	pc	Sandpaper #120	n/a
				1	pail	Rust Remover	n/a
				2	gal	Solvent, industrial (Paint Remover)	n/a

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
B2.08	Change engine oil and filter.	Dredge crew	5.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
B2.09	Change engine oil and filter.	Dredge crew	20.00	27	lj	Oil, Engine Lube, 15W40	n/a
				1	pc	Element, Filter, Engine Oil	n/a
B2.10	Change water separator & pre fuel filter.	Dredge crew	20.00	1	pc	Element, filter, prefuel	n/a
B2.11	Change main fuel filter.	Dredge crew	20.00	1	pc	Element, filter, main fuel	n/a
				1	pc	Element, filter, fuel cap	n/a
UNDERCARRIAGE SYSTEM							
B2.12	Inspect rollers and bushings.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.13	Inspect and test all pontoon compartments.	Dredge crew	20.00	n/a	n/a	n/a	n/a
B2.14	Check track chain slack and adjust tension.	Dredge crew	20.00	1	job	Track chain tension adjustment ( ZCA= 1½ to 2½ inches)	n/a

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Make and model: Doosan DX225LC

PM Stage: **PM3**

Maintenance Interval: **Every 1000 hours or 6 months**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B3.01	Perform Daily, 50, 250 and 500 Hours Service Checks	Dredge crew	710.00	1	pc	Refer to PM1, PM2, and PM3	n/a
B3.02	Change air-conditioning outer filter.	Dredge crew	15.00	1	job	Element, air-con outer filter	n/a
B3.03	Check air-conditioner refrigerant.	Dredge crew	5.00	1	job	Freon 134A, charging works	n/a
B3.04	Check electrical system and control panels.	Doosan Dealer	15.00	1	job	Voltage Regulator, reconditioning (to be performed by authorized DOOSAN dealer)	n/a
B3.05	Replace batteries.	Dredge crew	10.00	2	pc	Battery, 12 V, 180 Ah	n/a
		Dredge crew		4	pc	Clamp, battery terminal	n/a
		Dredge crew		4	pc	Lug, battery terminal	n/a
ENGINE SYSTEM							
B3.06	Change air breather filter.	Dredge crew	15.00	1	pc	Element, air breather filter	n/a
B3.07	Check and adjust engine and inspect for defective parts.	Doosan Dealer	15.00	1	job	Engine compression pressure test (service only)	n/a
		Doosan Dealer		1	job	Injection pressure test (to be performed by authorized DOOSAN dealer)	n/a
		Doosan Dealer		1	job	Injection timing test (to be performed by authorized DOOSAN dealer)	n/a
HYDRAULIC SYSTEM							
B3.08	Replace hydraulic oil return filter.	Dredge crew	15.00	1	pc	Element, return filter, hydraulic oil	n/a
B3.09	Change pilot filter of hydraulic oil.	Dredge crew	15.00	1	pc	Element, pilot filter, hydraulic oil	n/a
B3.10	Change oil in travel reduction device.	Dredge crew	20.00	10.8	li	Oil, gear, SAE 80W-90 (API GL5)	n/a



Make and model: Doosan DX225LC

PM Stage: **PM4**

Maintenance Interval: **Every 2000 hours or yearly**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B4.01	Perform Daily, 50, 250 and 500 Hour Service Checks.	Dredge crew	710.00			Refer to PM1, PM2, PM3, PM4 and PM5	n/a
B4.02	Replace outer & inner air cleaner element	Dredge crew	15.00	1	pc	Filter, outer air cleaner	n/a
		Dredge crew		1	pc	Filter, inner air cleaner	n/a
B4.03	Inspect machine to check for cracked or broken welds and other damage	Dredge crew	15.00	n/a	n/a	n/a	n/a
HYDRAULIC SYSTEM							
B4.04	Change hydraulic oil & clean suction strainer	Dredge crew	15.00	195	li	Oil, hydraulic VG. 68	n/a
B4.05	Change swing reduction device oil	Dredge crew	20.00	5	li	Oil, gear, SAE 80W-90 (API GL5)	n/a
B4.06	Perform and record the results of the cycle time tests	Dredge crew	15.00	n/a	n/a	n/a	n/a
B4.07	Check undercarriage hydraulic hoses	n/a	10.00	n/a	n/a	n/a	n/a
B4.08	Check boom, arm & bucket cylinder line hoses	n/a	10.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
B4.09	Change radiator coolant	Dredge crew	20.00	24	li	Coolant, Anti-Corrosive, Propylene Glycol	n/a
B4.10	Check alternator and starter	Dredge crew	30.00	1	job	Alternator, reconditioning (to be performed by authorized DOOSAN dealer	n/a
B4.11	Check adjust valve clearance	Dredge crew	30.00	1	job	Valve clearance adjustment (to be performed by authorized DOOSAN dealer	n/a
B4.12	Check head bolts torques	n/a	10.00	n/a	n/a	n/a	n/a
B4.13	Check engine major component hoses	n/a	10.00	n/a	n/a	n/a	n/a

**Make and model: Doosan DX300**

PM Stage: **PM1d**

Maintenance Interval: **Every 10 hours or Daily**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Safety Hazard:

**Safety Hazard:**

1. Make sure to lock out the hydraulic controls and post a notice (Warning Tag) that the machine is being serviced to prevent any unauthorized operation.
2. Make sure to clean up any fluid spills, especially around the engine.
3. Inspect all fuel lines to make sure that fittings, lines, filters and O-rings, etc., are tight and are not showing signs of wear or damage.
4. If the inspection or test procedure requires that the engine be running, make sure to keep all unauthorized personnel away from the machine, and that all industry standard safety precautions are followed.

**Preliminary Work Machine Setup for Maintenance:**

1. Park on firm, level ground.
2. Lower bucket to ground.
3. Set safety lever or "LOCK" position.
4. Allow engine to run at low idle for a minimum of five minutes to allow engine to cool. If this is not done, heat surge may occur.
5. Shut down engine by turning key to "O" (OFF) position. Remove key from starter switch.
6. Before starting maintenance work, hang up a tag, "Do Not Touch When Performing Inspection or Maintenance" on cabin door or work lever.

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty	Unit	Item Description	
GENERAL							
B1d.01	Grease boom, arm, front attachment plns & bushings and hydraulic cylinder shaft of supplementary pontoons	Dredge crew	10.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B1d.02	Grease swing bearing	Dredge crew	10.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B1d.03	Grease swing reduction device/gear hydraulic cylinders and piping for leaks and tighten if necessary.	Dredge crew	5.00	1	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B1d.04	Check level the window washer liquid.	Dredge crew	5.00	0.2	li	Washer Fluid	n/a
B1d.05	Inspect bucket teeth and side cutters for signs of wear.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.06	Inspect seat belt for proper operation.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.07	Cleaning/washing of AE after daily operation (Undercarriage and front structure).	Dredge crew	15.00	1	drum	Fresh Water	n/a

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
B1d.08	Check level of hydraulic oil tank.	Dredge crew	5.00	0.2	ll	Oil, Hydraulic ISO VG. 68	n/a
B1d.09	Check for leaks in hydraulic system.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.10	Check oil level of swing reduction device.	Dredge crew	5.00	0.2	ll	Oil, Gear, 80W-90	
ENGINE SYSTEM							
B1d.11	Check engine oil level.	Dredge crew	5.00	0.2	ll	Oil, engine lube, 15W40	n/a
B1d.12	Check fuel level.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.13	Check for leaks in fuel system.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.14	Check water separator & pre fuel filter and drain water as required.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.15	Clean dust net in front of oil cooler & intercooler.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.16	Check cooling system and refill as required.	Dredge crew	5.00	0.2	ll	Coolant, Anti-Corrosive, Propylene Glycol	n/a
B1d.17	Inspect cooling fan blade.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.18	Check air intake system.	Dredge crew	5.00	n/a	n/a	n/a	n/a
UNDERCARRIAGE SYSTEM							
B1d.19	Inspect structure for cracks and faulty welds.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.20	Check operation of all switches.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.21	Check the operation of pilot cut-off switch.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.22	Check operation of all exterior lights, horns & control console indicator & monitor lights.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.23	Start engine, check starting ability and observe exhaust color. Listen for any abnormal sounds.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.24	Check operation all controls.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.25	Inspect undercarriage for signs of wear, missing parts and oil leakage (travel motors, sprockets, track chain assemblies, hydraulic system, etc.)	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.26	Check the track chain condition before and after traveling.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.27	Check the slacking of track tension ( Maintain: G= 1 1/2 to 2 1/2 Gap)	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.28	Ensure that the bottom and the top track chains of the pontoon are in the tension or flat.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1d.29	Lubricate track rollers after daily operation.	Dredge crew	10.00	2	ll	Used Oil	n/a

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Make and model: Doosan DX300

PM Stage: **PM1w**

Maintenance Interval: **Every 50 hours or Weekly**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B1w.01	Perform all daily service checks	Dredge crew	170.00	n/a	n/a	Refer to PM1	n/a
B1w.02	Grease axle bearing	Dredge crew	10.00	2	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
ENGINE SYSTEM							
B1w.03	Drain water and sediment from fuel tank	Dredge crew	10.00	n/a	n/a	n/a	n/a
B1w.04	Change engine oil and filter (First 50 hours only)	Dredge crew	20.00	36	l	Oil, Engine Lube, 15W40	n/a
				1	pc	Element, Filter, Engine Oil	n/a
UNDERCARRIAGE SYSTEM							
B1w.05	Inspect the undercarriage assembly	Dredge crew	10.00	n/a	n/a	n/a	n/a
B1w.06	Check engine fan belt for cracks, wear and correct tension (First 50 hours only)	Dredge crew	10.00	n/a	n/a	n/a	n/a

Make and model: Doosan DX300

PM Stage: **PM1m**

Maintenance Interval: **Every 250 hours or Monthly**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B1m.01	Perform all Daily and 50 Hours Service Checks.	Dredge crew	230.00	n/a	n/a	Refer to PM1 and PM2	n/a
B1m.02	Inspect pins and bushing of the front attachment for signs of wear.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.03	Check electrolyte levels in batteries and charging ammeter.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.04	Inspect for any loose or missing nuts and bolts.	Dredge crew	5.00	n/a	n/a	n/a	n/a
HYDRAULIC SYSTEM							
B1m.05	Check the gear oil condition of the hydraulic travel motor.	Dredge crew	5.00	4	li	Gear Oil, SAE 80W-90 (API GL5)	n/a
B1m.06	Change swing reduction device oil (Drain and refill after first 250 hour only)	Dredge crew	20.00	6	li	Oil, gear, SAE 80W-90 (API GL5)	n/a
B1m.07	Change oil in travel reduction device (one on each side of unit) (First 250 hours only)	Dredge crew	20.00	14	li	Oil, gear, SAE 80W-90 (API GL5)	n/a
B1m.08	Replace hydraulic oil return filter (After first 250 hours)	Dredge crew	20.00	1	pc	Element, return filter, hydraulic oil	n/a
B1m.09	Change pilot filter (after first 250 hours)	Dredge crew	20.00	1	pc	Element, pilot filter, hydraulic oil	n/a
ENGINE SYSTEM							
B1m.10	Check engine fan belt tension and check for signs of wear.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.11	Inspect fuel system hose clamps.	Dredge crew	5.00	n/a	n/a	n/a	n/a
UNDERCARRIAGE SYSTEM							
B1m.12	Inspect and replace deteriorated wearing plates.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.13	Inspect and replace deteriorated track pins.	Dredge crew	5.00	n/a	n/a	n/a	n/a
B1m.14	Check track chain slack and adjust tension.	Dredge crew	5.00	n/a	n/a	n/a	n/a

