

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

SUBJECT: Preventive Maintenance Manual of All DPWH Amphibious Excavators

In order to reduce maintenance costs, improve the reliability and availability of all Amphibious Excavators (AE) of this Department, as well as to minimize exposure to hazard of both personnel and equipment in the practice of Preventive Maintenance (PM), the *Amphibious Excavator Preventive Maintenance Manual (AEPMM)* as herein attached to form part of this Department Order, is hereby issued to all concerned personnel and offices to serve as a guide in the planning, execution and control of the amphibious equipment maintenance programs. The Manual has been developed based on the maintenance schedule recommended by the Original Equipment Manufacturer (OEM), combined with the years of experience of this Department's engineers in the field of dredge maintenance. With the adaptation this Manual, the Department expects to achieve standardized Preventive Maintenance Program, thus avoiding confusion and any delays in achieving the goals of this Department's Dredging Programs.

Prior to dry-docking and repair of dredges, which is required to be done every two and a half years as indicated in D.O. No. 160, Series of 2015 or the "Guidelines for the Dry-docking and Repair of DPWH Dredges and Other Floating Equipment", all AE are required to undergo preventive maintenance activities which are done regularly based on calendar time or service hours of the equipment. This Order applies to all *Doosan and Volvo Amphibious Excavators*. Funding will be charged to the Maintenance and Other Operating Expenses (MOOE) of the Bureau of Equipment (BOE).

Please be guided by the attached Preventive Maintenance Monthly Checklist for Amphibious Excavator Form, PM Program, Pre-PM Work Order, Post-PM Work Order, History of Repair, PM Compliance Sticker Guide and PM Reporting Form. Instructions of filling out and submission of these forms are listed in the Manual.

This Department Order shall take effect immediately.

WIN7T01588

ROMEO S. MONO ESO I ecretary Officer-In-Charge Department of Public Works and Highways Office of the Secretary

9.1 TNLI

Preventive Maintenance Manual of All DPWH Amphibious Excavators

Annex "A"

FOREWORD

The Department's fleet of Amphibious Excavators (AE) play a major role on the nation's flood control and mitigation programs. Proper care and effective maintenance not only extend the serviceable life of the excavator but also ensure its reliability to meet our needs, thru dredging operations, in a cost-efficient and environment-friendly manner.

In line with this, DPWH, through the Bureau of Equipment (BOE), has developed the **Amphibious Excavator Preventive Maintenance Manual (AEPMM).**

This Manual intends to provide systematic upkeep, service and inspection of equipment to detect and correct failures in the earliest possible time. All implementing offices and dredge personnel are responsible for the proper operation and maintenance of the excavators that they are assigned with. The overall appearance and condition of the excavator reflect the operator's attitude and concern towards their equipment and ultimately the performance of their duties.

All concerned personnel are enjoined to use this Manual as a guide on the proper practice of preventive maintenance of all Amphibious Excavators deployed nationwide.

MARK A. VILLAR Secretary

OBJECTIVES

Proper operation and maintenance of Amphibious Excavators (AE) play an important role in the successful implementation of the Department's flood control projects. The purpose of this Manual is to make the Dredge Masters and crews familiar with the Preventive Maintenance (PM) procedures done for all DPWH Amphibious Excavators including minor repairs and adjustments.

Daily walk-around inspections are also required to ensure that the machines are in correct, safe and functional operating condition.

The equipment preventive maintenance system, schedule and type of maintenance work to be carried out are planned and organized in advance. It is essential that Dredge Masters and operators are aware of the proper discipline in the performance of preventive maintenance for Amphibious Excavators:

- minimize breakdowns;
- avoid accidents;
- maximize the use of equipment; and
- avoid faulty and unnecessary repairs, leading to a considerable increase in cost.

The following maintenance procedures specify the sequence of activities that will be applied to prevent further breakdowns of Amphibious Excavators to keep them in good operating condition.

TABLE OF CONTENTS

TITLE PAGE	i
FOREWORD	ii
OBJECTIVES	iii
EXECUTIVE SUMMARY	1
DEFINITION OF TERMS	3
1. ORGANIZATION	3
1.1 Dredgeman Foreman (DF)	4
1.2 Marine Engineman (ME)	4
1.3 Dredge Master (DM)	5
1.4 Chief, Equipment Management Division (EMD)	5
1.5 Chief, Floating Equipment Division (FED)	6
2. REPORTING	6
2.1 PM Compliance Sticker Guide	7
2.2 Monthly Equipment Checklist Form	7
2.3 Additional Preventive and Corrective Maintenance	8
Order	8
2.4 History of Repair	8
3. PM Activities	8
4. Maintenance and Inspection	10
4.1 Product Identification Number (PIN) Location	10
4.2 Component Serial Numbers	10
4.3 Safety Precautions	11
4.4 Table of Recommended Lubricants	11
4.5 Preliminary Work Machine Set-Up for Maintenance	12
PM1: 10 hrs/Daily Service	13
B101 Greasing of Pivot	15
B102 Check engine oil level	16
B103 Check level of Hydraulic Oil Tank	17
B104 Check/Inspect Hydraulic System	18
B105 Check/Inspect Fuel System	19
B106 Check Oil Level of Swing Reduction Gear	20
B107 Check Dust Net in Front of Oil Cooler & Intercooler	21
B108 Check/Top-up Cooling System	22
B109 Check/Refill Window Washer Liquid	23
B110 Inspect Bucket Teeth & Side Cutters	24

B111 Check Cooling Fan Blade	25
B112 Check Air Intake System	26
B113 Inspect Seat Belt for Proper Operation	27
B114 Inspect Structure for Cracks & Faulty Welds	28
B115 Check Operation of Switches	29
B116 Check Operation of Pilot Cut-Off Switch	30
B117 Check Operation of All Lights, Horns, Control, Console	
& Monitor Lights	32
B118 Check All Controls	33
PM2: 50 hrs/Weekly Service	34
B201 Greasing of Arm, Bucket Joint Pins, & Swing Bearings	35
B202 Draining of Fuel Tank	36
B203 Check Engine Fan Blades for Cracks, Wear & Correct	37
B204 Greasing of Axle Bearings & Hydraulic Pins & Bushings	57
of Carriage	38
PM3: 250hrs/Monthly Service	39
B301 Inspection & Greasing of Arm & Front Attachment	
Pins	40
B302 Check Engine Fan Beltsfor Cracks, Wear & Correct	41
P202 Change Break Eiter	42
B204 Doplace Hydraulic Oil Daturn Eiltar	42
B305 Change Dibt Filter	43
B306 Inspect Bushing & Dins of the Front End Attachment	45
B307 Inspection of Loose/Missing Bolts & Nuts	45 46
B308 Check Hydraulic Travel Motor Oil of the Carriage	47
PM4: 500brs/Quarterly Service	48
P401 Currenting of Current Corry & Division P402 Changes Engine	70
01 & Filter	40
Oli & Filler	47
RANS Chaning of Air-Conditioning Filter	50
R404 Cleaning of Radiator Oil Cooler Intercooler Fuel	21
Cooler & Aircon Condenser Core	52
R405 Cleaning of Outer Filter of Air cleaner	52
	55

B406 Change of Water Separator & Pre-Fuel Filter	54
B407 Change Main Fuel Filter	55
B408 Change Swing Reduction Device Oil	56
B409 Check Pontoon for Leaks & Damages	57
PM5:1,000hrs/Semi-Annual Service	58
B501 Greasing of Swing Reduction Device	59
B502 Change Air Breather Filter	60
B503 Replace Hydraulic Oil Return Filter	61
B504 Change of Pilot Filter	62
B505 Change Oil in Swing Reduction Device	63
B506 Change Aircon Outer Filter	64
B507 Check Aircon Refrigerant	65
B508 Change Fuel Cap Filter	66
B509 Check & Adjust Engine	67
PM6: 2,000hrs/Annual Service	68
B601 Replace Outer & Inner Air Cleaner Filters	69
B602 Drain/Change Radiator Coolant	70
B603 Cleaning of Hydraulic Oil Exchange & Suction	72
B604 Check Rubber Anti-Vibration Shock Mounting	74
B605 Check/Inspect Machine for Cracked /Broken	75
B606 Check Alternator & Starter Assembly, Check/Adjust Valve	
Clearance, Check Head Bolt Torques	76
PM7: 4,500hrs/2.5 years	77
Undercarriage Maintenance	78
ACKNOWLEDGEMENT	80
BIBLIOGRAPHY	81

EXECUTIVE SUMMARY

Preventive Maintenance (PM) is a type of maintenance that is regularly performed on a piece of equipment to lessen the likelihood of failure. It also ensures the equipment's reliability, decreases costs of unwanted repair, minimizes system downtime, improves safety of operation and generally prolongs the useful life of the equipment.

Thus, to ensure reliability of equipment and services are efficiently provided to the public, all concerned personnel are hereby required to observe PM of all Amphibious Excavator (AE). This order shall be strictly implemented and any enduser who does not comply will be sanctioned accordingly.

PM activities listed in this manual include inspection, cleaning, testing, oil top-ups, calibration, adjustment and alignment, removal and replacement of some parts as well as other safety and precautionary measures. Any irregularities encountered during the PM servicing that require major repair or any maintenance activities not included in this Manual should prompt the Dredge Master to prepare the detailed Maintenance Plan of corresponding Corrective Maintenance Work Order, furnishing the Bureau of Equipment, for review, evaluation, comments, and file for future reference.

DEFINITION OF TERMS

Activity

Type of Work performed with frequency to produce a significant impact on the resource requirements of a work program.

Maintenance

Ensuring that physical assets continue to do what their intended users want them to do. It is a function of keeping physical assets in or restoring them to serviceable condition.

Preventive Maintenance (PM)

Proactive approach of maintaining equipment on a regular schedule based on elapsed time or meter readings. The purpose of PM is to prevent maintenance problems or failures before they take place.

Corrective Maintenance (CM)

Type of maintenance done to take corrective action in the event of a breakdown of the equipment. The equipment is repaired, calibrated to its serviceable condition.

Maintenance Personnel

People who will perform the maintenance activities which includes the employees of this Department either Regular, Co-terminus with the Incumbent (CTI) and Job Order employees, mechanics, operators and laborers.

Maintenance Plan

A maintenance plan which is developed for each activity and contains the following:

• Maintenance activity;

- PM scheduling and interval group;
 - Pre-PM Work Order approved by the BOE Bureau Director;
 - PM Work Order duly signed by the Regional Office concerned based on the approved Pre-PM Work Order;
 - Deadline Order;
 - CM Work Order;
 - Request for Post-Repair Inspection;
 - Post-Repair Inspection Report for Outside Repair;
 - PM compliance Guide (sticker) and monitoring;
 - ✤ Materials, Tools and Parts needed;
 - Work Method, Crew composition and estimated duration;
 - ✤ History of Repair;
 - List of safety hazards, environmental compliance and precautionary measures needed;
 - Personal Protective Equipment (PPE) needed;

Amphibious Excavator (AE)

Type of dredging equipment that is self-propelled, can operate on both Land and water by bucket and clamshell.

1. ORGANIZATION

DUTIES AND RESPONSIBILITIES

Maintenance personnel are assigned according to the work and activity to be performed. However, they are not permanently assigned to specific activity but are strategically utilized in the most efficient and effective combinations for the work scheduled. In order to apply preventive maintenance management, the dredge maintenance personnel must be organized in performing the required services to the equipment. The assignment of maintenance personnel based on the activity to be performed is necessary to fulfill the preventive maintenance plan and schedule. It should be noted that any capable personnel can perform the duties of the absent personnel in order to avoid delay in operations or shorten maintenance time provided that consent is given by the Dredge Master (DM).

Every AE should have the following personnel on board who will be assigned to execute the activities included in this manual.

1.1 Dredge Man Foreman (DF)

- Checks the condition of equipment parts and components;
- In-charge of the lubrication of parts and components;
- Cleans and paints corroded portion of the dredge to ensure safe and rust-free maintenance programs are being observed and implemented on-board;
- Records and reports any observations from the daily inspections to the DM for his appropriate action;
- Performs other duties assigned by the DM.

1.2 Marine Engineman (ME)

- Ensures the proper operation of engine by performing scheduled preventive maintenance works, engine check-ups, oil top-ups, filter replacement, cleaning the engine room, etc;
- Cleans and paints corroded portion in the engine room to ensure safe and rust-free maintenance programs are being observed and implemented onboard;

- Records and Reports any observations from the daily inspections to the DM for his appropriate action;
- Performs other duties assigned by the DM.

1.3 Dredge Master (DM)

- Supervises the execution of PM activities (PM1-PM6) and ensure that such activities are within the schedule;
- Conducts walk-around inspections to identify any defects and document maintenance needs by using the CM Work Order Form;
- Conducts monthly equipment inspection using the prescribed checklist form (Annex "B");
- Assigns work to foremen;
- Conducts field inspection of work-in-progress and completed work to ensure work is directed appropriately and effectively and document by using the Post-Repair Form;
- Submits monthly preventive maintenance accomplishment reports;
- Supervises the installation/replacement of PM materials;
- Ensures that PM schedule are observed and strictly implemented accordingly;
- Performs related work as assigned by EMD Chief, BOE Bureau Director and his representative.

1.4 Chief, Equipment Management Division (EMD)

- Directs the crew of each dredge assigned in his area of jurisdiction, to implement the program and schedule for checking, repair and monitoring of equipment;
- Reviews and submits project maintenance estimates;
- Reviews and submits monthly report to BOE;
- Ensures resources are properly procured and assigned for maintenance works;

• Directs the Dredge Master relative to PM activities performed as in accordance to specified PM stages;

1.5 Chief, Floating Equipment Division (FED)

- Ensures resources are used to achieve Department objectives and priorities;
- Conducts field inspection and takes corrective measures to ensure reports are accurate and submitted on time;
- Reviews and analyzes monthly reports submitted by the DM and EMD chief;
- Prepares annual PM Program of Work (POW) and the corresponding Project Procurement Management Plan (PPMP) for approval of the BOE Director to adequately support the various PM activities and anticipated repairs;
- Undertakes procurement of PM parts in accordance with the Annual POW and the PPMP approved by the BOE Director at least 3 months before the succeeding year. The FED and EMD shall be represented in the Pre qualifications, Bidding, and Award Committee (PBAC) and the supply delivery Inspection Team whenever the subject PM parts are under procurement.
- Prepares the Purchase Request (PR) as based on the approved POW and PPMP.

2. REPORTING

Reporting serves as the source of information and data for PM Planning. It tells the management about the maintenance needs and concerns that need to be addressed. The objectives of the PM Plan cannot be attained without adequate and accurate reports.

2.1 PM Compliance Sticker Guide

- The PM Compliance Sticker Guide should be accomplish by the Dredge Master and affix his/her signature on the space/box provided thereon as their guide to keep track of the PM stages;
- Recording the PM stage performed to keep track on what would be the next stage to be undertaken. This will serve as the guide for the maintenance personnel on what activity should be carried out and determines its present status.
- This will also serve as an information to the supervisors and inspectors that care is being taken of on the equipment;
- The DM should send recent photos of the dredge together with their monthly report to validate the present status of the equipment.

2.2 Monthly Equipment Checklist Form

- The equipment checklist form for Amphibious Excavator must be accomplished and included in the monthly PM compliance reports in order to check the physical condition of the equipment will then be submitted to DPWH Regional Office and Bureau of Equipment for proper recording and filing purposes;
- Findings, observations and recommendation from inspections shall be listed in the section provided in the form;
- All Narrative reports written in this form must be strictly observed and considered as part of the Official Request and should be acted upon by the Regional Office concerned and the Bureau of Equipment;
- A surprise inspection will be done by the BOE Inspectorate Team to validate the Checklist submitted then by the Dredge Master concerned.

2.3 Additional Preventive and Corrective Maintenance Work Order (If any)

- Additional PM Work Order generated under the scheduled PM Program due to unforeseen defect/s must be accomplished and approved by the Regional Director concerned, providing the Bureau of Equipment of a copy for their concerns and PM Program adjustment;
- All Corrective Maintenance (CM) works to be done on the dredge shall be supported by the CM Work Order Form duly approved by the Regional Office concerned, and copy of which shall be sent to the Bureau of Equipment for consolidation, updating of History of Repair and for future reference.

2.4 History of Repair

• History of Repair must be attached to all types of work order as part of the monthly report showing maintenance work description, detailed parts and materials installed, costing, reliability and craft serviceman.

3. PM ACTIVITIES

The AE PM Manual prepared by the Floating Equipment Division is composed of set of activities. Listing includes the labor, tool, material, safety and environmental compliant requirements. Activities are numbered and named in groups indicating the maintenance interval schedule on when the activities should be performed. Maintenance intervals are determined either by the dredge's service hours or by calendar days (CD).

Activities that require replacement of parts/components should follow the recommended intervals determined by the

service hours of the machine while activities that require visual inspections, cleaning, functional test, measurement of operating quantities, lubrication are done on a regular interval or based on the calendar time.

Code is assigned to each maintenance activity for quick and easy identification and reference to the group of maintenance activities. The code is composed of a letter followed by three (3) numbers. The letter corresponds for the dredge class; the first number indicates the PM stage and the two (2) last numbers refers to the activity item number from its PM group (example shown below).



Dredge Code	Dredge Class
Α	Multi-Purpose Amphibious Dredge
В	Amphibious Excavator
С	PDDP Dredges
D	Pinatubo Dredges
E	Luzon, Visayas, Mindanao Dredges
F	Other Cutter Suction Dredges

		PM Interval based on			
Code	PM Group	Calendar Time	Service		
Coue			Hours		
+100	PM1	Daily	10		
+200	PM2	Weekly	50		
+300	PM3	Monthly	250		
+400	PM4	Quarterly	500		
+500	PM5	Semi-Annually	1000		
+600	PM6	Annually	2000		
+700	PM7/DDR	Every 2.5 years	-		

4. MAINTENANCE AND INSPECTION

Routine maintenance and inspections are required to keep the machine in the correct operating condition. The following activities list the inspection intervals, the system or component checks, and references.

NOTE: The following activities list the service checks and their required intervals. The service cycles may need to be shortened depending on the working conditions. Extremely hot or dusty conditions will require more frequent service. Operational hours are determined by the amount of time accumulated on the engine hour meter on the control console in the cabin.

Besides the normal hour meter, the multifunction gauge can be used to keep track of the hours on individual filters.

4.1 Product Identification Number (PIN) Location

A PIN number is stamped on the upper frame, under the boom foot. It is also stamped on the product identification plate on outside of the cabin on right.

NOTE: *Please take note of these numbers and their locations. These will be required whenever warranty or service work is required. Keep this number on file, in case the machine is stolen.*

4.2 Component Serial Numbers

There are many serial numbers on each traceable components of the machine. For example, the engine serial number is stamped on the rear left side of the engine block, above the compressor. Additional engine information is described on a label on the rocker cover. Please take note of these numbers and their locations. These will be required whenever warranty service work is requested.

4.3 Safety Precautions

- 1. Make sure to lock out the hydraulic controls and post a notice warning tag (Lock-out/Tag-out or Hot Works Operations) based on D.O. 162 series of 2015, 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. Make sure to keep all unauthorized personnel away from the machine and that all standard safety precautions are followed if the inspection or test procedure requires that the engine be running.

4.4 Table of Recommended Lubricants

RESERVOIR	KIND OF FLUID	OIL TO BE USED
Engine oil Pan	Engine Oil	SAE 15W-40
Swing Drive Case	Gear Oil	SAE 90 and API GL5
Final Drive Case	Gear Oil	SAE 140 and API GL5
Hydraulic Oil Tank	Hydraulic Oil	ISO VG. 68
Fuel Tank	Diesel Fuel	ASTM D975 No. 2
Grease Fitting	Grease	Multipurpose Lithium Grease NLGI No. 2
Cooling System	Coolant	50% coolant 50% distilled water

API: American Petroleum Institute.

ASTM: American Society of Testing and Materials.

- ISO: International Organization for Standardization.
- NLGI: National Lubricating Grease Institute.
- SAE: Society of Automotive Engineers.

4.5 Preliminary Work Machine Set-Up for Maintenance

Activity Code	Maintenance Activity					
<i>Note:</i> Certain types of maintenance may require the machine to be						
positioned diff	ferently. Always return machine to this position.					
1.	Park on firm level ground.					
2.	Lower bucket or work tool to ground.					
3.	Move the lever to "LOCK" position.					
4.	Allow engine to run at low idle for a minimum of five					
	(5) minutes to allow engine to cool. If it is not done,					
	heat surge can occur.					
5.	Stop engine by turning key to "O" (OFF) position.					
	Remove key from starter switch.					
6.	Before starting maintenance work, hang up "Lock-Out					
	Tag" on cabin door or work lever.					
WARNING	If engine must be run while performing maintenance,					
	use extreme care. Always have one person in the					
	cabin at all times. Never leave the cabin with the					
engine running.						

PM Group: <u>PM1</u> Maintenance Interval: <u>10hrs./Daily Service</u>

Activity	Maintenance Activity	Estimated Time	Labor	Tools	Materials	PPE
Coue		(minutes)				
			Operator/			hard hat, safety
B101	Greasing of pivots	17.00	Engine	grease gun	grease	shoes, gloves,
			Man			overall clothes
			Operator/		SAE 15W-	hard hat, safety
B102	Check engine oil level	4.00	Engine		40*, clean	shoes, gloves,
		-	Man		cloth	overall clothes
D102	Chack lavel of hydraulic oil tank	4.00	Operator/	uwanah	hydraulic oil	nard nat, safety
B103		4.00	Engine	wrench	(ISO VG68)	snoes, gloves,
			Midfi Operator/			overall clounes
B104	Check/inspect Hydraulic System	7.00	Engine	wrench		choos aloves
D104	checky inspect Hydraulie System	7.00	Man	WICICI		overall clothes
			Operator/			hard hat safety
B105	Check/inspect Fuel System	8 00	Fngine	container	diesel, clean	shoes aloves
5105	energinspeer i dei system	0.00	Man		cloth	overall clothes
			Operator/		CAE 00	safety shoes,
B106	Clean oil level of swing reduction gear	5.00	Engine		SAE 90, Clean Cloth	gloves, overall
			Man			clothes
	Clean duct not infront of oil cooler &		Operator/	air		safety shoes,
B107	intercooler	6.00	Engine	compressor	water, pail	gloves, overall
			Man			clothes
			Operator/			safety shoes,
B108	Check/top-up cooling system	8.00	Engine		coolant*	gloves, overall
			Man			clothes
			Operator/			safety shoes,
B109	Check/refill window washer liquid	4.00	Engine		water	gloves, overall
			Man			clothes
			Operator/			safety shoes,
B110	Inspect bucket teeth & side cutters	12.00	Engine			gloves, overall
			Man			clothes
B111			Operator/			safety shoes,
	Check cooling fan blade	13.00	Engine	wrench		gloves, overall
			Man			clothes
0110	Chaele air intalea aust	F 00	Operator/	anner dute		nard hat, safety
BIIZ	Check air Intake system	5.00	Engine	screw ariver		snues, gloves,
* :6			Mail		(a	
*-if necessary (continued on next						

PM Group: <u>PM1</u> Maintenance Interval: <u>10hrs./Daily Service</u>

B113	Inspect seat belt for proper operation	8.00	Operator		safety shoes, gloves, overall clothes
B114	Inspect structures for cracks & faulty welds	5.00	Operator/ Engine Man		hard hat, safety shoes, gloves, overall clothes
B115	Check operation of switches	4.00	Operator		hard hat, safety shoes, gloves, overall clothes
B116	Check operation of pilot cut-off switch	27.00	Operator		safety shoes, gloves, overall clothes
B117	Check operation of all lights, horns, control console and monitor lights	8.00	Operator	bulb	hard hat, safety shoes, gloves, overall clothes
B118	Check all controls	25.00	Operator/ Engine Man		safety shoes, gloves, overall clothes

Activity Code:B101Crew Composition:AE Operator/Engine ManMaintenance Activity:Greasing of PivotsMaintenance Interval:10hr./Daily Service

		Activity Estimated Tools Time Quantity Class (minutes) & Unit		Estimated Tools		Mat	terials
	Activit			Class	Quantity & Unit	Description	
NOTE:	Grease the ff. until ex	cess shows: (every		Grease		
10hrs./c	laily for first 100 hrs.	and every 50	or 250 hrs.	1 pc.	aun		grease
thereafte	er.		1		gun		
1	Arm link joint pin (1	point)	1.00				
2	Link joint pin (2 poir	nts)	2.00				
3	Arm bucket joint pir	ı (1 point)	1.00				
4	Bucket link joint pin (1 point)		1.00				
5	Bucket cylinder rod pin (1 point)		1.00				
6	Boom cylinder head pin (2		2.00				
7	Boom foot pint (2 points)		2.00				
8	Boom cylinder rod pin (2 points)		2.00				
9	Arm cylinder head p	in (1 point)	1.00				
10	Boom arm joint pin	(2 points)	2.00				
11	Arm cylinder rod pir	n (1 point)	1.00				
12	Bucket cylinder head	pin (1 point)	1.00				
		TOTAL	17.00				
Remind	ler: Clean off (wip	e) the old gr	ease that h	as been p	urged.		
			Safety				
	Hazard		Precau	tion		Requ	ired PPE
May slips, trips or fall. Keep the area clean. Clear the area of any materials that blocks the passageway. Gloves.		Safety shoes,					

Activity Code:	<u>B102</u>
Crew Composition:	AE Operator/Engine Man
Maintenance Activity:	Check engine oil level
Maintenance Interval:	10hr./Daily Service

Saguanca			Estimated	То	ols	Ma	terials
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Open access door.		0.25				
2	Pull out dipstick. Cle cloth.	an with clean	0.50			1 pc.	clean cloth
3	Insert dipstick fully and pull out. Check if the level is between the "Low & Full" marks.		0.50				
4	If top-up is needed, open the filler cap.		1.00				
5	5 Add oil until the oil level is between 'Low & Full' marks.		1.00				SAE 15-W40
6	Clean & reinstall the	filler cap.	0.50			1 pc.	clean cloth
7	Close the access doo	or.	0.25				
		TOTAL	4.00				
			Safety				
Hazard			Precaut	tion		Requ	ired PPE
Skin burns caused by contact Avoid contac with hot engine parts and oil. come in contac		t with hot oil & engine parts to act with the skin.		parts to	Hard hat, gloves, safety shoes		

Activity Code: <u>B103</u> Crew Composition: <u>AE Operator/Engine Man</u> Maintenance Activity: Check level of Hydraulic Oil Tank Maintenance Interval: 10hr./Daily Service

Soguonco		Estimated	То	ols	Ma	terials
No.	Activity	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Start the engine. Set the speed to "Low Idle"	0.50				
2	Move the "LEVER" to lock position.	0.20				
3	Open right access door.	0.20				
4	Check the level on the sight glass. The oil must be between marks of sight glass (L-F).	0.40				
5	If the oil level is below "L" mark, a	add oil.				
5.1	Lift the breather cap to release air pressure.	0.50				
5.2	Open upper cover of the tank. Add oil to the required level.	1.00	1 pc.	wrench		hydraulic oil (ISO VG68)*
6	If the oil level is above "H" mark,	drain oil.				
6.1	Loosen the drain plug at the bottom of the tank to drain the excess oil.	1.00	1 pc.	wrench		
6.2	Clean and reinstall drain plug.	0.20				
NOTE: Use	a suitable container. Disposed of drained	d fluids mut be	e in complian	nce with all a	pplicable env	rironmental

laws & regulation. * - supply to the exact required amount of fluid.

	TOTAL	4.00						
Safety								
Hazard	Precaut	Precaution			Required PPE			
Skin burns caused by contact with	Avoid skin conta	actwith hoto	il & engine p	arts to	Hard hat, s	afety shoes,		
he hot engine parts and oil. come in contact with the skin.					gloves.			
Slips. Spillage of fluid.	Wipe off spills.							