Make and model: Doosan DX300

PM Stage: **PM2**

Maintenance Interval: **Every 500 hours or 3 months**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B2.01	Perform Daily, 50, 250 Hour Service Checks.	Dredge crew	355.00	n/a	n/a	Refer to PM1, PM2 and PM3	n/a
B2.02	Grease swing gear and pinion.	Dredge crew	10.00	2	lb	Grease, Corrosion Resistant, Multipurpose Lithium, NLGI No. 2	Grease Gun
B2.03	Clean air-conditioning outer filter.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.04	Clean air-conditioning inner filter.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.05	Clean radiator, oil cooler, intercooler, fuel cooler and a/c condenser core.	Dredge crew	20.00	n/a	n/a	n/a	n/a
B2.06	Clean outer filter of Air Cleaner.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.07	Painting of all pontoon, track roller & front attachment.	Dredge crew	180.00	3	gal	Paint, marine red lead primer (2-coat), pontoon L-R	n/a
				3	gal	Paint, Marine Gray (2-coat), pontoon L-R	n/a
				2	gal	Paint, marine Ditzler Orange (2-coat), Boom, Arm, Bucket	n/a
				3	gal	Paint, marine lacquer thinner	n/a
				2	pc	Brush, steel cup	n/a
				2	pc	Brush, steel	n/a
				2	pc	Roller, paint brush 4"	n/a
				2	pc	Brush, paint 4"	n/a
				5	kg	Rags, main deck	n/a
				30	pc	Sandpaper #120	n/a
				1	pail	Rust Remover	n/a
				2	gal	Solvent, industrial (Paint Remover)	n/a

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HYDRAULIC SYSTEM							
B2.08	Check the oil level in travel reduction device.	Dredge crew	5.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
B2.09	Change engine oil and filter.	Dredge crew	20.00	36	li	Oil, Engine Lube, 15W40	n/a
				1	pc	Element, Filter, Engine Oil	n/a
B2.10	Change water separator & pre fuel filter.	Dredge crew	20.00	1	pc	Element, filter, prefuel	n/a
B2.11	Change main fuel filter.	Dredge crew	20.00	1	pc	Element, filter, main fuel	n/a
				1	pc	Element, filter, fuel cap	n/a
UNDERCARRIAGE SYSTEM							
B2.12	Inspect rollers and bushings.	Dredge crew	10.00	n/a	n/a	n/a	n/a
B2.13	Inspect and test all pontoon compartments.	Dredge crew	20.00	n/a	n/a	n/a	n/a
B2.14	Check track chain slack and adjust tension.	Dredge crew	20.00	1	job	Track chain tension adjustment ( ZCA= 1½ to 2½ inches)	n/a

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Make and model: Doosan DX300

PM Stage: **PM3**

Maintenance Interval: **Every 1000 hours or 6 months**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B3.01	Perform Daily, 50, 250 and 500 Hour Service Checks	Dredge crew	710.00	1	pc	Refer to PM1, PM2, PM3 and PM4	n/a
B3.02	Change air-conditioning outer filter.	Dredge crew	15.00	1	job	Element, air-con outer filter	n/a
B3.03	Check air-conditioner refrigerant.	Dredge crew	5.00	1	job	Freon 134A, charging works	n/a
B3.04	Check electrical system and control panels.	Doosan Dealer	15.00	1	job	Voltage Regulator, reconditioning (to be performed by authorized DOOSAN dealer)	n/a
B3.05	Replace batteries.	Dredge crew	10.00	2	pc	Battery, 12 V, 180 Ah	n/a
		Dredge crew		4	pc	Clamp, battery terminal	n/a
		Dredge crew		4	pc	Lug, battery terminal	n/a
HYDRAULIC SYSTEM							
B3.06	Replace hydraulic oil return filter.	Dredge crew	15.00	1	pc	Element, return filter, hydraulic oil	n/a
B3.07	Change pilot filter of hydraulic oil.	Dredge crew	15.00	1	pc	Element, pilot filter, hydraulic oil	n/a
B3.08	Change oil in travel reduction device.	Dredge crew	20.00	14	l	Oil, gear, SAE 80W-90 (API GL5)	n/a
ENGINE SYSTEM							
B3.09	Change air breather filter.	Dredge crew	15.00	1	pc	Element, air breather filter	n/a
B3.10	Check and adjust engine and inspect for defective parts.	Doosan Dealer	15.00	1	job	Engine compression pressure test (service only)	n/a
		Doosan Dealer		1	job	Injection pressure test (to be performed by authorized DOOSAN dealer)	n/a
		Doosan Dealer		1	job	Injection timing test (to be performed by authorized DOOSAN dealer)	n/a



Make and model: Doosan DX300

PM Stage: **PM4**

Maintenance Interval: **Every 2000 hours or yearly**

PPE: **Hand Gloves, Hard Hat, Goggles, Safety Shoes, Mask**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
B4.01	Perform Daily, 50, 250 and 500 Hour Service Checks.	Dredge crew	710.00	n/a	n/a	Refer to PM1, PM2, PM3, PM4 and PM5	n/a
B4.02	Replace outer & inner air cleaner element	Dredge crew	15.00	1	pc	Filter, outer air cleaner	n/a
		Dredge crew		1	pc	Filter, inner air cleaner	n/a
B4.03	Inspect machine to check for cracked or broken welds and other damage	Dredge crew	15.00	n/a	n/a	n/a	n/a
HYDRAULIC SYSTEM							
B4.04	Change hydraulic oil & clean suction strainer	Dredge crew	15.00	280	li	Oil, hydraulic VG. 68	n/a
B4.05	Change swing reduction device oil	Dredge crew	20.00	5	li	Oil, gear, SAE 80W-90 (API GL5)	n/a
B4.06	Perform and record the results of the cycle time tests	Dredge crew	15.00	n/a	n/a	n/a	n/a
B4.07	Check undercarriage hydraulic hoses	n/a	10.00	n/a	n/a	n/a	n/a
B4.08	Check boom, arm & bucket cylinder line hoses	n/a	10.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
B4.09	Change radiator coolant	Dredge crew	20.00	35	li	Coolant, Anti-Corrosive, Propylene Glycol	n/a
B4.10	Check alternator and starter	Dredge crew	30.00	1	job	Alternator, reconditioning (to be performed by authorized DOOSAN dealer	n/a
B4.11	Check adjust valve clearance	Dredge crew	30.00	1	job	Valve clearance adjustment (to be performed by authorized DOOSAN dealer	n/a
B4.12	Check head bolts torques	n/a	10.00	n/a	n/a	n/a	n/a
B4.13	Check engine major component hoses	n/a	10.00	n/a	n/a	n/a	n/a

# **ANNEX "L"**

## **PREVENTIVE MAINTENANCE MANUAL CUTTER SUCTION DREDGE (CSD)**

## Cutter Suction Dredge

PM Stage: **PM1d**Maintenance Interval: **Every 10 hours or Daily**PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
C1d.01	Perform daily walk around inspection		5	n/a	n/a	n/a	n/a
UPPER STRUCTURE SECTION							
C1d.02	Perform mopping and degreasing of Deck-Floor, Sidewalls, Exhaust Funnel, Safety Railings, and other surfaces (materials must be procured monthly)	Dredge crew	10	1	pc	Mop, Scrub Brush (w/ Holder)	n/a
				1	pc	Mop, Sponge (w/ Holder)	
				2	kg	Rags	
				3	kg	Powder Metal Cleaner, Marine	
				2	cans	WD40 (360mL)	
				1	gal	Water Soluble Degreaser	
				30	pcs	Garbage bag (big)	
	1	drum	Fresh water				
C1d.03	Visual inspection for early signs of oxidation	Dredge crew	1	n/a	n/a	n/a	n/a
C1d.04	Check lubrication of chain block assembly	Dredge crew	1	n/a	n/a	n/a	n/a
C1d.05	Check condition of shackles	Dredge crew	1	n/a	n/a	n/a	n/a
C1d.06	Check structural condition of safety railings	Dredge crew	1	n/a	n/a	n/a	n/a
C1d.07	Check for water day tank level	Dredge crew	1	n/a	n/a	n/a	n/a
C1d.08	Check for damaged electrical wiring insulations, integrity of the light mast structure and condition and functionality of all lighting fixtures	Dredge crew	2	n/a	n/a	n/a	n/a
FRONT STRUCTURE SECTION							
C1d.09	Check lubrication of pillow block, counter bearing, Foreside wire tumbling sheaves, Ladder hoisting wire sheaves, Center of rotation of ladder and cutter ladder winch	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.10	Check the condition of the "A" Frame Structure & Cutter Head Ladder, condition of swing block assembly and fittings and tighten loose bolts and nuts	Dredge crew	2	n/a	n/a	n/a	n/a
REAR STRUCTURE SECTION							
C1d.11	Check the condition of the Spud poles, Spud collar, Spud pins and Spud frames	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.12	Check lubrication of Spud pulleys, Spud ram ball joint, Spud hoisting block on both sides (Starboard and Portside) and hoisting wire and sheaves in the ladder gantry	Dredge crew	2	n/a	n/a		n/a