Activity Code:B104Crew Composition:AE Operator/Engine ManMaintenance Activity:Check/Inspect Hydraulic SystemMaintenance Interval:10hr./Daily Service

Saguanca		Estimated		Tools		Materials	
No.	Activit	Y	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Check for leaks on fittings, piping & hoses.		3.00				
2	Tighten fittings, piping connections.		4.00	1 pc.	wrench		
3	Determine the source of leaks & do minor repair if necessary.						
		TOTAL	7.00				
			Safety				
	Hazard		Precaut	ion		Requ	ired PPE
Skin burns caused by contact with Avoid contact w hot engine parts and oil. Slips, trips or fall. Materials that b			ith engine parts to come in contact eep the area clean & clear of any lock the passageway.			Hard hat, safety shoes, gbves.	

Activity Code:	<u>B105</u>
Crew Composition:	AE Operator/Engine Man
Maintenance Activity:	Check/Inspect Fuel System
Maintenance Interval:	10hr./Daily Service

Soquonco			Estimated	То	ols	Mat	terials
No.	Activity	1	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Check the amount of fu through the tank sight	uel in the tank gauge.	0.25				
2	Open the cap of the fu	el tank.	0.25				
3	Fill the tank to the reco level.	mmended	1.00				Diesel
4	Clean the cap before reinstalling.		1.00			1 pc.	clean cloth
5	Inspect the engine compartment to verify that fuel system is not leaking.		0.75				
6	If any leak is noted, determine the source of the leak and repair immediately		1.25				
7	Open the left access door.		0.25				
8	Locate the fuel-water s	eparator.	0.25				
9	Check the bowl if it is fu sediment.	I of water or	0.25				
10	If the bowl is full of wat place a small container filter.	er or sediment, under the fuel	0.25	1 pc.	container		
11	Open the drain valve an collected water or sedin	nd drain the nent.	2.00				
12	Close drain valve.		0.50				
NOTE: Dispo working day	ose drained fluids in acco to avoid moisture inside	ordance to envi the fuel tank.	ronmental law	s & regulatio	n. Fill the ta	nk at the en	d of the
		TOTAL	8.00				
			Safety	-			
	Hazard		Precaut	ion		Required PPE	
Skin burns ar contact with	nd injuries caused by hot engine parts.	Avoid contact w on the compart	vith hot engine parts and sharp edges ment.			Hard hat, safety shoes, gloves.	

Activity Code:

B106 Crew Composition: **AE Operator/Engine Man** Maintenance Activity: Check Oil Level of Swing Reduction Gear Maintenance Interval: 10hr./Daily Service

Comuchas			Estimated	Тос	ols	Materials	
No.	Activit	1	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Pull out dipstick.		1.00				
2	Clean with cloth.		0.25			1 pc.	clean cloth
3	Insert dipstick fully and pull out. Check if the level is between the "Low & Full" marks.		1.25				
4	Oil level must between "HIGH" and "LOW", if oil is above "HIGH" mark, drain to proper level.		1.25				
5	If oil does not reach the "L" mark on the dipstick, add oil to the recommended level.		1.25				SAE 90
		TOTAL	5.00				
			Safety	-			
	Hazard		Precaut	ion		Requ	ired PPE
Skin burns caused by contact with Avoid skin conta the hot engine parts and oil. components. W		act with the ho lear prescribe	ot oil and eng d PPE.	jine	gbves, overal clothes, safety shoes		
Hand injuries and tools, slip	caused by sharp parts pping of tools etc.	Wear prescribed hand and power	d hand protec r tools in safe	tion and maii condition.	ntain all	gloves, over	ral clothes

 Activity Code:
 B107

 Crew Composition:
 AE Operator/Engine Man

 Maintenance Activity:
 Check Dust Net in Front of Oil Cooler & Intercooler

Maintenance Interval: 10hr./Daily Service

Estimated Tools Materials Sequence Quantity Activity Time Quantity No. Class Description & Unit & Unit (minutes) Loosen the wing bolts. 0.50 1 2 Remove dust net. 0.50 air 3 Clean with compressed air or water. 5.00 1 1 pail water compressor TOTAL 6.00 Safety Hazard Precaution Required PPE Wear prescribed eye and respiratory protection. goggles, dust mask Dust entering the eye and respiratory system. Hand injuries caused by sharp parts Wear prescribed hand protection and maintain all hand gloves, overall clothes and tools, slipping of tools etc. and power tools in safe condition.

Activity Code: <u>B108</u> Maintenance Interval: 10hr./Daily Service

Crew Composition: **AE Operator/Engine Man** Maintenance Activity: Check/Top-up Cooling System

Convonco			Estimated	Te	ools	Materials		
No.	Activity	1	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description	
1	Remove radiator cap.		0.50					
2	Check the coolant level inside the radiator.		1.00					
3	Refill radiator as required.		1.00				engine coolant*	
4	Check the coolant transfer line for obstruction, or pinch.		2.50					
5	Clear obstruction if any		1.00					
6	Repair if necessary.							
7	Check the level of the coolant in the coolant recovery tank.		1.00					
8	If the coolant is below the mark, add coolant to the	the "LOW" ne tank.	1.00					
		TOTAL	8.00			* If necessary		
			Safety			1		
	Hazard		Precau	ition		Requ	ired PPE	
Skin burns caused by contact with Avoid skin conta the hot engine parts and oil. components. W			act with hot oil and equipment Vear prescribe PPE.			gloves, overall clothes, safety shoes		
Hand injuries caused by sharp parts and tools, slipping of tools etc.		Wear prescribed and power tools	d hand protec in safe condi	tion and maii tion.	ntain all hand			

Activity Code:B109Crew Composition:AE Operator/Engine ManMaintenance Activity:Check/Refill Window Washer LiquidMaintenance Interval:10hr./Daily Service

Soguoneo				T	ools	Ma	Materials	
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description	
1	Open left front access door.		1.00					
2	Check fluid level in windshield washer tank.		1.00					
3	Open fill cap. Add fluid to the required level if necessary.		1.00				water	
4	Close fill cap.		1.00					
		TOTAL	4.00					
			Safety					
	Hazard		Precau	tion		Requ	ired PPE	
Hand injuries caused by sharp parts Wear prescribed and tools, slipping of tools etc.		I hand protection.			Safety shoe,s gloves, overall clothes			

Activity Code:B110Crew Composition:AE Operator/Engine ManMaintenance Activity:Inspect Bucket Teeth & Side CuttersMaintenance Interval:10hr./Daily Service

Soquanca				T	ools	Materials	
No.	Activity	1	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Inspect the bucket teeth to make sure that tooth wear or breakage has not developed.		1.00				
2	Replace worn-out or damage tooth.		5.00				
3	Inspect the side cutters. Make surer no breakage has developed.		1.00				
4	Replace worn-out or damage side cutter.		5.00				
Important: adapter is e	Do not allow the repla exposed.	aceable bucket	t teeth or sid	le cutter to	wear down	to the point	that bucket
		TOTAL	12.00				
			Safety				
	Hazard		Precau	tion		Requ	ired PPE
Hand injuries caused by sharp parts Wear prescribed and tools, slipping of tools etc. And power tools			d hand protect in safe condi	tion and mai tion.	ntain all hand	Safety shoe overall cloth	es, gbves, es

Activity Code:B111Crew Composition:AE Operator/Engine ManMaintenance Activity:Check Cooling Fan BladeMaintenance Interval:10hr./Daily Service

Soguonco			Estimated	T	ools	Ma	terials
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Open rear access door.		1.00				
2	Rotate the crankshaft manually on the accessory drive pulley nut.			1 pc.	wrench		
2	Check fan blades for cracks, bend or bose blades.		8.00				
3	Check blade alignment, contact between blades & shroud.						
4	Check for bose bolts. Tighten if necessary.		3.00	1 pc.	wrench		
6	Replace damaged fan bl	ades.					
5	Close rear access door.		1.00				
		TOTAL	13.00				
			Safety			-	
	Hazard	Precau	tion		Requ	ired PPE	
Hand injuries caused by sharp parts Wear prescriber and tools, slipping of tools etc. and power tools			d hand protection and maintain all hand s in safe condition.			gloves, overall clothes, hard hat	

Activity Code:**B112**Crew Composition:**AE Operator/Engine Man**Maintenance Activity:**Check Air Intake System**Maintenance Interval:**10hr./Daily Service**

Soguonco			Estimated	T	ools	Ma	terials
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Open rear access door.		1.00				
2	Check the engine intake hose, and hose bands for damage.		1.00				
3	If damaged, wrinkled, or loose, replace or tighten.		2.00	1 pc.	Screw driver (+)		
4	Close rear access door.		1.00				
	TOTAL		5.00				
			Safety				
	Hazard		Precaution			Requ	ired PPE
Hand injuries caused by sharp parts Wear prescribe and tools, slipping of tools etc. and power tools			d hand protection and maintain all hand s in safe condition.			gloves, overall clothes, hard hat	
Blows from	moving components.	Make sure thei working area.	re are no una	uthorized pe	ople in the	hard hat, sa gloves	afety shoes,

Activity Code: **B113** Crew Composition: AE Operator Maintenance Activity: Inspect Seat Belt for Proper Operation Maintenance Interval: 10hr./Daily Service

Estimated Materials Tools Sequence Activity Quantity Time Quantity Description No. Class & Unit & Unit (minutes) Check webbing for cuts, wear, fraying, 1 1 00

1	dirt and stiffness.		1.00				
2	If system is equipped with a retractor, pull webbing completely out and inspect full length of webbing.		2.00				
3	Look for cuts, wear, fraying, dirt and stiffness.		1.00				
4	Check buckle and latch for correct operation.		1.00				
5	Check latch plate for wear, deformed and buckle is damaged or broken casing.		1.00				
4	Check retractor web storage device (if equipped) by extending webbing and retracting correctly.		1.00				
5	Check webbing in areas exposed to ultraviolet (UV) rays from sun or extreme dust or dirt.		1.00				
		TOTAL	8.00				
			Safety				
Hazard			Precau	tion		Requ	ired PPE
Hand injuries caused by sharp parts Wear prescribed I and tools, slipping of tools etc.		hand protection and maintain all hand n safe condition.			gloves, overall clothes, safety shoes		

Activity Code: Crew Composition:

<u>B114</u> AE Operator/Engine Man Maintenance Activity: Inspect Structure for Cracks & Faulty Welds Maintenance Interval: 10hr./Daily Service

Soquanca	Activity		Estimated	Tools		Materials				
No.			Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description			
1	Inspect/check for any v faulty welds on the strue machine.	3.00								
2	Clear and clean the area or faulty welds.	2.00								
3	Repair/replace any dam operating the machine.									
	TOTAL		5.00							
Safety										
Hazard			Required PPE							
Slips or trips, head bumps, burns & fire.		Clear the area of any materials that blocks the passageway. Perform welding away from flammable materials.				gloves, overall clothes, hard hat, safety shoes				

28

Activity Code: Crew Composition: Maintenance Activity: Maintenance Interval:

B115 AE Operator Check Operation of Switches 10hr./Daily Service

Soquence	Activity		Estimated	stimated Tools		Materials				
No.			Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description			
1	Turn the switch to "ON	1.00								
2	Check/verify the condition of all switches before starting the engine.		3.00							
		4.00								
Safety										
Hazard			Precaution			Required PPE				
Electric shock, skin burns.		Be sure the hands are dry. Clean the cabin.				gbves, overal cbthes, hard hat, safety shoes				
<u>B116</u>

Crew Composition: **AE Operator**

Maintenance Activity: Check Operation of Pilot Cut-Off Switch Maintenance Interval: 10hr./Daily Service

Somonco		Estimated	Too	s	Materials	
No.	Activity	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Park the machine on a level of surface, lower the attachment to the ground.	10.00				
2	Move safety lever up into "UNLOCK" position.	1.00				
3	Operate the levers in all directions to check if the boom, arm, bucket and swing functions operate correctly.	5.00				
4	Raise the boom and arm such that the bucket is about 1 m (3 ft.) off the ground.	1.00				
5	Move the safety lever down into "LOCK" position to deactivate the work group (joystick) levers.	1.00				
6	Check if there are movements of the boom, arm and swing functions when controls are moved.	1.00				
7	With the safety lever still in the "LOCK" position, move the travel controls. There must be no movement of the excavator tracks.	2.00				
8	Move safety lever up into "UNLOCK" position.	1.00				
9	Raise the boom and arm such that the bucket about 1 m (3 ft.) off the ground.	1.00				
					(continued	l on next page)

Activity Code:**B116**Crew Composition:**AE Operator**Maintenance Activity:**Check Operation of Pilot Cut-Off Switch**Maintenance Interval:**10hr./Daily Service**

10	Operate the lever (joystic While lowering the boom , "LOCK" position. Boom m these steps for arm, buck	2.00					
11	Lower work group to the	2.00					
	TOTAL						
		Safety					
	Hazard	Preca	aution			Required PPE	
Hand injuries caused by sharp parts Wear prescribed hand protection and tools, slipping of tools etc. tools in safe condition.			and maintain all hand and power			gloves, overall clothes,	
Blows from moving components. Make sure there are no people i seat and fasten seatbelt			in the working area. Sit in operator's safety shoes				ty shoes

Activity Code:B117Crew Composition:AE OperatorMaintenance Activity:Check Operation of All Lights, Horns,
Control, Console & Monitor LightsMaintenance Interval:10hr./Daily Service

Soguonco			Estimated	Tool	s	Materials	
No.	Activ	ity	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Turn engine starter switch and observe all of the indi	to "I" (ON) position cator lights.	1.00				
2	Check operation of all light	2.00					
3	Replace busted bulbs.	1.00				bulb	
3	Sound the horn. Replace/r	1.00					
4	Turn "ON" and inspect all	1.00					
5	Replace any monitor's bur or broken housing or lense	ned bulbs or cracked s.	2.00				bulb
		TOTAL	8.00				
		Sat	fety				
	Hazard		Precaution			Requ	ired PPE
Hand injurie and tools, s	s caused by sharp parts lipping of tools etc.	Wear prescribed hand and power tools in safe	gloves, overall clothes, safety shoes, hard hat				
Fire/explosic	n	Do not smoke when re	pairing faulty	electrical par	ts.	,	

<u>B118</u>

Crew Composition:

<u>AE Operator</u>

Maintenance Activity:

Maintenance Interval: **<u>10hr./Daily Service</u>**

Comence				Tool	S	Materials	
No.	Acti	vity		Quantity & Unit	Class	Quantity & Unit	Description
1	Park the machine the mac surface, lower the attachn	hine on a level of nent to the ground.	10.00				
2	Move safety lever up into	"UNLOCK" position.	1.00				
3	Operate the levers in all di boom, arm, bucket and si correctly.	rections to if check the wing functions operate	5.00				
4	Raise the boom and arm about 1 m (3 ft.) off the	such that the bucket ground.	1.00				
5	Move the safety lever down deactivate the work group	vn into "LOCK" position to (joystick) levers.	1.00				
6	Check if there are movem and swing functions when	1.00					
7	With the safety lever still i move the travel controls. movement of the excava) the "LOCk" position, There must be no or tracks.	2.00				
8	Move safety lever to "UN	OCK" position.	1.00				
9	Raise the boom and arm s m (3 ft.) off the ground.	so the bucket is about 1	1.00				
10	Operate the lever (joystic) slowly. While boom is lowe lever down into "LOCK" po must stop. Repeat these swing and travel functions	 to lower the boom ring, move the safety isition. Boom movement steps for arm, bucket, 	1.00				
11	Lower work group to the g	round and stop engine.	1.00				
		TOTAL	25.00				
		Safe	ty				• -
	Hazard	Pr	ecaution			Requ	ired PPE
Hand injuries caused by sharp parts Wear prescribed han and tools, slipping of tools etc. Blows from moving components. people in the working seatbelt			tection and m on. Make sum . Sit in operat	naintain all ha e there are r tor's seat an	ind and 10 d fasten	gloves, over safety shoe	rall clothes, s

PM Group: **PM 2**

Maintenance Interval: 50hrs./Weekly Service

Activity Code	Activity	Estimated Time (minutes)	Labor	Tools	Materials	PPE
Note: All P B201	M1 Activities are included in the PM2 Gro Greasing of arm, bucket joint pins & swing bearing	<i>ир.</i> 12.00	Operator/ Engine Man	grease gun	grease, clean cloth	hard hat, safety shoes, gloves, overall clothes
B202	Draining of fuel tank	5.00	Operator/ Engine Man	container	clean cloth	hard hat, safety shoes, gloves, overall clothes
B203	Check engine fan belts for cracks, wear & correct tension	8.00	Operator/ Engine Man	wrench		hard hat, safety shoes, gloves, overall clothes
B204	Greasing of axle bearings and hydraulic pins & bushings carriage	21.00	Operator/ Engine Man	grease gun	grease	hard hat, safety shoes, gloves, overall clothes

Crew Composition: <u>AE Operator/Engine Man</u>

Maintenance Activity: Greasing of Arm, Bucket Joint Pins, & Swing

<u>Bearings</u>

Maintenance Interval: 50hrs./Weekly Service

Saguarca			Estimated	То	ols	М	aterials		
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description		
1	Remove the cover of the gr	ease nipple.	0.50						
2	Press the grease fitting & inject grease with the grease gun on the ff. joints:			1 pc.	Grease Gun		Grease		
2a	Arm link joint pin (1 point)		1.00						
2b	Link joint pin (2 points)		2.00						
2c	Arm bucket joint pin (1 point)		1.00						
2d	Bucket link joint pin (1 point)		1.00						
2e	Bucket cylinder rod pin (1 point)		1.00						
2f	Swing bearing (3 points)		3.00						
3	Replace the nipple cover		0.50						
4	Wipe off the old grease that has been purged. (.25mins/joint)		2.00			1 pc.	clean cloth		
		TOTAL	12.00						
	Safety								
	Hazard			Precaution			Required PPE		
Slips, trips and head bumps. Clear the are passageway.			ea of any materials that block the			Gloves, Overall clothes, safety shoes, hard hat.			

Activity Code:	<u>B202</u>
Crew Composition:	AE Operator/Engine Man
Maintenance Activity:	Draining of Fuel Tank
Maintenance Interval:	50hr./Weekly Service

Soguence			Estimated	То	ols	Ма	terials
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
Perform th	s procedure before starting	the machine.					
1	Place a suitable container b fuel tank.	elow the	1.00	1 pc.	container		
2	Turn to "open" position the check if there is water or sediments/deposition inside Drain until water and sedim longer evident in the flow.	3.00					
3	Close the drain & wipe off f	luid.	1.00			1 pc.	clean cloth
Dispose dra Always fill t	in fluid according to environ he fuel after each day of wo	mental laws rk to prevent	& regulation. moisture forn	ning inside th	e tank.		
		TOTAL	5.00				
			Safety				
	Hazard		Precau	ition		Requ	ired PPE
Slips or trips. Head bump. Clear the ar passageway			ea of any mater	ials that bloc	k the	Gloves, Ove safety shoe	erall clothes, es, hard hat

Activity Code: B203 Crew Composition: AE Operator/Engine Man Maintenance Activity: Check Engine Fan Blades for Cracks, Wear & Correct Tension

Maintenance Interval: 50hr./Weekly Service

Soquence			Estimated	To	ols	Materials		
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description	
1	Open the access door of th	e engine.	1.00					
2	Check the tension of the fan belt by pressing downward on the belt. The belt should flex for about 10 mm.		1.50					
3	To adjust, loosen the alternator adjustment plate bolts and adjust the belt tension.		5.00	1 pc.	wrench: 17mm			
4	Retighten the bolts.		0.50	1 pc.	wrench: 17mm			
		TOTAL	8.00					
			Safety					
	Hazard		Precau	tion		Requ	ired PPE	
Head bump. Skin abrasion & burns. Avoid o			ct with hot & sharp edges on engine .			Gloves, overall clothes, safety shoes, hard hat		

Activity Code:B204Crew Composition:AE Operator/Engine ManMaintenance Activity:Greasing of Axle Bearings & Hydraulic Pins& Bushings of Carriage

Maintenance Interval: 50hr./Weekly Service

Soquence			Estimated	То	ols	Materials		
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description	
1	Do a walk around inspection track assemblies.	n on the	3 00					
2	Check for missing, damage excessively worn-out parts.	d or	5.00					
3	Press the grease fitting on the axle bearings & inject grease with the grease gun.		8.00	1	grease gun		grease	
4	Press the grease fitting of the hydraulic cylinder pins& bushings, & inject grease with the grease gun.		8.00	1	grease gun		grease	
5	Wipe off excess grease.		2.00			1 pc.	clean cloth	
		TOTAL	21.00					
			Safety					
	Hazard		Precau	ition		Required PPE		
Trips or slips.		Clear the are	ea of materials blocking the path.			Gloves, overall clothes, safety shoes, hard hat		

PM Group:

<u>PM3</u>

Maintenance Interval :

Activity Code	Maintenance Activity	Estimated Time (minutes)	Labor	Tools	Materials	PPE
Note: All PM	11 & PM2 Acitivities are included in the PM3 Gr	оир				
B301	Inspection & greasing of arm & front attachment pins	14.00	Operator/E ngine Man	grease gun	grease, clean cloth	hard hat, safety shoes, gloves, overall clothes
B302	Check engine fan belts for cracks, wear & correct tension	5.00	Operator/E ngine Man	wrench		hard hat, safety shoes, gloves, overall clothes
B303	Change breaker filter	9.00	Operator/E ngine Man	wrench	filter, clean cloth, hydraulic oil	hard hat, safety shoes, gloves, overall clothes
B304	Replace hydraulic oil return filter	27.00	Operator/E ngine Man	wrench	clean cloth, hydraulic oil	hard hat, safety shoes, gloves, overall clothes, safety glasses
B305	Change pilot filter	20.00	Operator/E ngine Man	screw driver	clean cloth, hydraulic oil	hard hat, safety shoes, gloves, overall clothes, safety glasses
B306	Inspect bushing & pins of the front end attachment	4.00	Operator/E ngine Man			hard hat, safety shoes, gloves, overall clothes
B307	Inspection of loose/missing bolts & nuts	11.00	Operator/E ngine Man	wrench		hard hat, safety shoes, gloves, overall clothes
B308	Check hydraulic travel motor oil of the carriage	17.00	Operator/E ngine Man	wrench	API GL- 4 SAE 90, seal tape film	hard hat, safety shoes, gloves, overall clothes

<u>B301</u>

Activity Code:

Crew Composition: **AE Operator/Engine Man**

Maintenance Activity: Inspection & Greasing of Arm & Front

Attachment Pins

Maintenance Interval: 250hr./Weekly Service

Soguorco			Estimated	Тоо	ls	Materials		
No.	Activit	У	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description	
1	Remove the cover of nipple.	the grease	0.50					
2	Press the grease fitting & inject grease on the ff. joints:			1 pc.	Grease gun		Grease	
2a	Boom cylinder head pin (2 points)		2.00					
2b	Boom foot pin (2 point	2.00						
2c	Boom cylinder rod pin	2.00						
2d	Arm cylinder head pin (1 point)		1.00					
2e	Boom arm joint pin (2 points)		2.00					
2f	Arm cylinder rod pin (1	. point)	1.00					
2g	Bucket cylinder head	pin (1 point)	1.00					
4	Replace the nipple cov	er.	0.50					
5	Wipe off the old greas been purged. (.25mins	se that has s/joint)	2.00			1 pc.	clean cloth	
		TOTAL	14.00					
Safety								
	Hazard		Precauti	on		Requi	red PPE	
Slips, trips and head bumps. C		Clear the area of passageway.	of any materials that blocks the			Gloves, Overall clothes, safety shoes, hard hat.		

Crew composition:

<u>B302</u>

AE Operator / Engine Man

Check Engine Fan Beltsfor Cracks,

Wear & Correct Tension

Maintenance Interval:

Maintenance Activity :

Convonco			Estimated	Тос	ols	Ma	aterials
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Open the access door of t	the engine.	0.50				
2	Check the tension of the f downward on the belt. Th for about 10 mm.	0.25					
3	To adjust, loosen the alte plate bolts and adjust the	2.00	1 pc.	wrench: 17mm			
4	Retighten the bolts.		2.00	1 pc.	wrench: 17mm		
5	Close the access door of	the engine.	0.25				
	TOTAL		5.00				
			Safety			-	
Hazard		Precautio	n		Req	uired PPE	
Head bump. Skin abrasion & burns.		Avoid contact with	the hot & shar	p edges on e	ingine .	Gloves, Overa shoes, hard h	Il clothes, safety at

<u>B303</u>

Crew composition:

<u>AE Operator/Engine Man</u>

Maintenance Activity :

<u>Change Break Filter</u>

Maintenance Interval:

Sequence		•	Estimated		Tools	Mate	erials
No.	Act	ivity	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Loosen the hydraulic oil ta release pressure.	ank breather cap to	1.00				
2	Locate breaker filter asse	mbly.	0.50				
3	Place a container under t Remove drain plug & drai	ne filter assembly. n the assembly.	1.00	1 pc.	wrench: 30mm container		
4	Unscrew filter housing fro	m filter bottom.	1.00	1 pc.	wrench: 30mm		
5	Remove O-ring from filter	head.	0.50				
6	Replace new filter.		0.50			1 pc.	Filter
7	Apply small amount of oil to O-ring & install the filter housing on the filter head.		0.50				
8	Reinstall drain plug.		0.50	1 pc.	wrench: 30 mm		
9	Start the engine & check	the oil level in the tank.	2.00				
10	Add hydraulic oil to corre	ct level if needed.	1.00				hydraulic oil
11	Clean the area of spilled	pil.	0.50			1 pc.	clean cloth
		TOTAL	9.00				
Dispose drai	ined fluid according to e	environmental laws& re	gulation.				
			Safety				
	Hazard		Precautio	on		Requi	red PPE
Slips, trips an	d head bumps.	Clear the area of any mate	erials and spil	ls.		Gloves, Overall clothes, safety shoes, hard hat.	

Crew composition:

<u>B304</u>

AE Operator/Engine Man

Maintenance Activity :

Replace Hydraulic Oil Return Filter

Maintenance Interval:

Seguence	•		Estimated		ols	Mat	erials
No.	Act	ivity	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Lift the breather cap sligh pressure.	tly to release the internal	1.00				
2	Loosen the bolts to remov	e the service cover.	3.00	1 pc.	wrench		
3	Remove spring, valve, O-	ring & bypass strainer.	4.00				
4	Remove filter & discard.		1.00				
5	Install new filter & O-ring		1.00				
6	Install bypass strainer, valve & spring.		2.00				
7	Clean and re-install service cover.		3.00	1 pc.	wrench	1 pc.	Clean cloth
8	Run engine for 10 minute	s at low idle.	10.00				
9	Check oil level in hydrauli recommended level if nec	c tank. Add oil to the resssary.	2.00				hydraulic oil
		TOTAL	27.00				
NOTE: Repla	nce hydraulic oil return filte	er after first 250 hours of op	peration, then	1,000 hours th	nereafter.		
		S	afety				
	Hazard		Precaution			Requi	red PPE
Hand injury o	aused by contact on	Avoid contact with the eng	jine.			Gloves, Overa	all clothes,
sharp edges.	Burns by contact with					safety shoes,	hard hat,
hot engine pa	arts.					protective gla	sses.

Crew composition:

<u>B305</u>

AE Operator/Engine Man

Maintenance Activity :

Change Pilot Filter

Maintenance Interval:

•			Estimated	То	ols	Materials	
Sequence No.	Acti	vity	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Lift the breather cap sligh internal pressure.	tly to release the	1.00				
1	Unscrew canister, remove cartridge.	3.00					
1	Insert the new cartridge	1.00					
1	Apply small amount of oil install the canister assem	3.00	1 pc.	screw driver	1 pc.	Clean cloth	
1	Run engine for 10 minute	s at low idle.	10.00				
1	Check oil level in hydrauli recommended level if nec	c tank. Add oil to the cesssary.	2.00				hydraulic oil
		TOTAL	20.00				
			Safety				
Hazard			Precaution			Requir	ed PPE
Hand injury caused by contact on Avoid contact with the en sharp edges, burns by contact on hot engine parts.		ngine.			Gloves, Overa safety shoes, protective gla	II clothes, hard hat, sses.	