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HULL SECTION							
C1d.13	Remove foreign objects, barnacles and other marine growth above and below waterline	Dredge crew	10	n/a	n/a	n/a	scrapper
C1d.14	Check and evaluate for coating condition (Good/Fair/Poor)	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.15	Visual inspection for early signs of oxidation in the internal hull stiffener	Dredge crew	1	n/a	n/a	n/a	n/a
C1d.16	Check for leaks, dents or deformation	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.17	Check level of 'Oily Bilge Water' located at hull chamber	Dredge crew	2	n/a	n/a	n/a	n/a
INSTRUMENTATION AND CONTROL SECTION							
C1d.18	Check and ensure all control gauges are working properly <i>(after starting the engine)</i>	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.19	Listen for unwanted sounds	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.20	Perform lamp test	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.21	Check for signs of moisture or contamination inside panels of all safety breakers	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.22	Check electrical control panels if free of dirt, dust, rodents, and pesky bugs	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.23	Check for burnt and corroded electrical terminals, <i>replace or resplice if there's any</i>	Dredge crew	2	tbd	pcs	Electrical terminals	n/a
C1d.24	Check condition of electrical cable trays	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.25	Remove irrelevant objects on electrical cables	Dredge crew	5	n/a	n/a	n/a	n/a
ENGINE ROOM SECTION							
C1d.26	Perform mopping and degreasing of Deck-Floor, Sidewalls, Exhaust Funnel, Safety Railings, and other surfaces (materials must be procured monthly)	Dredge crew	10	1	pc	Mop, Scrub Brush (w/ Holder)	n/a
				1	pc	Mop, Sponge (w/ Holder)	
				2	kg	Rags	
				3	kg	Powder Metal Claeaner, Marine	
				2	cans	WD40 (360mL)	
				1	gal	Water Soluble Degreaser	
				30	pcs	Garbage bag (big)	
			10	1	drum	Fresh water	
C1d.27	Check for any leaks	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.28	Check gear oil level (Reduction Gear) and engine oil level (AE/DPE/MGE)	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.29	Check condition of sea water pump, all belts for wear and terision and general condition of all heat exchangers and oil cooler	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.30	Top-up fresh cooling water in expansion tanks of engines	Dredge crew	5	5	l	Water, Fresh	n/a
C1d.31	Listen for unwanted sounds and engine vibration	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.32	Check the condition and functionality of all lighting fixtures	Dredge crew	5	n/a	n/a	n/a	n/a

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
DREDGING SECTION							
Suction Side							
C1d.33	Remove foreign objects in the cutter crown assembly	Dredge crew	5	n/a	n/a	n/a	Machete knife
C1d.34	Check, Clean and Remove blockage from suction and discharge pipes	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.35	Check condition of hoses	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.36	Visual Inspection for early signs of oxidation	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.37	Check fittings and tighten loose U-bolts, bolts and nuts	Dredge crew	5	n/a	n/a	n/a	Adjustable Wrench/Vice grip
Pump Side							
C1d.38	Check signs of wear and leaks on pump cover (front and back)	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.39	Check compression packing seal, replace if necessary	Dredge crew	2	tbd	pcs	Packing seal	n/a
C1d.40	Remove foreign objects in the pump impeller assembly	Dredge crew	5	n/a	n/a	n/a	Machete knife
Discharge Side							
C1d.41	Visual Inspection for early signs of oxidation	Dredge crew	2	n/a	n/a	n/a	n/a
C1d.42	Check signs of wear on Stand pipe, elbow and S-pipe	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.43	Check signs of wear and leaks of onboard pipeline	Dredge crew	5	n/a	n/a	n/a	n/a
C1d.44	Check fittings and tighten loose U-bolts, bolts and nuts	Dredge crew	5	n/a	n/a	n/a	Adjustable Wrench/Vice grip

Cutter Suction Dredge

PM Stage: **PM1w**

Maintenance Interval: **Every 50 hours or weekly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
C1w.01	Grease foreside wire tumbling sheaves	Dredge crew	3	0.25	kg	Grease (NLGI No. 2)	Grease Gun
C1w.02	Grease ladder hoist wire and sheaves on the ladder and ladder gantry	Dredge crew	3	0.5	kg	Grease (NLGI No. 2)	Grease Gun
C1w.03	Grease ladder sheer back stay	Dredge crew	3	0.25	kg	Grease (NLGI No. 2)	Grease Gun
C1w.04	Grease ladder cable rollers	Dredge crew	3	0.25	kg	Grease (NLGI No. 2)	Grease Gun
C1w.05	Grease ladder bolt and ladder pin	Dredge crew	3	0.25	kg	Grease (NLGI No. 2)	Grease Gun
C1w.06	Grease center of rotation of ladder	Dredge crew	3	0.25	kg	Grease (NLGI No. 2)	Grease Gun
C1w.07	Grease swivel bend for discharge pipeline (if any)	Dredge crew	3	0.25	kg	Grease (NLGI No. 2)	Grease Gun
C1w.08	Grease spud wire and hoisting wire sheaves	Dredge crew	3	0.5	kg	Grease (NLGI No. 2)	Grease Gun
C1w.09	Grease spud ram ball joint	Dredge crew	3	0.25	kg	Grease (NLGI No. 2)	Grease Gun
C1w.10	Grease spud pulley	Dredge crew	3	0.25	kg	Grease (NLGI No. 2)	Grease Gun
C1w.11	Grease swing hoist wire and sheaves	Dredge crew	3	0.5	kg	Grease (NLGI No. 2)	Grease Gun
C1w.12	Grease swing block assembly	Dredge crew	3	0.5	kg	Grease (NLGI No. 2)	Grease Gun
C1w.13	Grease rest wire	Dredge crew	3	0.25	kg	Grease (NLGI No. 2)	Grease Gun
C1w.14	Grease cutter bearing and coupling	Dredge crew	3	0.5	kg	Grease (NLGI No. 2)	Grease Gun

Cutter Suction Dredge

PM Stage: **PM1m**

Maintenance Interval: **Every 250 hours or Monthly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Note: **(\*) Include only the type of engine that is applicable to the type of CSD**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
<b>*AUXILIARY ENGINE (AE)</b>							
C1m.06	Top-up engine oil level of AE	Dredge crew	10	2	li	Engine oil, SAE #40	n/a
C1m.07	Top-up engine oil level (reduction gear/turbo charger/governor/push rod)	Dredge crew	10	1	li	Gear oil, SAE #90	n/a
C1m.08	Top-up Hydraulic Tank with Hydraulic Oil <i>(omit for pneumatic type of CSD)</i>	Dredge crew	10	2	pails	Hydraulic oil VG. 68	n/a
C1m.09	Top up and put the battery charging switch of the auxiliary set at "off" (if mounted).	Dredge crew	5	1	li	Electrolyte, (Distilled Water)	n/a
C1m.10	Check fresh cooling water level in expansion tanks of engines on deck (well cooling)	Dredge crew	3	5	li	Water, Fresh	n/a
<b>*DREDGE PUMP ENGINE (DPE)</b>							
C1m.01	Top up engine oil of DPE	Dredge crew	10	2	li	Engine oil, SAE #40	n/a
C1m.02	Top-up oil levels (reduction gear/turbo charger/governor/push rod)	Dredge crew	10	1	li	Gear oil, SAE #90	n/a
C1m.03	Top-up Hydraulic Tank with Hydraulic Oil <i>(omit for pneumatic type of CSD)</i>	Dredge crew	10	2	pails	Hydraulic oil VG. 68	n/a
C1m.04	Top up and put the battery charging switch of the auxiliary set at "off" (if mounted).	Dredge crew	5	1	li	Electrolyte, (Distilled Water)	n/a
C1m.05	Check fresh cooling water level in expansion tanks of engines on deck (well cooling)	Dredge crew	3	5	li	Water, Fresh	n/a
<b>*MAIN GENERATOR ENGINE (MGE)</b>							
C1m.11	Top-up engine oil level of MGE	Dredge crew	10	2	li	Engine oil, SAE #40	n/a
C1m.12	Top-up engine oil level (reduction gear/turbo charger/governor/push rod)	Dredge crew	10	1	li	Gear oil, SAE #90	n/a
C1m.13	Top-up Hydraulic Tank with Hydraulic Oil <i>(omit for pneumatic type of CSD)</i>	Dredge crew	10	2	pails	Hydraulic oil VG. 68	n/a
C1m.14	Top up and put the battery charging switch of the auxiliary set at "off" (if mounted).	Dredge crew	5	1	li	Electrolyte, (Distilled Water)	n/a
C1m.15	Check fresh cooling water level in expansion tanks of engines on deck (well cooling)	Dredge crew	3	5	li	Water, Fresh	n/a

Cutter Suction Dredge

PM Stage: **PM2**

Maintenance Interval: **Every 650 hours or 4 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Note: **(\*) Include only the type of engine that is applicable to the type of CSD;**

**(\*\*) Quantity of Oil, Fuel and Air Filters depends on the type of the CSD; Some filters must be replaced only or cleaned only depending on the type of CSD.**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
C2.01	Perform PM1	Dredge crew	30	n/a	n/a	n/a	n/a
<b>*AUXILIARY ENGINE (AE)</b>							
C2.02	Perform engine change oil and replace/clean all filters	Dredge crew	2wd	**	drums	Engine Oil, SAE 40	2 empty used drums
				0.5	kg	Rags	
				**	pcs	Oil Filter	n/a
				**	pcs	Fuel Filter	n/a
C2.03	Check all electrical parts/components	Dredge crew	5	n/a	n/a	n/a	Multimeter
C2.04	Check air filter and DC generator	Dredge crew	5	n/a	n/a	n/a	n/a
<b>*DREDGE PUMP ENGINE (DPE)</b>							
C2.05	Perform engine change oil and replace/clean all filters	Dredge crew	2wd	**	drums	Engine Oil, SAE 40	2 empty used drums
				0.5	kg	Rags	
				**	pcs	Oil Filter	n/a
				**	pcs	Fuel Filter	n/a
C2.06	Check and clean oil cooler	Dredge crew	5	**	pcs	Air Filter	n/a
				1	can	WD40 (250 ml)	n/a
				0.5	kg	Rags	n/a
				1	gal	Stain remover liquid	n/a
<b>*MAIN GENERATOR ENGINE (MGE)</b>							
C2.07	Check and clean DC generator air filter, primary fuel filter, cooling sea water, filter, sea water leak and turbo-charger air filter.	Dredge crew	5	0.5	kg	Rags	n/a
C2.08	Perform engine change oil and clean all filters	Dredge crew	2wd	**	drums	Engine Oil, SAE 40	2 empty used drums
				**	pcs	Oil Filter	
				**	pcs	Fuel Filter	
				**	pcs	Air Filter	
				0.5	kg	Rags	
C2.09	Check cooling sea water pump	Dredge crew	3	n/a	n/a	n/a	n/a
C2.10	Check induction motor	Dredge crew	3	n/a	n/a	n/a	n/a
<b>DREDGE PUMP MAJOR COMPONENT AND WINCH MECHANISM</b>							
C2.11	Cleaning of Wavi Floats	Dredge crew	30	n/a	n/a	n/a	n/a
C2.12	Inspect corroded portion of cutter ladder, sea water and lube oil pipelines, <i>repair under CM if necessary</i>	Dredge crew	5	tbd	tbd	Portion of cutter ladder, sea water and lube oil pipelines	n/a
C2.13	Inspect corroded portion of spud, <i>repair under CM if necessary</i>	Dredge crew	5	tbd	tbd	Portion of spud	n/a