Crew composition:

Maintenance Activity : <u>D300</u>

<u>AE Operator/Engine Man</u>

Inspect Bushing & Pins of the Front

End Attachment

Maintenance Interval:

		Estimated	Тоо	Tools		erials	
Sequence No.	Activ	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description	
1	Lower the Boom to the gr	1.00					
2	Check/inspect the pins and bushing of the front end attachments for signs of wear.		3.00				
3	Repair/replace worn out part(s) if necessary						
		TOTAL	4.00				
		9	Safety				
	Hazard		Precaution			Requi	red PPE
Head bump. Hand injuries caused by Aw contact on sharp edges & burns.		Avoid contact with hot	id contact with hot & sharp edges of engine .			Gloves, Overa safety shoes,	all clothes, hard hat

<u>B307</u>

Crew composition:

AE Operator/Engine Man

Inspection of Loose/Missing

Maintenance Activity :

<u>Bolts & Nuts</u>

Maintenance Interval:

Soguonco	Activity		Estimated	1	Tools	Materials	
No.			Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Perform a walk around ir equipment.	spection on the	5.00				
2	Check/inspect any loose on nuts.	3.00		wrench- different sizes			
3	Tighten/replace bolts & nuts.		3.00		wrench- different sizes		
		TOTAL	11.00				
			Safety				
Hazard		Precaution			Required PPE		
Trips or slips.		Clear the area of materials blocking the path.				Gloves, Overall clothes, safety shoes, hard hat	

Crew composition:

<u>B308</u>

<u>AE Operator/Engine Man</u>

Maintenance Activity :

Check Hydraulic Travel Motor Oil

of the Carriage

Maintenance Interval:

Soquence			Estimated	То	ols	Ма	terials
No.	Activi	ty	Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
1	Rotate the axle until the c parallel to the ground.	il level check port is	10.00				
2	Lower the attachments to the engine and allow to c	2.00					
3	3 Slowly loosen the oil level check plug to release the pressure inside the barrel. (Oil level must be horizontal with the hole)			1 pc.	wrench		
4	Add oil until it flows out fi	rom the hole.	1.00			liter	API GL-4 SAE 90
5	Apply thread seal tape file & install the plug.	m around the thread	3.00	1 pc.	wrench	1 roll	seal tape film
		TOTAL	17.00				
			Safety				
	Hazard					Requ	ired PPE
Slips, trips and head bumps.		Clear the area of any	area of any materials and spills.			Gloves, Overall clothes, safety shoes, hard hat.	

PM Group: <u>PM4</u> Maintenance Interval: <u>500hrs./Quarterly Service</u>

Activity Code	Maintenance Activity	Estimated Time (minutes)	Labor	Tools	Materials	PPE
Note: A//	PM1, PM2 & PM3 Acitivities are included	in the PM4	Group			
B401	Greasing of swing gear & pinion	17.00	Operator/ Engine Man	wrench	grease, clean cloth	hard hat, safety shoes, gloves, overall clothes
B402	Change engine oil & filter	40.00	Operator/ Engine Man	wrench	fiter, grease, clean cloth	hard hat, safety shoes, gloves, overall clothes
B403	Cleaning of airconditioning filters	17.00	Operator/ Engine Man	compressor	detergent soap	hard hat, safety shoes, gloves, overall clothes, googles, dust mask
B404	Cleaning of radiator, oil cooler, intercooler, fuel cooler & aircon condenser core	13.00	Operator/ Engine Man	air compressor, pressurized water or steam		hard hat, safety shoes, gloves, overall clothes, googles, dust mask
B405	Cleaning of outer filter of air cleaner	11.50	Operator/ Engine Man	compressor	clean cloth	hard hat, safety shoes, gloves, overall clothes, googles, dust mask
B406	Change of water separator & pre-fuel filter	5.50	Operator/ Engine Man	special tool	diesel, clean cloth	hard hat, safety shoes, gloves, overall clothes
B407	Change main fuel filter	18.50	Operator/ Engine Man	wrench	diesel, clean cloth	hard hat, safety shoes, gloves, overall clothes
B408	Change swing reduction device oil	10.00	Operator/ Engine Man	wrench	SAE 90, clean cloth	hard hat, safety shoes, gloves, overall clothes, googles
B409	Check pontoons for leaks and damages	26.00	Operator/ Engine Man	wrench, flashlight, pressure gauge, air compressor, welding machine	soap, water	hard hat, safety shoes, gloves, overall clothes, googles, dust mask

Crew composition:

<u>B401</u>

<u>AE Operator/Engine Man</u>

Greasing of Swing Gear & Pinion

Maintenance Interval:

Maintenance Activity :

	Estimated Tools		Tools	Ma	aterials				
Sequence No.	Activity		Time	Quantity	Class	Quantity	Description		
			(minutes)	& Unit	Clubb	& Unit	Description		
1	Remove the inspection	cover.	1.00	1 pc.	wrench				
2	Check/inspect the cond	ition of the							
	grease. (Make sure that there is no								
	water or other contaminants)		10.00						
3	Rotate the upper struct	ure so that	10.00				grease		
	the entire face of the sv	ving gear							
	can be lubricated.								
4	If water contamination is found,					1pcs.	clean cloth		
	remove the lower acces	s cover so	5.00				grease		
	that the gear teeth can	be	5.00						
	thoroughly cleaned and	lubricated.							
5	Install access covers aft	er	1.00	1 nc	wrench				
	lubricating gear teeth.		1.00	i pc.	WICHCH				
		TOTAL	17.00						
Use extre	me caution when perfor	ming this act	tivities. Gre	asing swin	ig gear & pinio	n must be s	ervice by only		
one perso	n.								
	Safety								
	Hazard		Prec	aution		Requ	uired PPE		
Head bumps, slips, injuries. Do not rotat			te while cleaning or greasing the			Gloves, Overall clothes,			
		swing gear.				safety sho	es, hard hat.		

<u>B402</u>

Crew composition:

Maintenance Activity :

Maintenance Interval:

<u>AE Operator/Engine Man</u>

Change Engine Oil & Filter

	Estimated Tools		Tools	Ma	nterials			
Sequence	Activity		Time	Quantity	Class	Quantity	Description	
			(minutes)	& Unit	Class	& Unit	Description	
1	Place a suitable large co	ontainer	0.25	1 pc.	container			
	under the engine.							
2	Remove cap & install the hose to		10.00					
	drain the engine oil.							
3	After complete drain, re	emove hose	0.25					
	& install the cap.							
4	Remove & discard the u	sed filter.	0.50	1 pc.	Filter wrench			
5	Apply a small amount o	f oil around	0.50			1 pc.	clean cloth	
	the filter gasket.						grease	
6	Install new filter by scre	wing filter	2.00			1 pc.	Filter	
	on head until gasket co	ntacts head,						
	turn filter 1/2 turn more	2.						
7	Refill the engine with t	ne correct	10.00			27 liters	SAE 15W-40	
	oil through the fill port.							
8	Start & run engine for 5	minutes at	1.00	1 pc.	wrench			
	"Low Idle".							
9	Stop engine.		0.25					
10	Check/ inspect for leaks	at the	0.25					
	filter.							
11	Recheck oil level after 15 minutes.		15.00			1 pc.	Clean cloth	
	TOTAL		40.00					
			Safety					
	Hazard		Prec	aution		Required PPE		
Head bumps, slips, skin burn. Clear the w		orking area.	orking area. Avoid contact with the			Gloves, Overall clothes,		
		engine.				safety sho	es, hard hat.	

<u>B403</u>

Crew composition:

Maintenance Activity :

AE Operator/Engine Man

Cleaning of Air-Conditioning Filters

Maintenance Interval:

			Estimated		Tools	Materials	
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
	Aircon outer filter.						
1	Open the left front acce the machine.	ess door of	1.00				
2	Remove the cover by lo the 4 wing bolts	osening	1.00				
3	Open the cover in the rear of the cabin.		0.50				
4	Remove filter & check f damage.	or any	1.00				
5	Clean the filter using co air.	mpressed	2.00	1	compressor		
6	Reassemble in reverse	order.	2.00				
	Aircon inner filter.						
7	Pull outward the knob while pressing the upper & lower part of the filter handle on the left rear side of the sphin		0.50				
8	Clean the filter using co air.	mpressed	2.00	1	compressor		
9	If filter is very dirty use detergent to clean. (be filter is completely dry installing.	water & sure that before	5.00			1 sachet	detergent soap
10	Reinstall the filter.		2.00				
		TOTAL	17.00				
Reminder in the "Of	All servicing & inspect F" position.	ion of air-co	nditioning s	ystem mu	st be performe	d with the	starter switch
			Safety				
	Hazard	Prec	aution		Required PPE		
Dust inhal due to du	ation. Eye irritation st.	the filters r	nus be dor	ne in open	Gloves, Ov safety sho dust mask,	erall clothes, es, hard hat, goggles.	

<u>B404</u>

Crew composition: <u>AE Operator/Engine Man</u>

Maintenance Activity :

<u>Cleaning of Radiator, Oil Cooler,</u> <u>Intercooler, Fuel Cooler, & Aircon</u> <u>Condenser Core</u>

Maintenance Interval:

c	Estimated Tools		rools	Ма	terials		
Sequence	Activity		Time	Quantity	Class	Quantity	Description
140.			(minutes)	& Unit	Class	& Unit	Description
1	Open the rear left door	& engine	1.00				
	cover.						
2	Loosen the wing bolts &	remove	1.00				
	dust net in front of oil c	ooler &					
	intercooler.						
3	Clean the outside of the	e radiator,	5.00		air		
	oil cooler, intercooler, f	uel cooler			compressor/		
	and air con condenser.				pressurized		
					water or		
					steam		
4	Repeat #3 from the insi	de of the	5.00		air		
	engine outward to remo	ove all dirt			compressor/		
	& debris.				pressurized		
					water or		
					steam		
5	Close the rear left door	& engine	1.00				
	cover.						
		TOTAL	13.00				
Note: To p	prevent damage of the co	ores, apply c	ompressed o	air from an	appropriate a	listance .	
			Safety				
Hazard			Preca	aution		Requ	ired PPE
Dust inhalation. Eye irritation Cleaning of		the cores m	nust be dor	ne from an	Gloves, Ov	erall clothes,	
due to dust. approprite		approprite	distance.			safety shoes, hard hat,	
						dust mask,	protective
						glasses.	

<u>B405</u>

Crew composition:

AE Operator/Engine Man

Maintenance Activity :

<u>Cleaning of Outer Filter of Air</u> <u>cleaner</u>

Maintenance Interval:

			Estimated	d Tools		Ma	terials
No.	Activity		Time	Quantity	Class	Quantity	Description
			(minutes)	& Unit		& Unit	
1	Open the access door at	the rear of	1.00				
	the cabin.						
2	Remove rubber evacuator valve		0.50				
	from bottom of air clear	ner housing					
	cover.						
3	Clean the valve, inspect	seal lips	2.00			1 pc.	clean cloth
	for wear or damage. Re	place if					
	necesssary.						
4	Remove the access cove	er by	2.00				
	loosening the latches.						
5	Remove the outer filter	from the	1.00				
	housing. Do not remove	inner					
	filter.						
6	Clean the outer filter by	blowing	1.00	1	compressor		
	compressed air from the	e inside of					
	the filter.						
7	Clean the air cleaner bo	dy & cover.	2.00			1 pc.	clean cloth
8	Install the air filter & co	ver	2.00				
	TOTAL		11.50				
Note: To p	prevent damage of the co	ores, apply c	ompressed o	air from an	appropriate a	listance.	
			Safety				
Hazard			Preca	aution		Requ	ired PPE
Dust inhalation. Eye irritation Cleaning of		the cores m	nust be dor	ne from an	Gloves, Ov	erall clothes,	
due to dust. approp		approprite	distance.			safety shoes, hard hat,	
						dust mask,	protective
						glasses.	

<u>B406</u>

Crew composition:

Maintenance Activity :

Change of Water Separator & Pre-

AE Operator/Engine Man

<u>Fuel Filter</u>

Estimated Tools Materials Sequence Time Activity Quantity Quantity No. Class Description (minutes) & Unit & Unit Open the left rear side door to 1 1.00 access fuel filter. Place a small container under the 2 0.25 pre fuel filter. 3 Open the drain valve at the bottom 1.00 of the filter & drain the fuel. 4 Remove the bowl. 1.00 special tool 1 pc. 5 Remove the cartridge from the 0.50 bowl. Coat the surface with fuel on Diesel fuel 6 0.25 packing of the new cartridge. 7 Tighten the cartridge by hand until 0.50 clean cloth 1 pc. packing comes into contact with the surface of the filter housing head. Coat surface of seal with fuel & 1 pc. special tool Diesel fuel 8 1.00 reinstall the bowl. Important: Dispose fluid according to environmental laws & regulation. TOTAL 5.50 Safety Hazard Precaution **Required PPE** Gloves, Overall clothes, Hand injuries caused by contact Avoid contact with sharp edges. Handling of with sharp edges. Skin irritation safety shoes, hard hat. fuel must be done with proper care. Avoid cause by contact on fuel. Head smoking while doing this activity. bumps. Fire/explosion.

Maintenance Interval: 500hrs./Quarterly Service

Activity Code: Crew composition: <u>B407</u> <u>AE Operator/Engine Man</u>

Maintenance Activity :

Change Main Fuel Filter

Maintenance Interval:

C			Estimated	Т	ools	Mat	erials
Sequence No.	Activity		Time	Quantity	Class	Quantity	Description
			(minutes)	& Unit	Cluss	& Unit	Description
1	Locate the main fuel fil	ter inside	1.00				
	the engine compartme	nt.					
2	Place a small container	under the	0.50				
	fuel filter.						
3	Unscrew the fuel filter	from	3.00	1 pc.	filter		
	assembly. Discard fuel f	ilter.			wrench		
Important	: Dispose fluid according	g to environ	mental laws	& regulati	on.		
4	Clean filter head.		0.50				
5	Install new fuel filter. C	oat fuel	3.00	1 pc.	filter		Diesel fuel
	filter gasket with fuel b	efore			wrench	1 pc.	Fuel filter
	installation.						
After inst	alling the new filter, air	may need to	be bled by	following	these proced	ures:	1
1	Loosen plug on the fuel	filter head.	1.00	1 pc.	wrench		
2	Pump the hand operate	d primer	1.00				
	pump until fuel is comi	ng out of					
	the plug hole.						
3	Tighten the plug in fuel	filter head.	0.50				
4	Continue to pump until	strong	2.00				
	resistance is felt.						
5	Clean the area of fuel s	oills.	0.50			1 pc.	clean cloth
6	Start the engine & look	for sign of	3.00				
	leaks.						
7	Repeat procedure if ne	cessary.	2.50				
	TOTAL		18.50				
			Safety				
	Hazard		Preca	ution		Requi	red PPE
Hand inju	ries cause by contact	Avoid conta	act with shar	rp edges. ⊢	landling of	Gloves, Ov	verall
with shar	edges. Skin irritation	fuel must b	e done with	proper ca	re. Avoid	clothes, safety shoes,	
cause by o	contact with fuel. Head	smoking wh	nile doing th	is activity.		hard hat.	
bumps. Fi	re/explosion.						