## Cutter Suction Dredge

PM Stage: **PM3**Maintenance Interval: **Every 1300 hours or 8 months**Safety: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles, Diver's suit (For wet location), various maintenance tools**Note: **(\*) Include only the type of engine that is applicable to the type of CSD**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
C3.01	Perform PM1 and PM2	Dredge Crew	2wd	n/a	n/a	n/a	n/a
<b>*AUXILIARY ENGINE (AE)</b>							
C3.02	Check/adjust/re-torque Connecting Rod Bearing, Main Bearing, valve clearance	Dredge Crew	2wd	n/a	n/s	n/a	Flat screw driver, Wrench, Feeler gauge.
<b>*MAIN GENERATOR ENGINE (MGE)</b>							
C3.02	Check and replace defective 12 pcs thermometer device, if any	Dredge Crew	1wd	tbd	pcs	Thermometer	n/a
C3.03	Check/adjust/re-torque Connecting Rod Bearing, Main Bearing, valve clearance	Dredge Crew	1wd	n/a	n/a	n/a	Flat screw driver, Wrench, Feeler gauge.
C3.04	Cleaning of fuel day tank	Dredge Crew	1wd	n/a	n/a	n/a	n/a
C3.05	Cleaning of Air starter (vane-leaf)	Dredge Crew	1wd	n/a	n/a	n/a	n/a
<b>*DREDGE PUMP ENGINE (DPE)</b>							
C3.03	Check worn-out belt of gland pump, <i>replace under CM if necessary</i>	Dredge Crew	5	tbd	pcs	Gland pump belt	n/a
C3.04	Check worn-out belt of alternator, <i>replace under CM if necessary</i>	Dredge Crew	5	tbd	pcs	Alternator belt	n/a
C3.07	Cleaning of Fuel Day Tank	Dredge Crew	4hrs	n/a	n/a	n/a	n/a
C3.08	Cleaning of oil pressure and water temperature sending unit	Dredge Crew	1hr	n/a	n/a	n/a	n/a
C3.10	Cleaning of cooling sea water pump Impeller	Dredge Crew	1hr	n/a	n/a	n/a	n/a
C3.11	Cleaning of 12 pcs Thermometer (intake/exhaust)	Dredge Crew	1hr	n/a	n/a	n/a	n/a
C3.12	Cleaning of 2 assy. DPE oil cooler	Dredge Crew	4hrs	n/a	n/a	n/a	n/a
C3.03	Check defective part/s of service pump, <i>replace under CM if necessary</i>	Dredge Crew	10	tbd	pcs	Service pump parts	n/a
<b>*DREDGE PUMP MAJOR COMPONENT AND WINCH MECHANISM</b>							
C3.04	Changing of oil of the air compressor	Dredge Crew	60	**	l	Oil, SAE 40	n/a
C3.05	Cleaning and greasing of sealing pump motor	Dredge Crew	60	0.25	kg	Grease, NLGI No. 2	Grease Gun
C3.06	Cleaning of pneumatic solenoid valves	Dredge Crew	60	n/a	n/a	n/a	n/a
C3.07	Inspect dredge pump liner, <i>replace under CM if necessary</i>	Dredge Crew	5	n/a	n/a	n/a	n/a
<b>OTHER ACCESSORIES</b>							
C3.08	Recondition of all onboard service pumps	Dredge Crew/ Technical Service	tbd	1	lot	Service Pumps, Parts and Service	n/a
C3.09	Servicing of all onboard air-conditioner units, if mounted		tbd	1	lot	Air Conditioner Unit, Parts and Service	n/a
C3.10	Recondition of all onboard electric/electronic instruments		tbd	1	lot	Electric/Electronic Instrument, and Service	n/a

## Cutter Suction Dredge

PM Stage: **PM4**Maintenance Interval: **Every 2000 hours or 12 months**Safety: **Hand Gloves, Hard Hat, Safety Shoes, Mask, Goggles, Diver's suit  
(For wet location), various maintenance tools**Note: **(\*) Include only the type of engine that is applicable to the type of CSD;****Item No. C4.17 of this PM Stage is applicable for Dredge Pinatubo I-A and I-B, Dredge 14-A and 14-B, Dredge 8-2 and 8-1 only;****For Dredge Pinatubo II-A and II-B, Dredge 10-3 and 10-4, Dredge Luzon II, Viasayas I and Visayas II and Dredge XCMG type of dredges, multiply each quantity of Item No. C4.17 of this PM Stage to 1.25 and round up the product;****For Dredge Pinatubo III-A and III-B and PDDP type of dredges, multiply each quantity of Item No. C4.17 of this PM Stage to 1.5 and round up the product.**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
C4.01	Perform PM1, PM2 and PM3	Dredge Crew	2wd	n/a	n/a	n/a	n/a
<b>*AUXILIARY ENGINE/DREDGE PUMP ENGINE</b>							
C4.02	Perform valve clearance adjustment	Dredge Crew	60	1	ldt	Service only, Valve clearance adjustment	Flat screw driver, Wrench, Feeler gauge.
				1	tube	Tri-bond, Sealant, AE	
				1	set	Gasket, valve cover, AE	
C4.03	Replace air cleaner element	Dredge Crew	60	1	pc	Element, air cleaner, AE	n/a
C4.04	Replace current fuses	Dredge Crew	15	1	pcs	Fuse, 80A	n/a
				1	pcs	Fuse, 63A	n/a
C4.05	Check for corroded zinc anode, AE cooling system, <i>replace under CM if necessary</i>	Dredge Crew	5	tbd	pcs	Zinc Anode	n/a
C4.06	Check liquidine seal kit, <i>replace under CM if necessary</i>	Dredge Crew	5	tbd	pcs	Liquid Seal Kit	n/a
C4.07	Check defective parts of clutch system, <i>replace under CM if necessary</i>	Dredge Crew	5	tbd	pcs	n/a	n/a
<b>*DREDGE PUMP MAJOR COMPONENT AND WINCH MECHANISM</b>							
C4.08	Check bolts and nuts of discharge pipes, <i>replace under CM if necessary</i>	Dredge Crew	5	tbd	pcs	Bolts and nuts	n/a
C4.09	Check Rubber gaskets of discharge pipe, <i>replace under CM if necessary</i>	Dredge Crew	5	tbd	pcs	Rubber Gaskets	n/a
C4.10	Check dredge pump liner, <i>replace under CM if necessary</i>	Dredge Crew	5	tbd	pcs	Pump Liner	n/a

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
C4.11	Painting of main deck, pilot house, spud ladder, winch room, and engine room	Dredge Crew	15wd	10	pc	4" Grinding stone/disc	Electric Grinder
				15	pc	7" Grinding stone/disc	
				5	pails	Paint, Marine (Black with Catalyst)	n/a
				5	pails	Paint, Marine (Gray with Catalyst)	n/a
				3	pails	Paint, Marine (White with Catalyst)	n/a
				5	pails	Paint, Marine, Primer, Epoxy	n/a
				5	pails	Paint, Lacquer Thinner	n/a
				4	pcs	Brush, Steel Cup	n/a
				4	pcs	Brush, Steel	n/a
				8	pcs	Roller Paint, Cotton 8"	n/a
				8	pcs	Roller Paint, Foam 4"	n/a
				8	pcs	Brush, Paint 4"	n/a
				8	pcs	Brush, Paint 2"	n/a
				6	pcs	Masking Tape 1"	n/a
				6	pcs	Masking Tape 2"	n/a
				8	pcs	Paint Tray	n/a
				8	kg	Powder Metal Cleaner	n/a
				5	pails	Rust Converter	n/a
				5	pails	Water Soluble Degreaser	n/a
				8	kg	Rags	n/a
				5	pails	Paint Remover	n/a
				25	pcs	Sand Paper #1000	n/a
				25	pcs	Sand Paper #120	n/a
				25	pcs	Sand Paper #240	n/a

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Cutter Suction Dredge

PM Stage: **PM5**

Maintenance Interval: **Every 2600 hours or 16 months**

Safety: **Hand Gloves, Hard Hat, goggles, Safety Shoes, Mask, Goggles, Diver's suit (For wet location), various maintenance tools**

Note: **(\*) Include only the type of engine that is applicable to the type of CSD**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
C5.01	Perform PM1, PM2 and PM3	Dredge Crew	2wd	n/a	n/a	n/a	n/a
<b>*AUXILIARY ENGINE (AE)</b>							
C5.02	Recondition air starter vane leaves	Dredge Crew/ Technical Service	tbd	1	lot	Outsourcing of technical services and parts needed	n/a
C5.03	Recondition Injector Tip		tbd	1	lot	Outsourcing of technical services and parts needed	n/a
C5.04	Recondition AC/DC generator		tbd	1	lot	Outsourcing of technical services and parts needed	n/a
<b>*MAIN GENERATOR ENGINE (MGE)</b>							
C5.05	Check governor lube oil, <i>replace under CM if necessary</i>	Dredge Crew/ Technical Service	tbd	1	lot	Outsourcing of technical services and parts needed	n/a
C5.06	Recondition Air starter (vane-leaf)		tbd	1	lot	Outsourcing of technical services and parts needed	n/a
<b>*DREDGE PUMP ENGINE (DPE)</b>							
C5.07	Recondition oil pressure and water temperature sending unit. <i>(Replace if necessary)</i>	Dredge Crew/ Technical Service	tbd	1	lot	Outsourcing of technical services and parts needed	n/a
C5.08	Recondition cooling sea water pump Impeller. <i>(Replace if necessary)</i>		tbd	1	lot	Outsourcing of technical services and parts needed	n/a
C5.09	Recondition 12 pcs Thermometer (intake/exhaust). <i>(Replace if necessary)</i>		tbd	1	lot	Outsourcing of technical services and parts needed	n/a
C5.10	Recondition 2 assy. DPE oil cooler. <i>(Replace if necessary)</i>		tbd	1	lot	Outsourcing of technical services and parts needed	n/a

Cutter Suction Dredge

PM Stage: **PM6**

Maintenance Interval: **Every 4000 hours or 2 years**

Safety: **Hand Gloves, Hard Hat, goggles, Safety Shoes, Mask, Goggles, Diver's suit (For wet location), various maintenance tools**

Note: **(\*) Include only the type of engine that is applicable to the type of CSD**  
**(\*\*) Quantities for item C.6.02 depends on the capacity of the type of CSD**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
C6.01	Perform PM 1, 2, 3 and 4	Dredge Crew	15wd	n/a	n/a	n/a	n/a
<b>*AUXILIARY ENGINE/MAIN GENERATOR ENGINE/DREDGE PUMP ENGINE</b>							
C6.02	Drain/clean/to-up cooling fresh water tank	Dredge Crew	1wd	**	li	Water, Fresh	n/a
				**	li	Coolant, Engine	n/a