<u>B408</u>

Crew composition:

Maintenance Activity :

<u>AE Operator/Engine Man</u> <u>Change Swing Reduction Device Oil</u>

Maintenance Interval:

			Estimated	То	ols	Mat	Materials	
Sequence No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description	
1	Place a suitable contain the excavator.	er under	0.50	1 pc.	container			
2	Loosen the drain plug to oil inside the reduction	drain the device.	0.50	1 pc.	wrench			
3	After draining, retighter	n the plug.	2.00	1 pc.	wrench			
4	Remove breather/fill cap, add oil to "H" mark on dipstick.		5.00			4 liters	SAE 90	
5	Clean the device after p the activities.	erforming	2.00			1 pc.	clean cloth	
		TOTAL	10.00					
NOTE: Ch	ange swing reduction de	vice oil after	first 500 hou	ırs & every 2	1,000 hours	thereafter .		
			Safety					
	Hazard		Preca	ution		Requi	red PPE	
Hand injury caused by contact Clear the ar			ea of any m	aterials that	t block the	Gloves, Ov	reall	
with sharp edges, head bumps,, passageway		Ι.			clothes, sa	fety shoes,		
slips/trips	•					hard hat, p glasses.	rotective	

<u>B409</u>

Crew composition:

Maintenance Activity :

AE Operator/Engine Man

Check Pontoon for Leaks & damages

Maintenance Interval:

Soguonco			Estimated	Тс	ools	Materials		
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description	
1	Park machine on firm &	level						
	ground. Stop the engine	2.						
2	Open manholes at the s pontoon walls.	ide of the	10.00	1 pc.	wrench			
3	Visually check if there is water		3.00	1 pc.	flashlight			
4	If water is found inside, remove all the drain plugs at the bottom of the inner side of the wall in each		3.00	1 pc.	wrench			
Reminder	: All compartments of a	eaking pont	oon must b	e tested wi	th an air press	sure betwe	en 5 psi to 6	
psi. Follov	v these procedures.	cuiling point			in un un press			
1	Install the pressure gau supply valve to drain po	ge & air ort of the	5.00	1 pc.	pressure gauge			
	compartment.			1 pc.	supply			
2	Supply air until the requ pressure. Close the air s valve.	uired test supply		1 unit	air compressor			
3	Apply soapy water to al welded joints to detern	l the nine &	5.00			1 sachet	Detergent soap	
4	locate the leaks. Weld/repair the area where leaks occur and on completion, repeat the air test on the affected			1 unit	welding machine	liiter	water	
Important	: This procedure must be	e repeated u	intil ther are	no further	leaks from th	ie comparti	ments is obse	
		TOTAL	26.00					
			Safety					
Hazard			Preca	aution		Required PPE		
head bumps, slips, injuries. Care must procedure		Care must b procedures	e observed when performing these			Gloves, Overall clothes, safety shoes, hard hat.		

PM Group:

<u>PM5</u>

Maintenance Interval :

Activity Code	Maintenance Activity	Estimated Time (minutes)	Labor	Tools	Materials	PPE
Note: A//	PM1, PM2, PM3 & PM4 Acitivities are	included in t	he PM5 Group)		
B501	Greasing of swing reduction device	11.50	Operator /Engine Man	grease gun	grease, clean cloth	hard hat, safety shoes, gloves, overall clothes
B502	Change air breather filter	3.00	Operator /Engine Man	screw driver	clean cloth	hard hat, safety shoes, gloves, overall clothes, googles
B503	Replace hydraulic oil return filter	30.00	Operator /Engine Man	wrench	hydraulic oil, clean cloth	hard hat, safety shoes, gloves, overall clothes, googles
B504	Change of pilot filter	23.00	Operator /Engine Man	wrench	hydraulic oil, clean cloth	hard hat, safety shoes, gloves, overall clothes, googles
B505	Change oil in swing reduction device	19.50	Operator /Engine Man	wrench	hydraulic oil, clean cloth	hard hat, safety shoes, gloves, overall clothes
B506	Change aircon outer filter	13.00	Operator /Engine Man			hard hat, safety shoes, gloves, overall clothes
B507	Change aircon refrigerant	15.00	Aircon Technician	wrench	HFC-134A	hard hat, safety shoes, gloves, overall clothes, googles, mask
B508	Change fuel cap filter	10.75	Operator /Engine Man	screw driver	clean cloth	hard hat, safety shoes, gloves, overall clothes, googles
B509	Check & adjust engine	90.00	DOOSAN Technician			

<u>B501</u>

Crew composition:

AE Operator/Engine Man

Maintenance Activity :

Greasing of Swing Reduction Device.

Maintenance Interval:

			Estimated	То	ols	Mat	erials
Sequence No.	Activity		Time	Quantity	Class	Quantity	Description
			(minutes)	& Unit	0.000	& Unit	Description
1	Park the machine on fir	m & level	10.00				
	ground. Lower the front						
	attachment to the grou	nd & stop					
	the engine.						
2	Remove air vent plug fr	om swing	0.50				
	reduction device.						
3	Press grease fitting & in	ject grease.	0.50	1 pc.	Grease		grease
4	Wipe-off excess grease	& re-install	0.50			1 pc.	Clean cloth
	air vent plug.						
		TOTAL	11.50				
			Safety				
Hazard		Precau	tion		Requi	red PPE	
Slips, head bumps, trips. Clear the		Clear the ar	rea of materials that block the			Gloves, Overall clothes,	
		passageway	Ι.			safety shoe	es, hard hat

Activity Code: <u>B</u>

<u>B502</u>

Crew composition:

Maintenance Activity :

<u>AE Operator/Engine Man</u>

<u>Change Air Breather Filter</u>

Maintenance Interval:

			Estimated	То	ols	Mat	erials
Sequence	Activity		Time	Quantity	Class	Quantity	Description
			(minutes)	& Unit	Class	& Unit	Description
1	Lift the breather cap slig	htly to	0.25				
	release the internal pressure.						
2	Unscrew bolt & take off	the	1.00	1 pc.	screw		
	breather cap.				driver		
3	Change the filter cartrid	ge &	1.50	1 pc.	screw		
	assemble the breather of	cap.			driver		
4	Wipe-off dirt & oil.		0.25			1 pc.	clean cloth
		TOTAL	3.00				
			Safety				
	Hazard		Precau	tion		Requi	red PPE
Hand injury caused by contact Avoid conta		icts with the	engine.		Gloves, Ov	erall clothes,	
with sharp edges, burns by					safety shoe	es, hard hat,	
contact w	ith hot engine parts.					protective	glasses.

<u>B503</u>

Crew composition:

Maintenance Activity :

AE Operator/Engine Man

Replace Hydraulic Oil Return Filter

Maintenance Interval:

c	Estimated Tools		ols	s Materials			
No.	Activity		Time	Quantity	Class	Quantity	Description
			(minutes)	& Unit	61055	& Unit	Description
1	Lift the breather cap slig	htly to	1.00				
	release the internal pres	ssure.					
2	Loosen bolts to remove the service		3.00	1 pc.	wrench		
	cover.						
3	Remove spring, valve, O	-ring &	4.00				
	bypass strainer.						
4	Remove & discard filter		2.00				
5	Install new filter & O-ring.		3.00				
6	Install bypass strainer, valve &		2.00				
	spring.						
7	Install service cover. Clean the		3.00	1 pc.	wrench	1 pc.	clean cloth
	area.						
8	Run engine for 10 minut	es at low	10.00				
	idle.						
9	Check oil level in hydrau	ılic tank.	2.00				hydraulic
	Add hydraulic oil to the						oil
	recommended level if n	ecesssary.					
		TOTAL	30.00				
			Safety				
Hazard		Precaution			Requi	red PPE	
Hand inju	iry caused by contact	Avoid conta	cts with the	engine.		Gloves, Overall clothes,	
with sharp edges, burns by						safety shoe	es, hard hat,
contact w	ith hot engine parts.					protective	glasses.

<u>B504</u>

Crew composition:

Maintenance Activity :

AE Operator/Engine Man

Change of Pilot Filter

Maintenance Interval:

			Estimated	То	ols	Mat	erials
Sequence	Activity		Time	Quantity	Class	Quantity	Description
NO.			(minutes)	& Unit	Cidss	& Unit	Description
1	Lift the breather cap slig	htly to	1.00				
	release the internal pressure.						
2	Unsrew canister, remov	e O-ring &	3.00	1 pc.	wrench		
	filter cartridge.						
3	Insert the new cartridge	e & O-ring.	4.00				
4	Apply small amount of o	oil around	3.00	1 pc.	wrench	1 pc.	clean cloth
	the O-ring & re-install the canister						
	assembly to the filter head.						
5	Run engine for 10 minut	es at low	10.00				
	idle.						
6	Check oil level in hydrai	ulic tank.	2.00				hydraulic
	Add hydraulic oil to the						oil
	recommended level if r	ecesssary.					
		TOTAL	23.00				
			Safety				
Hazard			Precau	ition		Requi	red PPE
Hand injury caused by contact Avoid conta		icts with the	engine.		Gloves, Ov	erall clothes,	
with sharp edges, burns by					safety shoe	es, hard hat,	
contact w	ith hot engine parts.					protective	glasses.

<u>B505</u>

Crew composition:

Maintenance Activity :

AE Operator/Engine Man

<u>Change Oil in Swing Reduction</u> <u>Device</u>

Maintenance Interval:

C			Estimated	То	ols	Mat	terials
No.	Activity		Time	Quantity	Class	Quantity	Description
			(minutes)	& Unit		& Unit	
1	Place a suitable contain	er under	0.50	1 pc.	container		
	the excavator.						
2	Loosen the drain plug to	drain the	10.00	1 pc.	wrench		
	oil inside the reduction	device.					
3	After draining, retighte	n the plug.	2.00	1 pc.	wrench		
4	Remove breather/fill ca	ıp, add oil	5.00				hydraulic
	to "H" mark on dipstick						oil
5	Clean the device after p	erforming	2.00			1 pc.	clean cloth
	the activities.						
		TOTAL	19.50				
			Safety	-			
Hazard			Precau	ution		Requi	ired PPE
Hand inju	ry caused by contact	Clear the ar	rea of any m	aterials that	at block	Gloves, Overall	
with sharp edges, head bumps,, the passage		eway.			clothes, safety shoes,		
slips/trip	5.					hard hat, p	protective

<u>B506</u>

Crew composition: <u>AE Operator/Engine Man</u>

Maintenance Activity :

Change Aircon Outer Filter

Maintenance Interval:

			Estimated	То	ols	Mat	terials
Sequence No.	Activity		Time	Quantity	Class	Quantity	Description
			(minutes)	& Unit		& Unit	
1	Open the access door ir front of the machine.	the left	1.00				
2	Remove the cover by loosening the 4 wing bolts.		3.00				
3	3 Open the cover in the rear of the cabin.		2.00				
4	Remove filter.		1.00				
5	Replace the new filter.		1.00				
6	Reassemble in reverse	order.	5.00				
		TOTAL	13.00				
Reminde	r: All servicing & inspect	tion of air-co	nditioning s	ystem mus	t be perfor	med with t	he starter
switch in	the "OFF" position.						
			Safety				
	Hazard		Precau	ition		Requi	red PPE
Dust inhalation. Eye irritation Avoid inhala		ation of dust	t when rem	oving the	Gloves, Ov	verall	
due to dust. old filter.					clothes, sa	fety shoes,	
						hard hat, d	lust mask,
						protective	glasses.

Activity Code:B507Crew composition:Aircon TechnicianMaintenance Activity:Check Aircon Refrigerant

Maintenance Interval:

			Estimated	То	ols	Mat	Materials	
Sequence No.	Procedure		Time	Quantity	Class	Quantity	Description	
			(minutes)	& Unit		& Unit		
1	Run engine at 1800 rpm		1.00					
2	Set fan speed to "HI" to maximum air flow.	allow	2.00					
3	Set the temperature co coldest.	ntrol to the	3.00					
4	Press the "Internal Circulation" switch.		1.00					
5	Observe the flow of bubbles in the sight glass of receiver dryer.		3.00					
6	Recharge the system wi	th the	5.00	1	wrench		HFC-134A	
	correct amount of refrig	gerant, if						
	necessary.							
		TOTAL	15.00					
Reminde	r: Servicing of air-condit	ioning syste	m must be p	erformed	by the qual	ified techn	ician.	
			Safety					
	Hazard		Precau	ution		Requi	ired PPE	
Frostbite	, Eye irritation,	Do not smol	ke while cha	arging refri	gerant to	Gloves, Ov	verall	
breathing problem. the system.		Avoid conta	act with ref	rigerant. If	clothes, sa	ifety shoes,		
there is no		recovery & r	ecycling ec	quipment	hard hat, g	as mask,		
		of refrigera	nt, release i	t in a well v	/entilated	protective	eye glass.	
		area.						
<u>B508</u>

Crew composition:

Maintenance Activity :

Maintenance Interval:

AE Operator/Engine Man

Change Fuel Cap Filter

			Estimated	То	ols	Materials	
Sequence	Activity		Time	Quantity	Class	Quantity	Description
			(minutes)	& Unit	Class	& Unit	Description
Extern	al shock or damage to fu	el cap can le	ad to damag	e to filter.	Proper care	e must be o	bserved to
protect th	e fuel cap filter from da	mage.			-	-	
1	Remove cap from the tank.		0.50				
2	Lay the cap on the flat s	urface.	0.25				
3	Disassemble the fuel ca	p by	2.00	1 pc.	screw		
	loosening the bolts.				driver		
4	Remove the rubber.		0.50				
5	Remove the old filter cartridge.		0.50				
6	Clean the cap.		1.00			1 pc.	clean cloth
7	Replace the new filter.		2.00				
8	Reassemble the cap in r	everse	4.00	1 pc.	screw		
	order.				driver		
		TOTAL	10.75				
			Safety				
	Hazard		Precau	tion		Requi	red PPE
Skin & ey	e irritation caused by	Wear prope	r PPE.			Gloves, Ov	verall
contact w	ith fuel.					clothes, sa	fety shoes,
						hard hat, p	orotective
						eyeglass.	

<u>B509</u>

Crew composition: **DOOSAN Technician**

Maintenance Activity :

Check & Adjust Engine

Maintenance Interval:

Sequence	Activity	Estimated	To	ols	Mat	terials		
No.	Activity	Time	Quantity	Class	Quantity	Description		
1	Check the engine compression pressure.	30.00						
2	Check injection pressure.	30.00						
3	Check injection timing.	30.00						
	τοτα	90.00						
Reminde DOOSAN	Reminder: Servicing for the engine Check-up & adjustment must be performed by the authorized DOOSAN technician using their test equipment.							
		Safety						
	Hazard	Preca	Precaution			Required PPE		

PM Group:

<u>PM6</u>

Maintenance Interval :

Activity Code	Maintenance Activity	Estimated Time (minutes)	Labor	Tools	Materials	PPE
Note: A//	PM1, PM2, PM3, PM4 & PM5 Acitiviti	es are includ	ed in the PM	16 Group		
B601	Replace outer & inner air cleaner filters	9.50	Operator/ Engine Man	compressor	clean cloth	hard hat, safety shoes, gloves, overall clothes, googles, dust mask
B602	Drain/change radiator coolant	54.50	Operator/ Engine Man	container	flushing solution, coolant	hard hat, safety shoes, gloves, overall clothes, googles
B603	Cleaning of hydraulic oil exchange & suction strainer	52.00	Operator/ Engine Man		hydraulic oil	hard hat, safety shoes, gloves, overall clothes, googles
B604	Check rubber anti-vibration shock mounting	23.00	Operator/ Engine Man			hard hat, safety shoes, gloves, overall clothes, googles
B605	Check/inspect machine for cracks/ broken welds or other structural damage	7.00	Operator/ Engine Man			hard hat, safety shoes, gloves, overall clothes
B606	Check alternator & starter assembly, check/adjust valve clearance, check head bolt torques		DOOSAN Technician			

<u>B601</u>

Crew composition: <u>AE Operator/Engine Man</u>

Maintenance Activity :

<u>Replace Outer & Inner Air Cleaner</u> <u>Filters</u>

Maintenance Interval:

C		Estimated	Т	ools	Materials	
No.	Activity	Time	Quantity	Class	Quantity	Description
		(minutes)	& Unit	Class	& Unit	Description
1	Open the access door at the rear of	1.00				
	the cabin.					
2	Remove rubber evacuator valve	0.25				
	from bottom of air cleaner housing					
	cover.					
3	Clean the valve & inspect seal lips	1.00			1 pc.	clean cloth
	for wear or damage. Replace if					
	necesssary.					
4	Remove the cover by loosening	0.50				
	the latches.					
5	Remove the outer filter from the	0.50				
	housing.					
6	Remove the inner filter.	0.25				
7	Clean the outer filter by blowing	2.00	1	compressor		
	compressed air from the inside of					
	the filter.					
8	Clean the air cleaner body & cover.	1.00			1 pc.	clean cloth
9	Install new inner filter (never	1.00				
	clean & reuse inner filter).					
10	Install new outer filter.	0.50				
11	Install air cleaner cover.	1.00				
12	Install evacuator valve with lips	0.50				
	parallel to the cover.					
	TOTAL	9.50				
Reminder	: Replace outer element after cleani	ng 5 times o	r every 2,0	00 hours. Rep	lace inner e	element
when a ne	ew outer element is installed. Make	sure that all	gaskets &	cover are pro	perly instal	led &
seated.						

scatca.								
Safety								
Hazard	Precaution	Required PPE						
Dust inhalation. Eye irritation	Cleaning of the cores must be done in	Gloves, Overall						
due to dust.	appropriate distance.	clothes, safety shoes,						
		hard hat, dust mask,						
		protective glasses.						

<u>B602</u>

<u>AE Operator/Engine Man</u>

Maintenance Activity :

Crew composition:

Activity Code:

Drain/Change Radiator Coolant

Maintenance Interval:

		Estimated	То	ols	Mat	terials
Sequence No.	Activity	Time	Quantity	Class	Quantity	Description
		(minutes)	& Unit	Class	& Unit	Description
1	Slowly open the radiator cap to	1.00				
	allow pressure to escape.					
2	Place a container under the	0.50	1 pc.	container		
	radiator & open the drain valve.					
3	Remove drain plug from engine.	1.00				
4	Install drain plug and close drain	5.00				
	valve after coolant has completely					
	drained.					
5	Fill the cooling system with	5.00				Flushing
	flushing solution.					solution
6	Run engine at low idle until	13.00				
	temperature gauge reaches the					
	"Blue Zone".					
7	Allow engine to cool.	5.00				
8	Drain the flushing fluid & fill the	3.00				
	system with water.					
9	Run the engine to allow the water	5.00				
	to circulate completely.					
10	Allow engine to cool & drain water	5.00				
	from the system.					
continued	on next page					

Activity Code:B602Crew composition:AE Operator/Engine ManMaintenance Activity:Drain/Change Radiator Coolant

Maintenance Interval:

Common	Comucines		Estimated	d Tools		Materials	
No	Activity		Time	Quantity	Class	Quantity	Description
1101			(minutes)	& Unit	Class	& Unit	Description
11	Fill the system with the	proper	3.00			30 liters	coolant
	mixture of coolant & wa	ater.					mixture
12	Run the engine with radiator open		5.00				
	to allow the air to be pu	rged from					
	the system. Fill radiator	to fill					
	neck. Install the radiator cap.						
13	Drain & refill radiator recovery		3.00				
	tank.						
	TOTAL		54.50				
Reminder	: Do not mix different br	ands of cool	ant. This can	damage th	ne system.		
Warning:	Radiator cleaning is perf	ormed while	e engine is ru	unning.			
			Safety				
	Hazard		Precau	tion		Requ	ired PPE
Burns cau	sed by pressurized	Be sure that	t proper dist	ance while		Gloves, O	verall
steam cor	ning out from the	performing	this activity.			clothes, safety shoes,	
radiator.						hard hat,	protective
						glasses.	

<u>B603</u>

Crew composition:

<u>AE Operator/Engine Man</u>

Maintenance Activity :

<u>Cleaning of Hydraulic Oil Exchange</u> <u>& Suction Strainer</u>

Maintenance Interval:

6		Estimated	d Tools		Ma	terials
No.	Activity	Time	Quantity	Class	Quantity	Description
		(minutes)	& Unit		& Unit	
1	Park the machine on firm & level	10.00				
	ground. Lower the front					
	attachment to the ground.					
2	Move safety lever to "Lock"					
	position.					
3	Stop the engine.	0.25				
4	Lift the breather cap to released	2.00				
	pressurized air from the tank.					
5	Place a container capable of	3.00				
	holding 280 liters. Open the drain					
	plug to drain the hydraulic oil.					
6	Wipe off any dirt or water from the	2.00				clean cloth
	top of the tank, around the fill port					
7	Carefully remove bolts & cover of	2.00				
	the filter port. (There is a spring					
	under the cover that will force the					
	cover up)					
8	Remove spring & strainer by	2.00				
	pulling on rod.					
9	Clean inside & outside of the	3.00			liters	diesel fuel
	strainer. Replace strainer if it is					
	broken.					
10	Allow engine to cool & drain water	5.00				
	from the system.					
11	Fill the system with the proper	3.00				
	mixture of coolant & water.					
continued	l on next page					

<u>B603</u>

Crew composition:

Maintenance Activity :

<u>Cleaning of Hydraulic Oil Exchange</u> <u>& Suction Strainer</u>

Maintenance Interval:

2,000hrs./Annual Service

AE Operator/Engine Man

C			Estimated	То	ols	Materials	
Sequence No.	Activity		Time	Quantity	Class	Quantity	Description
-			(minutes)	& Unit	Clubb	& Unit	Beschption
12	Position the strainer on b	OSS	0.50				
	portion of the suction pip	e.					
13	Fill the hydraulic oil tank.	Check	10.00			liters	Hydraulic
	the level on sight glass on	the side					oil
14	Replace spring on rod.		0.50				
15	Replace cover .		0.25				
16	Start the engine. Run at lo	ow idle to	3.00				
	build pressure at the hydr	raulic					
	tank.						
17	Slowly loosen the vent pl	ug until	0.50				
	hydraulic oil flows out of	the plug.					
18	Tighten the plug.		0.50				
19	Check oil level on the sigh	nt gauge.	0.50				
20	Wipe off excess oil on top	o of the	1.00				
	tank.						
21	Stop the engine.		3.00				
	TOTAL		52.00				
Reminder	: Be careful of squirting oil	when ren	noving the d	rain plug.			
	Dispose drain fluids & filt	ter in accor	dance to en	vironment	al laws & r	egulation.	
Warning:	The hydraulic oil will be ho	ot after no	rmal operati	on.			
	Allow the system to cool b	efore serv	icing any hy	draulic con	nponent.		
	Place a "Lock out/Tag out"	sign to no	tify that serv	vice work is	s being per	rformed.	
			Safety				
	Hazard		Precau	tion		Requi	ired PPE
Skin irrita	tion/burn when in 🛛 🛛 🛛	1ake sure t	hat the syste	em has coo	led down	Gloves, O	verall
contact wi	th hot hydraulic oil. b	efore perf	orming the a	ctivities.		clothes, safety shoes,	
Slips, hea	d bumps. C	lean the ar	rea of any m	aterials.		hard hat, protective	
						eye glasse	es.

<u>B604</u>

Crew composition:

<u>AE Operator/Engine Man</u>

Maintenance Activity :

Check Rubber Anti-Vibration Shock Mounting

Maintenance Interval:

		Estimated	Tools		Materials	
Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description
Move the lever to "Lock Run engine at "Low Idle	" position. ".	(
Observe for the abnormal noise & vibration.		10.00				
Stop the engine.		3.00				
Check/inspect all the rubber bushings & engine support for wears or cracks. Replace if necesssary.		10.00				
Contact DOOSAN deale if needed.	r for parts,					
	TOTAL	23.00				
		Safety				
Hazard		Precau	tion		Requ	ired PPE
Skin burns cause of contact with Avoid conta engine hot engine parts. Head bumps.		ict with the e	engine.		Gloves, O clothes, sa hard hat, j glasses	verall afety shoes, protective
	Activity Move the lever to "Lock Run engine at "Low Idle Observe for the abnorm vibration. Stop the engine. Check/inspect all the ru bushings & engine supp wears or cracks. Replace necessary. Contact DOOSAN dealer if needed. Hazard cause of contact with t engine parts. Head	Activity Move the lever to "Lock" position. Run engine at "Low Idle". Observe for the abnormal noise & vibration. Stop the engine. Check/inspect all the rubber bushings & engine support for wears or cracks. Replace if necessary. Contact DOOSAN dealer for parts, if needed. Hazard Kazard Activity Avoid contact with t engine parts. Head	Activity Time (minutes) Move the lever to "Lock" position. Run engine at "Low Idle". Observe for the abnormal noise & vibration. 10.00 Stop the engine. 3.00 Check/inspect all the rubber bushings & engine support for wears or cracks. Replace if necessary. 10.00 Contact DOOSAN dealer for parts, if needed. 23.00 TOTAL Zanot Hazard Precau cause of contact with t engine parts. Head	Activity Time (minutes) Quantity & Unit Move the lever to "Lock" position. Run engine at "Low Idle". Image: Comparison of the abnormal noise & 10.00 Image: Comparison of the abnormal noise & 10.00 Observe for the abnormal noise & 10.00 Image: Comparison of the abnormal noise & 10.00 Image: Comparison of the abnormal noise & 10.00 Stop the engine. 3.00 Image: Comparison of the abnormal noise & 10.00 Stop the engine. 3.00 Image: Comparison of the abnormal noise & 10.00 Check/inspect all the rubber 10.00 Image: Comparison of the abnormal noise & 10.00 Stop the engine support for Image: Comparison of the abnormal noise & 10.00 Image: Comparison of the abnormal noise & 10.00 Check/inspect all the rubber 10.00 Image: Comparison of the abnormal noise & 10.00 Image: Comparison of the abnormal noise & 10.00 Check/inspect all the rubber 10.00 Image: Comparison of the abnormal noise & 10.00 Image: Comparison of the abnormal noise & 10.00 Contact DOOSAN dealer for parts, if needed. TOTAL 23.00 Image: Comparison of the abnormal noise & 10.00 Hazard Precaution Avoid contact with the engine. Image: Comparison of the abnormal noise & 10.00 Flagse of contact with the abnormal noise & 10.00 Image: Comparison of the abnormal noise & 10.00 Image: Comparison of the abnormal noise & 10.00	Activity Time (minutes) Quantity & Unit Class Move the lever to "Lock" position. Run engine at "Low Idle". 10.00 1 1 Observe for the abnormal noise & vibration. 10.00 1 1 Stop the engine. 3.00 1 1 Check/inspect all the rubber bushings & engine support for wears or cracks. Replace if necessary. 10.00 1 1 Contact DOOSAN dealer for parts, if needed. 23.00 1 1 Frecaution Hazard Precaution	Activity Time (minutes) Quantity & Unit Quantity & Unit Move the lever to "Lock" position. Run engine at "Low Idle". 10.00 Image: Class of the shormal noise & 10.00 Image: Class of

Activity Code:	<u>B605</u>
Crew composition:	AE Operator/Engine Man
Maintenance Activity :	<u>Check/Inspect Machine for Cracked</u> <u>/Broken Welds or Other Structural</u> <u>Damage</u>

Maintenance Interval: <u>2,000hrs./Annual Service</u>

	·	•	Estimated	То	ols	Ma	terials
Sequence No.	Activity		Time	Quantity	Class	Quantity	Description
2	Perform a walk around inspection, inspect/check on any structural damage of the machine.		(minutes) 5.00	& Unit		& Unit	
3	Check for cracks on structures & cracked or broken welds.		2.00				
4	Perform necessary corre	ection.					
		TOTAL	7.00				
			Safety			•	
	Hazard		Precau	tion		Required PPE	
Slips, head bumps, trips. Clear the ar passageway		ea of materi ⁄.	als that blo	ock the	Gloves, O clothes, sa hard hat.	verall afety shoes,	

Activity Code:	<u>B606</u>
Crew composition:	DOOSAN Technician
Maintenance Activity:	Check Alternator & Starter Assembly.
	Check/Adjust Valve Clearance
	Check Head Bolt Torques
Maintenance Interval:	2,000hrs./Annual Service

Soguonco			Estimated	T	ools	Materials		
No.	Activity		Time (minutes)	Quantity & Unit	Class	Quantity & Unit	Description	
1	Check alternator & starter.							
2	Perform & record Cycle Time ⁻ results.	Test						
3	Check/adjust valve clearance.							
4	Check/retighten head bolts torque.							
5	Check/inspect all the rubber bushings & engine support fo wears or cracks. Replace if necesssary.	r						
IMPORTA	NT: Activities 1-5 must be p	perfor	med by DO	OSAN Te	chnician or a	authorized		
represen	tatives.							
		TOTAL	0.00					
			Safety					
	Hazard	Preca	ution		Requi	red PPE		

PM Group:

<u>PM7</u>

Maintenance Interval : <u>4,500hrs/2.5 years (whichever comes first)</u>

Note: Please refer to D.O. 160, Series of 2015 or the "Guideline on the Dry-docking and Repair of DPWH Dredges and Other Floating Equipment".