# **A N N E X "M"**

## **PREVENTIVE MAINTENANCE MANUAL SUPPORT VESSEL (SV)**



Support Vessel Type: Anchor Barge

PM Stage: **PM1d**

Maintenance Interval: **Every 10 hours or Daily**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
D1.01	Perform Daily walk-around inspection	Dredge crew	5.00	n/a	n/a	n/a	n/a
D1.02	Perform Washing after Daily Operation including Top-up	Dredge crew	15.00	1	drum	Fresh Water	n/a
ENGINE SYSTEM							
D1.03	Check Engine Oil Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.04	Check Transmission Gear Oil Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.05	Check Fuel Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.06	Check Battery Terminals	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.07	Check Oil leaks, Water leaks, & Fuel leaks	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.08	Check Bilge Water Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.09	Check Fresh Water Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
PROPELLER SYSTEM							
D1.10	Grease Propeller Shaft	Dredge crew	3.00	0.5	lb.	Grease NLGI No. 2	Grease Gun
CRANE SYSTEM							
D1.11	Check Hydraulic Oil Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
WINCH SYSTEM							
D1.12	Grease Winch Pulley including Winch Brake, Pillow Block	Dredge crew	3.00	0.5	lb.	Grease NLGI No. 2	Grease Gun

Support Vessel Type: Anchor Barge

PM Stage: **PM1w**

Maintenance Interval: **Every 50 hours or Weekly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D1.01	Check Battery, Electrolyte Level	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.02	Check Reduction Gear Oil level	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.03	Check tension of Alternator belt	Dredge crew	2.00	n/a	n/a	n/a	n/a
WINCH SYSTEM							
D1.04	Check of Winch Cable	Dredge crew	3.00	0.5	lb.	Grease, NGLI No.2	Grease Gun

Support Vessel Type: Anchor Barge

PM Stage: **PM1m**

Maintenance Interval: **Every 200 hours or Monthly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D1.01	Top-up Battery, Electrolyte to level	Dredge crew	2.00	0.5	lit.	Electrolyte for Dry Cell Battery	n/a
D1.02	Top-up Engine Oil to level	Dredge crew	2.00	2	lit.	Engine Oil SAE #40	n/a
D1.03	Top-up Transmission Gear Oil to level	Dredge crew	2.00	2	lit.	Transmission Gear Oil SAE #140	n/a
D1.04	Correct Tension of Alternator Belt	Dredge crew	2.00	n/a	n/a	n/a	n/a
WINCH SYSTEM							
D1.05	Grease Winch Cable including Sheave	Dredge crew	10.00	1	lb	Grease, NGLI No.2	n/a
D1.06	Top-up Hydraulic Oil to level	Dredge crew	2.00	2	lit.	Hydraulic Oil VG #68	n/a



Support Vessel Type: Anchor Barge

PM Stage: **PM2**

Maintenance Interval: **Every 650 hours or 4 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D2.1	Change Engine Oil	Dredge crew	30.00	1	pail	Engine Oil SAE #40	n/a
D2.2	Change Oil Filter	Dredge crew	10.00	1	set	Oil Filter, as per sample	n/a
D2.3	Change Fuel Filter	Dredge crew	10.00	1	set	Fuel Filter, as per sample	n/a
D2.4	Paint Engine Room (White), Painting of Railings & Flooring (Black), Engine Wall (White), Engine (Catterpillar Yellow, Engine Name Plate Excluded), Gear & Sea Water Pipeline, Railings (Crystal Green), Fresh Waterline (Blue)	Dredge crew	240.00	1	gal.	Marine Paint, Black	Air Compressor and Electric Grinder with Grinding Stone
				1.5	gals.	Marine Paint, White	
				2	gals.	Marine Paint, Primer, Red Oxide	
				0.5	pail.	Marine Paint, Caterpillar Yellow	
				1	quart	Marine Paint, Blue	
				0.5	pail.	Marine Paint, Crystal Green	
				1	pail.	Marine Paint Primer, Yellow	
				2.5	pails.	Laquer Thinner	
				4	gals.	Thinner Acrylic Paint	
				1	gal	Paint Remover	
				1	pc.	Steel Brush	
				2	pcs.	Brush Paint 4" (for Paint Remover), Primer Paint	
				2	pcs.	Brush Paint 2" (for Paint Remover), Primer Paint	
				2	pcs.	Brush Paint 1" (for Paint Remover), Primer Paint	
				2	rolls.	Masking Tape 1"	
				2	rolls.	Masking Tape 2"	
				5	kqs.	Used Newspaper	
				1	pc.	Steel Cup Brush	
				25	pcs.	Abrasive Paper 240, 8.27" x 11.69" silicon carbide, water prrof	
				25	pcs.	Abrasive Paper 150, 8.27" x 11.69" silicon carbide, water prrof	
				2	kqs.	Rags for painting use, Cotton	

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
CABIN							
D2.5	Paint Pilot House (White), Flooring (Battleship Gray)	Dredge crew	180.00	1	gal	Marine Paint, Battleship Gray	Air Compressor and Electric Grinder with Grinding Stone
				1	gal	Marine Paint, White	
				2	gal	Marine Paint, Primer, Red Oxide	
				4	gals.	Thinner Acrylic Paint	
				1	gal	Paint Remover	
				4	pcs.	Steel Brush	
				2	pcs.	Brush Paint 4" (for Paint Remover), Primer Paint	
				2	pcs.	Brush Paint 2" (for Paint Remover), Primer Paint	
				2	pcs.	Brush Paint 1" (for Paint Remover), Primer Paint	
				2	rolls.	Masking Tape 1"	
				2	rolls.	Masking Tape 2"	
				3	kgs.	Used Newspaper	
				2	pcs.	Steel Cup Brush	
				25	pcs.	Abrasive Paper 240, 8.27" x 11.69" silicon carbide, water prrof	
				25	pcs.	Abrasive Paper 150, 8.27" x 11.69" silicon carbide, water prrof	
				2	kgs.	Rags for painting use, Cotton	

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
<b>HULL SYSTEM</b>							
D2.6	Paint Side Hull (Battleship Gray), Railings & Flooring (Crystal Green)	Dredge crew	180.00	1	pail	Marine Paint, Battleship Gray	Air Compressor and Electric Grinder with Grinding Stone
				1	pail	Marine Paint, Crystal Green	
				2.5	pails	Lacquer Thinner	
				0.5	pail	Paint Remover	
				1	pc.	Steel Brush	
				1	pc.	Brush Paint 4" (for Paint Remover), Primer Paint	
				1	pc.	Brush Paint 2" (for Paint Remover), Primer Paint	
				1	pc.	Brush Paint 1" (for Paint Remover), Primer Paint	
				1	pc.	Paint Roller 4"	
				2	rolls	Masking Tape 1"	
				2	rolls	Masking Tape 2"	
				1	kg.	Used Newspaper	
				1	pc.	Steel Cup Brush	
				10	pcs.	Abrasive Paper 240, silicon carbide, water proof	
				10	pcs.	Abrasive Paper 150, silicon carbide, water proof	
				1	kg.	Rags for painting use, Cotton	

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Support Vessel Type: Anchor Barge

PM Stage: **PM3**

Maintenance Interval: **Every 1,300 hours or 8 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D3.01	Check Charging status of Alternator Assembly	Dredge crew	2.00	n/a	n/a	n/a	n/a
D3.02	Check Starting status of Starter Motor and Solenoid Assembly	Dredge crew	2.00	n/a	n/a	n/a	n/a

Support Vessel Type: Anchor Barge

PM Stage: **PM4**

Maintenance Interval: **Every 2000 hours or yearly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D4.01	Drain & Refill Transmission Gear Oil	Dredge crew	60.00	1	pail	Transmission Gear Oil #40	n/a
D4.02	Replace Air filter	Dredge crew	10.00	1	pc.	Air Filter, aps	n/a
CRANE SYSTEM							
D4.03	Replace Hydraulic Hose, Hydraulic Pump & Inlet	Dredge crew	15.00	1	pc.	Hydraulic Hose 1"Ø, 2 mtrs. With Fittings	n/a
				1	pc.	Hydraulic Hose 3/4"Ø, 2 mtrs. With Fittings	
				1	pc.	Hydraulic Hose 1/2"Ø, 2 ft.	
D4.04	Drain & Refill Hydraulic Oil	Dredge crew	60.00	5	pails	Hydraulic Oil VG #68	n/a

Support Vessel Type: Anchor Barge

PM Stage: **PM5**

Maintenance Interval: **Every 2650 hours or 1 year and 4 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D5.01	Replace Battery 2D	Dredge crew	10.00	2	pcs	Battery, 2D	Wrench
				4	pcs	Battery Terminals	
				4	pcs	Battery Lugs	
D5.02	Calibrate Injector and Nozzles	Dredge crew	30.00	2	pcs.	Cooling Water Hoses, as per sample	n/a
D5.03	Replace Air Cleaner	Dredge crew	5.00	1	pc.	Air Cleaner (as per sample)	n/a
D5.04	Valve Clearance Adjustment	Dredge crew	10.00	n/a	n/a	n/a	n/a
D5.05	Replace Starter Motor/Solenoid	Dredge crew	15.00	n/a	n/a	n/a	n/a
D5.06	Recondition of Alternator	Dredge crew	30.00	n/a	n/a	n/a	n/a
D5.07	Calibrate Fuel Feed Pump	Dredge crew	30.00	n/a	n/a	n/a	n/a
D5.08	Transmission Cable (Forward and Reverse)	Dredge crew	20.00	1	set	Gasket, Valve Cover, as per sample	n/a
D5.09	Replace Voltage Regulator 24V	Dredge crew	10.00	1	pc.	Voltage Regulator 24V	n/a

Support Vessel Type: Anchor Barge

PM Stage: **PM6**

Maintenance Interval: **Every 4000 hours or 2 years**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D6.01	Drain and Refill Fuel Tank	Dredge crew	30.00	n/a	n/a	n/a	n/a
D6.02	Drain and refill Water Cooling System	Dredge crew	30.00	1	pail	Fresh Water	n/a

Support Vessel Type: Multi-cat

PM Stage: **PM1d**

Maintenance Interval: **Every 10 hours or Daily**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
D1.01	Perform Daily walk-around Inspection	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.02	Check Mooring Ropes	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.03	Check Loose Bolts and Nuts	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.04	Check Rubber Fenders Ropes	Dredge crew	1.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
D1.05	Check Engine Oil Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.06	Check Strainer of Fresh Cooling Water	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.07	Check Heat Exchanger Tank	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.08	Check Automatic Transmission Gear Box Oil Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.09	Check Fuel Tank Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.10	Check Battery Terminals 12V/8D	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.11	Check Terminals of Alternator 24V/80amp	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.12	Check Terminal of Starter Motor 24V/7.5kW	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.13	Check Pipelines, Oil leaks, Water leaks, & Fuel leaks	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.14	Check Bilge Water Level, pump out if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.15	Check Engine Room Working Light	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.16	Check Engine Gauges before and after engine has started	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.17	Check Rudder Major Components, functional reliabilities	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.18	Check Propeller Shaft, Grease if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.19	Check Gate Valves, Pipeline	Dredge crew	1.00	n/a	n/a	n/a	n/a

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
CRANE SYSTEM							
D1.20	Check Hydraulic Fittings	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.21	Check Boom-Crane Assembly	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.22	Check Cylinders, Hook and Pulleys, Grease if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.23	Check Hoses and Clamps	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.24	Check Hydraulic Tank Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
CABIN							
D1.25	Check Light Mast and other Working Lights	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.26	Check Panel Board with Gauges & Alarm Device	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.27	Check Navigational Lights	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.28	Cleaning and Washing of Pilot House after Daily Operation	Dredge crew	15.00	0.5	drum	Fresh Water	n/a
D1.29	Check Cabin Light	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.30	Check Windshield Glass	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.31	Check Windshield Wiper and Motor	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.32	Check Mast Base and Lights	Dredge crew	1.00	n/a	n/a	n/a	n/a
HULL SYSTEM							
D1.33	Clean and Washing Deck after Daily Operation	Dredge crew	15.00	0.5	drum	Fresh Water	n/a
D1.34	Check Manhole Hatches	Dredge crew	1.00	n/a	n/a	n/a	n/a

Support Vessel Type: Multi-cat

PM Stage: **PM1w**

Maintenance Interval: **Every 50 hours or Weekly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D1.01	Check Alternator Belts for wear and tear	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.02	Check Hydraulic Belts for weaver and tear	Dredge crew	1.00	n/a	n/a	n/a	n/a
PROPELLER SYSTEM							
D1.03	Check Rudder Major Components	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.04	Check Propeller Shaft	Dredge crew	1.00	n/a	n/a	n/a	n/a

T



Support Vessel Type: Multi-cat

PM Stage: **PM1m**

Maintenance Interval: **Every 200 hours or Monthly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D1.01	Top-up Engine Oil, to level	Dredge crew	2.00	5	lit.	Engine Oil SAE #40	n/a
D1.02	Clean Strainer of Fresh Cooling Water	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.03	Check Hoses and Clamps	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.04	Top-up Automatic Transmission Gear Box Oil, to level	Dredge crew	2.00	1	lit.	Gear oil SAE #90	n/a
D1.05	Top-up Battery Terminals 12V/8D	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.06	Clean Terminals of Alternator 24V/80amp	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.07	Clean Terminal of Starter Motor 24V/7.5kW	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.08	Refill Electrolyte Battery	Dredge crew	2.00	0.5	lit.	Electrolyte for Dry Cell Battery	n/a
PROPELLER SYSTEM							
D1.09	Grease Rudder Major Components	Dredge crew	3.00	14	lbs.	Grease NLGI No. 2	Grease Gun
D1.10	Grease Propeller Shaft	Dredge crew	3.00				
D1.11	Replace Packing Seal of Shaft Propeller	Dredge crew	5.00	1	box	Packing Seal, impregnated, 3/4"Ø, 5lbs./box	n/a
D1.12	Refill Electrolyte Battery	Dredge crew	2.00	1	lit.	Electrolyte for Dry Cell Battery	n/a
CRANE SYSTEM							
D1.13	Top-up Hydraulic Tank Level	Dredge crew	2.00	5	lit.	Hydraulic Oil VG #68	n/a

X

Support Vessel Type: Multi-cat

PM Stage: **PM2**

Maintenance Interval: **Every 650 hours or 4 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D2.01	Change Engine Oil	Dredge crew	10.00	2	pails	Engine Oil SAE #40	n/a
D2.02	Replace Cartridge, Oil Filter	Dredge crew	10.00	1	pc.	Oil Filter Cartridge, as per sample	n/a
D2.03	Replace Cartridge, Fuel Filter	Dredge crew	10.00	1	pc.	Fuel Filter Cartridge, as per sample	n/a
D2.04	Replace Cartridge of Hydraulic Oil Filter, aps	Dredge crew	10.00	1	pc.	Hydraulic Oil Filter, as per sample	n/a
D2.05	Clean Sea Water Strainer	Dredge crew	5.00	n/a	n/a	n/a	n/a
D2.06	Paint Engine Side Shell (White), Sea Water Pipeline (Sea Green), Engine Assembly (Caterpillar Yellow), Fresh Waterline Pipe (Blue), Flooring (Battleship Gray)	Dredge crew	240.00	1	gal	Marine Paint, White	Air Compressor and Electric Grinder
				2	lit.	Marine Paint, Sea Green	
				1	lit.	Marine Paint, Caterpillar Yellow	
				1	lit.	Marine Paint, Blue	
				1	gal.	Marine Paint, Battleship Gray	
				1	gal.	Marine Paint Primer, Red Lead	
				3	gals.	Thinner Acrylic Paint	
				1	gal.	Paint Remover	
				1	pc.	Steel Brush	
				1	pc.	Grinding Stone, 4"Ø	
				2	pcs.	Brush Paint 4" (for Paint Remover), Primer Paint	
				2	pcs.	Brush Paint 2" (for Paint Remover), Primer Paint	
				2	pcs.	Brush Paint 1" (for Paint Remover), Primer Paint	
				2	rolls	Masking Tape 1"	
				2	rolls	Masking Tape 2"	
				5	kgs.	Used Newspaper	
				1	pc.	Steel Cup Brush	
				25	pcs.	Abrasive Paper 240, 8.27" x 11.69" silicon	
				25	pcs.	Abrasive Paper 150, 8.27" x 11.69" silicon	
				2	kgs.	Rags for painting use, Cotton	

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
CABIN							
D2.07	Clean and Repaint Dilapidating Portion of Pilot House, Deck, Hull, Boom-Crane Assembly	Dredge crew	180.00	1	pc.	Scrub with Stick	Air Compressor and Electric Grinder
				1	pc.	Mop Head with Stick	
				1	gal.	Marine Paint, White	
				1	gal.	Marine Paint, Gray	
				1	gal.	Marine Paint, Green	
				1	gal.	Marine Paint, Yellow	
				2	gals.	Marine Paint Primer, Red Lead	
				6	gals.	Thinner Acrylic Paint	
				1	gal.	Paint Remover	
				1	pc.	Steel Brush	
				1	pc.	Steel Cup Brush	
				1	pc.	Grinding Stone, 4"Ø	
				2	pcs.	Brush Paint 4"	
				2	pcs.	Brush Paint 2"	
				2	pcs.	Brush Paint 1"	
				1	roll.	Masking Tape 1"	
				1	roll.	Masking Tape 2"	
				2	kgs.	Used Newspaper	
				25	pcs.	Abrasive Paper 240, 8.27" x 11.69" silicon	
				25	pcs.	Abrasive Paper 150, 8.27" x 11.69" silicon	
				2	kgs.	Rags for Painting use, Cotton	

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Support Vessel Type: Multi-cat

PM Stage: **PM3**

Maintenance Interval: **Every 1,300 hours or 8 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty	Unit	Item Description	
ENGINE SYSTEM							
D3.01	Check charging status of Alternator Assembly, service if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.02	Check starting status of Starter Motor Assembly, service if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.03	Check status of Starter Motor Solenoid Assembly, service if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.04	Check status of Relay on Lighting and Sensor for All Gauges, service if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.05	Re-align and re-tighten of Alternator Belt	Dredge crew	5.00	n/a	n/a	n/a	n/a
D3.06	Re-align and re-tighten of Hydraulic Pump Belt	Dredge crew	5.00	n/a	n/a	n/a	n/a
D3.07	Check Voltage Regulator, service if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.08	Perform Lamp Test, service if necessary	Dredge crew	3.00	n/a	n/a	n/a	n/a
D3.09	Check Injection Pump, service if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.10	Check Injector Nozzle Tip, service if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a

Support Vessel Type: Multi-cat

PM Stage: **PM4**

Maintenance Interval: **Every 2000 hours or yearly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D4.01	Recondition of Turbocharger Assembly, demounting/remounting	Dredge crew	60.00	n/a	n/a	n/a	n/a
D4.02	Repalce Air Filter	Dredge crew	10.00	1	pc.	Air Filter, aps	n/a

Support Vessel Type: Multi-cat

PM Stage: **PM5**

Maintenance Interval: **Every 2650 hours or 1 year and 4 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D5.01	Recondition Charging status of Alternator Assembly	Dredge crew	15.00	n/a	n/a	n/a	n/a
D5.02	Recondition Starting Power of Starter Motor and Solenoid Assembly	Dredge crew	15.00	n/a	n/a	n/a	n/a
D5.03	Recondition Sensor on All Panel Gauges	Dredge crew	15.00	n/a	n/a	n/a	n/a
D5.04	Replace Alternator Belt	Dredge crew	10.00	1	pc.	Alternator Belt, aps	n/a
D5.05	Replace Hydraulic Pump Belt	Dredge crew	10.00	1	pc.	Hydraulic Pump Belt	n/a
D5.06	Replace Voltage Regulator	Dredge crew	10.00	1	pc.	Voltage Regulator 24V	n/a
D5.07	Perform Lamp Test in Engine Room	Dredge crew	1.00	n/a	n/a	n/a	n/a
D5.08	Calibrate Injection Pump	Dredge crew	30.00	n/a	n/a	n/a	n/a
D5.09	Calibrate Injector Nozzle Tip	Dredge crew	30.00	n/a	n/a	n/a	n/a
D5.10	Correct Valve Adjust Clearance	Dredge crew	10.00	n/a	n/a	n/a	n/a
D5.11	Replace Battery 4D	Dredge crew	10.00	2	pcs.	Battery 4D	n/a
				4	pcs.	Clamp, Battery Terminal	
				4	pcs.	Lugs, Battery Terminal	
				4	pcs.	Battery Cable, aps	
CABIN							
D5.12	Recondition of Relays or Switches on All Navigational Lights, recondition	Dredge crew	30.00	n/a	n/a	n/a	n/a
D5.13	Recondition of All Fixtures onboard, recondition	Dredge crew	30.00	n/a	n/a	n/a	n/a

Support Vessel Type: Multi-cat

PM Stage: **PM6**

Maintenance Interval: **Every 4000 hours or 2 years**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D6.01	Drain and Refill of Gear Box Oil	Dredge crew	60.00	1	pail	Gear oil SAE# 90	n/a
D6.02	Drain and Refill Fuel Tank	Dredge crew	30.00	n/a	n/a	n/a	n/a
D6.04	Drain and refill Water Cooling System	Dredge crew	30.00	1	pail	Fresh Water	n/a
CRANE SYSTEM							
D6.03	Drain and Refill Hydraulic Tank	Dredge crew	60.00	2	pail	Hydraulic Oil VG #69	n/a

T

Support Vessel Type: Tender (Single Engine)

PM Stage: **PM1d**

Maintenance Interval: **Every 10 hours or Daily**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
D1.01	Perform Daily walk-around Inspection	Dredge crew	5.00	n/a	n/a	n/a	n/a
D1.02	Check Cleanliness of Engine Room	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.03	Check for Leaks, Water, Oil, Fuel	Dredge crew	1.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
D1.04	Check Water Level, Radiator	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.05	Check Engine Oil	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.06	Check Starter Terminal	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.07	Check Battery Terminal	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.08	Check Belt Tension of Water Pump for Engine Cooling	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.09	Check Belt, Alternator	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.10	Check Fuel Tank Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.11	Check Voltage Regulator	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.12	Check Bilge Water Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.13	Check Engine Pressure Gauge	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.14	Check Working Light	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.15	Check Air Cleaner	Dredge crew	1.00	n/a	n/a	n/a	n/a

Support Vessel Type: Tender (Single Engine)

PM Stage: **PM1w**

Maintenance Interval: **Every 50 hours or Weekly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D1.01	Check Battery, Electrolyte Level	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.02	Check Motor Oil	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.03	Check Fuel Filter	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.04	Check Spark Plug	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.05	Check Gear Oil	Dredge crew	1.00	n/a	n/a	n/a	n/a
PROPELLER SYSTEM							
D1.06	Grease Propulsion Shaft	Dredge crew	3.00	2	lb.	Grease NLGI No. 2	Grease Gun
HULL SYSTEM							
D1.07	Clean Upper Deck before and after using the Equipment	Dredge crew	15.00	3	drums	Fresh Water	n/a
				1	pc.	Scrub with Stick	
				1	pc.	Mop Head	
				4	lit.	Liquid Soap	

Support Vessel Type: Tender (Single Engine)

PM Stage: **PM1m**

Maintenance Interval: **Every 200 hours or Monthly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D1.01	Top-up Battery, Electrolyte to level	Dredge crew	2.00	0.5	lit.	Electrolyte for Dry Cell Battery	n/a
D1.02	Top-up Engine Oil to level	Dredge crew	2.00	2	lit.	Engine Oil SAE #40	n/a
D1.03	Top-up Gear Oil to level	Dredge crew	2.00	0.5	lit.	Transmission Gear Oil SAE #140	n/a
D1.04	Top-up Water to level	Dredge crew	2.00	0.5	lit.	Fresh Water	n/a



Support Vessel Type: Tender (Single Engine)

PM Stage: **PM2**

Maintenance Interval: **Every 650 hours or 4 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D2.01	Change Engine Oil	Dredge crew	60.00	2	pails	Engine Oil SAE #40	n/a
D2.02	Change Oil Filter	Dredge crew	10.00	1	pc.	Oil Filter, as per sample	n/a
D2.03	Change Fuel Filter	Dredge crew	10.00	1	pc.	Fuel Filter, as per sample	n/a
D.04	Paint Wall (White), Engine (Excluded Engine Name Plate - Caterpillar Yellow), Gear & Sea Water Pipeline, Fresh Waterline Pipeline (Blue)	Dredge crew	240.00	2	gal	Marine Paint, White	Air Compressor and Electric Grinder with Grinding Stone
				2	gal	Marine Paint, Caterpillar Yellow	
				1	lit.	Marine Paint, Blue	
				2	gal	Marine Paint, Crystal Green	
				2	gal	Marine Paint Primer, Yellow	
				8	gals	Thinner Acrylic Paint	
				1	pail	Paint Remover	
				2	pcs.	Steel Brush	
				1	pc.	Steel Cup Brush	
				2	pcs.	Brush Paint 4"	
				2	pcs.	Brush Paint 2"	
				2	pcs.	Brush Paint 1"	
				2	pcs.	Paint Roller 4	
				3	roll\$	Masking Tape 1"	
				3	roll\$	Masking Tape 2"	
				2	kgs.	Used Newspaper	
				25	pcs.	Abrasive Paper 240, 8.27" x 11.69" silicon	
				25	pcs.	Abrasive Paper 150, 8.27" x 11.69" silicon	
				2	kgs.	Rags for Painting use, Cotton	

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HULL SYSTEM							
D2.05	Paint Side Hull (Battleship Gray), Pilot House (White), Railings & Flooring (Crystal Green), Railings & Flooring (Crystal Green),	Dredge crew	180.00	2	gal.	Marine Paint, Battleship Gray	Air Compressor and Electric Grinder with Grinding Stone
				2	gal.	Marine Paint, Crystal Green	
				2	gal.	Marine Paint, White	
				6	gal.	Thinner Acrylic Paint	
				1	gal.	Paint Remover	
				2	pcs.	Steel Brush	
				1	pc.	Steel Cup Brush	
				2	pcs.	Brush Paint 4"	
				2	pcs.	Brush Paint 2"	
				2	pcs.	Brush Paint 1"	
				2	pcs.	Paint Roller 4	
				3	rolls	Masking Tape 1"	
				3	rolls	Masking Tape 2"	
				2	kgs.	Used Newspaper	
				25	pcs.	Abrasive Paper 240, 8.27" x 11.69" silicon	
				25	pcs.	Abrasive Paper 150, 8.27" x 11.69" silicon	
				2	kgs.	Rags for Painting use, Cotton	

Support Vessel Type: Tender (Single Engine)

PM Stage: **PM3**

Maintenance Interval: **Every 1,300 hours or 8 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D3.01	Check Voltage Regulator	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.02	Check Battery Relay, Terminal	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.03	Check Alternator , Charging	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.04	Check Starter, Listen for Start-up Sound	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.05	Check Battery Terminal & Cables	Dredge crew	1.00	n/a	n/a	n/a	n/a

Support Vessel Type: Tender (Single Engine)

PM Stage: **PM4**

Maintenance Interval: **Every 2000 hours or yearly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty	Unit	Item Description	
ENGINE SYSTEM							
D4.01	Replace Air Filter	Dredge crew	10.00	1	pc.	Air Filter, as per sample	n/a

Support Vessel Type: Tender (Single Engine)

PM Stage: **PM5**

Maintenance Interval: **Every 2650 hours or 1 year and 4 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty	Unit	Item Description	
ENGINE SYSTEM							
D5.01	Calibrate Injector and Nozzles	Dredge crew	60.00	n/a	n/a	n/a	n/a
D5.02	Adjust Valve Clearance	Dredge crew	10.00	n/a	n/a	n/a	n/a
D5.03	Recondition Starter Motor	Dredge crew	15.00	n/a	n/a	n/a	n/a
D5.04	Recondition Alternator	Dredge crew	15.00	n/a	n/a	n/a	n/a
D5.05	Replace Voltage Regulator, 24V	Dredge crew	10.00	1	pc.	Voltage Regulator, 24V	n/a
D5.07	Replace Battery 4D	Dredge crew	10.00	2	pcs.	Battery 4D	n/a
				4	pcs.	Clamp, Battery Terminal	
				4	pcs.	Lugs, Battery Terminal	
CABIN							
D5.08	Recondition Status of Relays or Switches on All Navigational Lights	Dredge crew	n/a	n/a	n/a	n/a	n/a
D5.09	Recondition Status of All Fixtures onboard	Dredge crew	n/a	n/a	n/a	n/a	n/a

Support Vessel Type: Tender (Single Engine)

PM Stage: **PM6**

Maintenance Interval: **Every 4000 hours or 2 years**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D6.01	Drain and refill Water Cooling System	Dredge crew	30.00	1	pail	Fresh Water	n/a

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Support Vessel Type: Workboat (Single Engine)

PM Stage: **PM1d**

Maintenance Interval: **Every 10 hours or Daily**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
D1.01	Perform Daily walk-around Inspection	Dredge crew	5.00	n/a	n/a	n/a	n/a
D1.02	Perform Washing after Daily Operation including top-up	Dredge crew	15.00	1	drum	Fresh Water	n/a
CRANE SYSTEM							
D1.03	Check for Oil Leaks, Hose	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.04	Clean Boom Assembly	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.05	Check Gear Oil and Hydraulic Motor Swing (Starboard/Portside) Reduction Gear, Top-up if necessary	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.06	Check Cables	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.07	Check Hydraulic Cylinders	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.08	Grease fittings	Dredge crew	1.00	0.5	lb.	Grease NLGI No. 2	Grease Gun
WINCH SYSTEM							
D1.09	Grease Cable Roller	Dredge crew	1.00	0.5	lb.	Grease NLGI No. 2	Grease Gun
D1.10	Grease Winch Gear & Winch Cable	Dredge crew	3.00	0.5	lb.	Grease NLGI No. 2	Grease Gun

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D1.11	Check Engine Oil Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.12	Check Transmission Oil Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.13	Check Reduction Gear Oil Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.14	Check Fresh Water Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.15	Check Fuel Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.16	Check Hydraulic Oil Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.17	Check Battery Terminals/Starter/Alternator	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.18	Check Belt, Hydraulic Pump/Sea Water Pump/General Service Pump/Alternator	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.19	Check for Oil leaks and Water leaks	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.20	Check the status of Heat Exchanger Assembly	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.21	Grease Shaft Impeller	Dredge crew	3.00	0.5	lb.	Grease NLGI No. 2	Grease Gun

Support Vessel Type: Workboat (Single Engine)

PM Stage: **PM1w**

Maintenance Interval: **Every 50 hours or Weekly**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
CRANE SYSTEM							
D1.01	Check Pins & Bushing of Boom Side	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.02	Check Swing Gear	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.03	Check Hydraulic oil level	Dredge crew	2.00	n/a	n/a	n/a	n/a
ENGINE SYSTEM							
D1.04	Chech Battery, Electrolytes Level	Dredge crew	1.00	n/a	n/a	n/a	n/a
WINCH SYSTEM							
D1.05	Check Gear oil level of Winch Motor	Dredge crew	1.00	n/a	n/a	n/a	n/a

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Support Vessel Type: Workboat (Single Engine)

PM Stage: **PM1m**Maintenance Interval: **Every 200 hours or Monthly**PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
GENERAL							
D1.01	Visual Inspection for early signs of Oxidation, perform cleaning and repainting if needed	Dredge crew	1.00	n/a	n/a	n/a	n/a
D1.02	Check Condition and Functionality of all Lighting Fixtures	Dredge crew	1.00	n/a	n/a	n/a	n/a
HULL SYSTEM							
D1.03	Perform mopping of Deck Floor, Side Walls, and Exhaust Funnel (after daily operation)	Dredge crew	15.00	2	pcs.	Scrub Brush Mop (with Stick Holder)	n/a
				1	pc.	Sponge Mop (with Stick Holder)	
				1	gal.	Water Soluble Degreaser	
D1.04	Check Structural Condition of Safety Railings	Dredge crew	1.00	n/a	n/a	n/a	n/a
CRANE SYSTEM							
D1.05	Top-up Swing Motor, Gear Oil, Starboard/Portside	Dredge crew	1.00	2	lit.	Gear Oil #90	n/a
D1.06	Clean Hydraulic Filter	Dredge crew	2.00	n/a	n/a	n/a	n/a
D1.07	Grease Pins & Bushing of Boom Side	Dredge crew	2.00	0.5	lb	Grease NLGI No. 2	Grease Gun
D1.08	Top-up Hydraulic Oil to level	Dredge crew	1.00	3	lit.	Hydraulic Oil #68	n/a
ENGINE SYSTEM							
D1.09	Top-up Battery, Electrolyte to level	Dredge crew	1.00	0.5	lit.	Electrolyte for Dry Cell Battery	n/a
D1.10	Top-up Fresh Water to level	Dredge crew	1.00	1	lit.	Fresh water	n/a
D1.11	Top-up Engine Oil to level	Dredge crew	1.00	2	lit.	Engine Oil SAE #40	n/a



Support Vessel Type: Workboat (Single Engine)

PM Stage: **PM2**Maintenance Interval: **Every 650 hours or 4 months**PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
CRANE SYSTEM							
D2.01	Top-up Gear Oil of Reduction Gear	Dredge crew	1.00	2	lit.	Reduction Gear Oil SAE #90	n/a
ENGINE SYSTEM							
D2.02	Change Engine Oil	Dredge crew	60.00	2	pails	Engine Oil SAE #40	n/a
D2.03	Element Oil Filter, replace	Dredge crew	10.00	2	pcs.	Element Oil Filter, as per sample	n/a
D2.04	Element Fuel Filter, replace	Dredge crew	10.00	1	pc.	Element Fuel Filter, as per sample	n/a
D2.05	Top-up Gear Oil, Reduction Gear	Dredge crew	1.00	0.5	lit.	Reduction Gear Oil SAE #90	n/a
D2.06	Top-up Gear Oil, Transmission	Dredge crew	1.00	0.5	lit.	Transmission Gear Oil #140	n/a
D2.07	Paint Engine Room (White), Flooring (Black), Side Hull (Battleship Gray), and Engine (Yellow)	Dredge crew	240.00	1	gals.	Marine Paint, White	Air Compressor and Electric Grinder with Grinding Stone
				1	gals.	Marine Paint, Black	
				1	gals.	Marine Paint, Battleship Gray	
				2	lit.	Marine Paint, Caterpillar Yellow	
				2	gals.	Marine Paint Primer, Gray	
				5	gals.	Thinner Acrylic Paint	
				1	gal	Paint Remover	
				2	pcs.	Steel Brush	
				1	pc.	Steel Cup Brush	
				2	pcs.	Brush Paint 4"	
				2	pcs.	Brush Paint 2"	
				2	pcs.	Brush Paint 1"	
				2	pcs.	Paint Roller 4	
				2	rolls	Masking Tape 1"	
				2	rolls	Masking Tape 2"	
				5	kgs.	Used Newspaper	
				25	pcs.	Abrasive Paper 240, 8.27" x 11.69" silicon	
				25	pcs.	Abrasive Paper 150, 8.27" x 11.69" silicon	
				2	kgs.	Rags for Painting use, Cotton	

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Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
HULL SYSTEM							
D2.08	Paint Upper Deck Flooring (Black) & Pilot House of Workboat (Battleship Gray)	Dredge crew	180.00	1	gal	Marine Paint, Battleship Gray	Air Compressor and Electric Grinder with Grinding Stone
				1	gal	Marine Paint, Black	
				2	gal	Marine Paint Primer, Gray	
				4	gals.	Thinner Acrylic Paint	
				1	gal	Paint Remover	
				2	pcs.	Steel Brush	
				1	pc.	Steel Cup Brush	
				2	pcs.	Brush Paint 4"	
				2	pcs.	Brush Paint 2"	
				2	pcs.	Brush Paint 1"	
				2	pcs.	Paint Roller 4	
				2	rolls	Masking Tape 1"	
				2	rolls	Masking Tape 2"	
				5	pcs.	Used Newspaper	
				25	pcs.	Abrasive Paper 240, 8.27" x 11.69" silicon	
				25	pcs.	Abrasive Paper 150, 8.27" x 11.69" silicon	
				2	pcs.	Rags for Painting use, Cotton	

Support Vessel Type: Workboat (Single Engine)

PM Stage: **PM3**Maintenance Interval: **Every 1,300 hours or 8 months**PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D3.01	Check Voltage Regulator Condition	Dredge crew	1.00	n/a	n/a	n/a	n/a
D3.02	Clean Battery Terminals	Dredge crew	1.00	n/a	n/a	n/a	n/a

Support Vessel Type: Workboat (Single Engine)

PM Stage: **PM4**Maintenance Interval: **Every 2000 hours or yearly**PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D4.01	Drain and refill Transmission Oil	Dredge crew	30.00	1	pail	Transmission Gear Oil #140	n/a
D4.02	Drain and refill Reduction Gear Oil	Dredge crew	30.00	1	pail	Reduction Gear Oil #90	n/a
D4.03	Replace Air filter	Dredge crew	10.00	1	pc.	Air Filter, as per sample	n/a
D4.04	Recondition Turbocharger Assembly	Dredge crew	15.00	n/a	n/a	n/a	n/a
CRANE SYSTEM							
D4.05	Replace O-ring Kit & Spring of Main Control Valve	Dredge crew	10.00	8	sets	O-ring Kit & Spring of Main Control Valve	n/a
D4.06	Drain & refill Hydraulic Oil	Dredge crew	60.00	2	pails	Hydraulic Oil #68	n/a
D4.07	Replace Hydraulic Hose of Main Control Valve	Dredge crew	10.00	11	pcs.	Hydraulic Hose of Main Control Valve	n/a
D4.08	Replace Hydraulic Hose of Swing Motor Starboard & Portside, as per sample	Dredge crew	10.00	6	pcs.	Hydraulic Hose, Swing Motor, Portside, as per sample	n/a
				6	pcs.	Hydraulic Hose, Swing Motor, Starboard Side, as per sample	
D4.09	Replace Hydraulic of Boom Cylinder Starboard/Portside, as per sample	Dredge crew	5.00	2	pcs.	Hydraulic Hose, Boom Cylinder, Portside, as per sample	n/a
				2	pcs.	Hydraulic Hose, Boom Cylinder, Starboard Side, as per sample	
D4.10	Replace Hydraulic Hose of Cylinder Boom (extension), as per sample	Dredge crew	10.00	2	pcs.	Hydraulic Hose, Boom Cylinder, Extension, as per sample	n/a
WINCH SYSTEM							
D4.11	Replace Hydraulic Hose of Winch Motor, as per sample	Dredge crew	10.00	3	pcs.	Hydraulic Hose, Winch Motor, as per sample	n/a

Support Vessel Type: Workboat (Single Engine)

PM Stage: **PM5**

Maintenance Interval: **Every 2650 hours or 1 year and 4 months**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
ENGINE SYSTEM							
D5.01	Replace belts for Belt Hydraulic Pump, as per sample	Dredge crew	10.00	4	pcs.	Belts for Hydraulic Pump, as per sample	n/a
D5.02	Replace belts for Sea Water Pump, as per sample	Dredge crew	10.00	1	pc.	Belts for Sea Water Pump, as per sample	n/a
D5.03	Replace belts for General Service Pump, as per sample	Dredge crew	10.00	1	pc.	Belts for General Service Pump, as per sample	n/a
D5.04	Replace belts for Alternator coupled in Starter Motor, as per sample	Dredge crew	10.00	2	pcs.	Belts for Alternator coupled in Starter Motor, as per sample	n/a
D5.05	Replace Voltage Regulator	Dredge crew	10.00	1	pc.	Voltage Regulator, 24V	n/a
D5.06	Replace Cooling Water Hose, as per sample	Dredge crew	5.00	2	pcs.	Cooling Water Hose, as per sample	n/a
D5.07	Replace O-ring Valve Section, as per sample	Dredge crew	5.00	1	set	O-ring Kit Valve Section, as per sample	n/a
D5.08	Replace Gasket, as per sample	Dredge crew	5.00	1	set	Gasket, Valve Cover, as per sample	n/a
D5.09	Recondition Starter Motor	Dredge crew	30.00	n/a	n/a	n/a	n/a
D5.10	Recondition Alternator	Dredge crew	30.00	n/a	n/a	n/a	n/a
D5.11	Calibrate Injector and Nozzle	Dredge crew	30.00	n/a	n/a	n/a	n/a
D5.12	Calibrate Valve Clearance	Dredge crew	30.00	n/a	n/a	n/a	n/a
D5.13	Replace Battery 8D	Dredge crew	10.00	2	pcs.	Battery 8D	n/a
				4	mtrs.	Battery Cable, as per sample	
				4	pcs.	Clamp, Battery Terminal	
				4	pcs.	Lugs, Battery Terminal	
CABIN							
D5.14	Recondition Status of Relays or Switches on All Navigational Lights	Dredge crew	n/a	n/a	n/a	n/a	n/a
D5.15	Recondition Status of All Fixtures onboard	Dredge crew	n/a	n/a	n/a	n/a	n/a

Support Vessel Type: Workboat (Single Engine)

PM Stage: **PM6**

Maintenance Interval: **Every 4000 hours or 2 years**

PPE: **Hand Gloves, Hard Hat, Safety Shoes, Mask, and Goggles**

Item No.	Work Description	Labor	Estimated Time (min)	Materials/Supplies/Technical Services			Tools/ Equipment
				Qty.	Unit	Item Description	
CRANE SYSTEM							
D6.01	Drain and Refill Hydraulic Tank	Dredge crew	60.00	2	pail	Hydraulic Oil VG #68	n/a
D6.02	Replace Seal Kit for Cylinder Boom and Cylinder Extension	Dredge crew	10.00	2	kits	Seal Kit for Cylinder of Boom Extension	n/a
WINCH SYSTEM							
D6.03	Replace Band Brake	Dredge crew	10.00	1	set	Band Brake for Winch, as per sample	n/a
ENGINE SYSTEM							
D6.04	Drain and refill Water Cooling System	Dredge crew	30.00	1	pail	Fresh Water	n/a