Undercarriage Maintenance:

Sequence No.	Activity Checking/Adjusting of Track Tension
Important: maybe too	Check the track chain condition before & after operation. The chain slack or loose during steering. Do not overtight the track chain.
1	Park the machine on firm & level ground. Stop the engine.
2	Ensure that the bottom & top track chains of the pontoon are in tension or flat.
3	Turn the sprockets to forward direction to get the flat chain top of the pontoon.
4	Below the front axle, check/measure the gap between the track rollers and pontoon body. The slack of the track chain, the gap must not be less than 1 1/2 inches and not more than 2 1/2 inches.
5	To adjust the tension: (if necessary)
5a	Loosen the bolts &nuts of the front & rear axle mounting.
5b	Loosen the lock nuts of the track tension adjuster. (Located at the inner & outer side of the axle mounting)
5c	Tighten the track tension adjuster bolts to adjust the track chain. The gap between the adjuster & the axle mounting must be the same at each end of the pontoon to ensure the correct alignment of the track chain.

Sequence	Activity
No.	Track Rollers Lubrication
Important: track roller	The machine will travel smoothly and can extend the life of the and pontoon if lubrication is done frequently.
1	Lubricate the track roller with used oil especially after the machine has been exposed to water or sludge and when the machine has not been used for a long period of time.

Sequence	Activity										
No.	Hydraulic Cylinder Care										
Important:	Important: Hydraulic cylinders is for amphibious excavator with extendable										
function. W	/hen extended, the hydraulic cylinder shaft is exposed to air, water										
and other s	olid objects that can cause corrosion or serious scratches.										
If the shaft	is no longer smooth, this will damage the shaft seal and will lead to										
oil leakage	and pressure loss. Proper care must be done/observed to protect										
the hydraul	ic cylinder. When the supplementary pontoons are attached to the										
undercarria	ge, it cannot be retracted. Extra care is required.										
1	After operation, park the machine on the ground.										

4	
n	Before retracting the carriage, clean the shaft surface. Remove the
Z	mud, earth, weed or other objects that stick on the shaft.
5	Apply grease or oil to the hydraulic shaft for extra protection from
	corrosion.

	-									
Sequence	Activity									
No.	Checking of Hydraulic Lines									
Important: Hydraulic hoses & tubes of the undercarriage are submerged whe operating. When operating in swampy or muddy areas, unseen hard & sharp objects can damage and puncture the hydraulic hoses & tubes. Regular inspection & proper care must be observed.										
1	Regularly inspect/clean the hydraulic hoses & fittings after operation.									
2	Check if ther are leaks on the joints.									
3	Inspect the hoses for cracks and cuts.									
_	If there is an abnormal loss of hydraulic pressure & oil level drop,									
4	hydraulic hoses & tubes inside the pontoon must be check and if no									
	abnormalities were found on the outside hydraulic lines.									

Sequence	Activity									
No.	Wearing Plates, Track Shoes, Track Rollers and Track Pins									
Important: Wearing plates are welded at the portion of the pontoon where there is contact with the track rollers and track pins during travel & steering. Without these plates the portion of the pontoon that contacts with the rollers & pins will wear-out fast. The rate of wear & tear of the wearing plates, track shoes & track pins must be checked every 100 hours. Failure to check/inspect and replace will damage the pontoon.										
1	Inspect & measure the thickness of the wearing plates. The minimum thickness of the plate is 4mm. Replace wearing plates if thickness is below 4mm.									
2	Inspect the track shoes and replace if greatly damaged.									
3	Change the track pins if the head is less than 4mm thick.									
4	Replace track rollers if its thickness is less than 3mm. The track link will make contact with the pontoon body if the rollers are completely worn-out.									
5	Apply grease or oil to the hydraulic shaft for extra protection from corrosion.									

ACKNOWLEDGEMENTS

The Bureau of Equipment (BOE) thru the Office of the Bureau Director wishes to extend its gratitude and appreciation to equipment distributors/suppliers who have supplied and made available the Operation and Maintenance Manuals, and to the engineers and staff of FED – Maintenance and Dry-docking Services Section who rendered their time and expertise to the development of various activities of this manual:

TORIBIO NOEL L. ILAO

Director, Bureau of Equipment

FERDINAND R. FUGABAN

Chief, Floating Equipment Division (FED)

VICTOR J. JAVIER

Chief, Maintenance and Dry-docking Services Section (MDSS)

LUIS B. PARIÑA, JR

Engineer III

MARIO L. MARASIGAN Engineer III

FRANCIS L. NUÑEZ Engineer II

JOVALE E. DELGADO Engineer III

SHALIMAR G. PALMA Engineer II

ECIA SELYN B. MARQUEZ

Engineer II

BIBLIOGRAPHY

- Doosan, DX225LC Operation and Maintenance Manual, January 2015
- Doosan DX225CLA Operation and Maintenance Manual, July 2008
- Volvo Excavator, Operator's Manual, series 0f 2010

CLASS "C"

BUREAU OF EQUIPMENT

FLOATING EQUIPMENT DIVISION

Manila

Date of Ocular Inspection:

MONTHLY CHECKLIST FOR AMPHIBIOUS EXCAVATOR

DREDGE NAME:			MAKE & MODEL:		
DPWH NO .:			UNIT SERIAL NO.:		
LOCATION:			ENGINE SERIAL NO.:		
PARTICULARS	FINDINGS	RECOMMENDATION	PARTICULARS	FINDINGS	RECOMMENDATION
A. PONTOON SIDE:			E. ENGINE ROOM:		
a. Poontoon Assembly, right			a. Engine Condition		
b. Poontoon Assembly, left			b. Transmission/Torque converter		
c. Additional Pontoon assy, right			c. Power Take Off assy.		
d. Additional Pontoon assy, left			d. Radiator assy.		
e. Spud assy (right pontoon)			e. Intercooler assy.		
f. Spud assy (left pontoon)			f. Turbo-charger assy.		
g. Hydraulic line assy, Pontoon			g. CRDi fuel system		
h. Track Pads			h. Fuel Filter		
i. Track Links			i. Oil Filter		
j. Hydraulic Motors, Track Pad,			j. Air Filter		
k. Hydraulic Motors, Track Pad,			k. Engine Belts		
B. FLATFORM SIDE:			I. Batteries		
a. Beam assy			m. Motor, starter, engine		
b. Additional Beam assy, right			n. Alternator		
c. Additional Beam assy, left			o. Oil, engine		
d. Center Flatform assembly			p. Separator, Fuel-water		
e. Hydraulic line assy, Center			F. ACCESSORIES:		
f. Hydraulic Hose and Adapters			a. Navigation Lights		
g. Hy draulic cy linder, pontoon, right			b. Working Lights		
h. Hy draulic cy linder, pontoon, left			c. Safety Signages		
C. PILOT HOUSE:			d. Cabin Air-conditioning system		
a. Cab/Canopy			G. OTHER SPECIFICATIONS:		
b. Cab Safety Rails			a. FUEL Capacity (liters)		
c. Control panel and Gauges			b. LUBE OIL Capacity (liters)		
d. Operation & control levers			c. GEAR OIL Capacity (liters)		
e. Monitor Assy			d. HYDRAULIC OIL Capacity		
f. CCTV, cowl mounted			e. Water Tank Capacity (liters)		
g. Hourmeter			f. GREASE (lbs)		
D. BOOM SIDE:			H. SAFETY/SPARE/TOOLS:		
a. Boom Assy			a. Personal Protective Gear		
b. Arm Assy			b. Fire Fighting Equipment		
c. Bucket Assy			c. First Aid Kit		
d. Cylinder, Boom			d. Operation Manual		
e. Cylinder, Arm			e. Parts Catalogue		
f. Cylinder, Bucket			f. Spare Parts / Tools / Etc.		
g. Clamshell assy			I. BODY PAINT CONDITION:		
OBSERVATION:					LEGEND:
					5 - GOOD
					4 - FAIR
RECOMMENDATION:					3 - POOR (FOR REPAIR)
					2 - CROP-OUT & RENEW
					1 - MISSING
					N/A - NOT APPLICABLE
Inspected By:	Checked/Verifi	ed By:	CONFORME:	NOTED	:

Chief, EMD

Republic of the Philippines Department of Public Works and Highways **BUREAU OF EQUIPMENT** Floating Equipment Division

PM SCHEDULE for AMPHIBIOUS EXCAVATOR CY-2016

Item	NAME of	Month of CV 201	lanuari	February	Marah	Anril	May	lune	Luby	August	Contembor	Ostahar	Nevember	December	REMARKS																								
no.	DREDGE		January	rebluary	Warch	Арпі	way	June	July	August	September	October	November	December																									
1	Amphibious Ex cav ator 1		PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4	PM 1,2	PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4,5	PM 1,2																									
2	Amphibious Ex cav ator 2																																						
3	Amphibious Ex cav ator 3																																						
4	Amphibious Ex cav ator 4																																						
5	Amphibious Ex cav ator 5																																						
6	Amphibious Ex cav ator 6	*																																					
7	Amphibious Ex cav ator 7	•																																					
	Amphibious Ex cav ator 8	eq																																					
9	Amphibious Ex cav ator 9	. E																																					
10	Amphibious Ex cav ator 10	erfo																																					
11	Amphibious Ex cav ator 11	. О.																																					
12	Amphibious Ex cav ator 12	 о																																					
13	Amphibious Ex cav ator 13	ž																																					
14	Amphibious Ex cav ator 14																																						
15	Amphibious Ex cav ator 15		- ~ ~ ~								~		, ,	, · · · · · · · · · · · · · · · · · · ·		~			~	~ .	~ ~ ~		~	~	-	- -													
16	Amphibious Ex cav ator 16																																						
17	Amphibious Ex cav ator 17																																						
18	Amphibious Ex cav ator 18																																						
19	Amphibious Ex cav ator 19	-																																					
20	Amphibious Ex cav ator 20	•											Į																										
21	Amphibious Ex cav ator 21																																						

NOTE:

1. PM Sequence were based on D.O. no. 05 series of 2016 under Annex "B".

PM 1 and Pm 2 are considered under daily/weekly walk-around inspection on Dredge.
 Prepare the Job Order for PM 3,4,5,6.

Prepared & Verified By:

Submitted By:

Noted:

VICTOR J. JAVIER Chief, MDSS

FERDINAND R. FUGABAN Chief, FED

TORIBIO NOEL L. ILAO Bureau Director

Republic of the Philippines Department of Public Works and Highways BUREAU OF EQUIPMENT

Manila

Pre-Approved PM WORK ORDER

EQUIPMENT TYPE, MAKE & MODEL E			ENGIN	NE MAKE	& MODEL	DPWH NO.	DREDGE N	IO. TIME	/ DATE IN	TIME / DATE OUT		NATURE OF WORK			
ASSIG	NED TO:								•	AUT	O MECHANIC/ ELECTRICIAN/ PRE-INSPECTI				ON
DATE OF A.R.E.					L	ADUK		WEL	DER/ SERVICE	EMAN ASSIGN	IED	WORK ORDER NO.	DATE		
						HRS		C	OST		NAM	1E			
ITEM														REQUESTED BY:	
NO.		FAI	LURE MODE											x	
				***********				******			********			<u>VICTOR J. JAV</u>	<u>IER</u>
														Chief, MDSS	6
								PARTS	SUPPLIES	NEEDED				PREPARED & INSPECTED	BY;
				ltem	01.	1.1)	DentMa	Estimated O	0/ 14 - (4)	0/ D		
				No.	Qıy.	Unit		CRIPTION (PP	(. <u>date</u>)	Part NO.	Estimated Co		70 K		
														FED Inspectora	ate
														RECOMMENDING APPROV	/AL:
													FERDINAND R. FUGABAN		
													Chief, FED		
														APPROVED:	
													TORIBIO NOEL L. ILAO		
														Bureau Direct	or
														PARTS/SUPPLIES	Р
														OIL/ LUBE	
														LABOR	
														TOTAL	
	Copy furn	ished:												REMARKS:	
		1. Dredge Maste	r III											Materials, Parts, Oil and	d lubricants will
		2. Regional Dire	ctor										ļ	be taken from EMD stocks a	nd maintenance
														shall be performed by the Dr	edge crew and
										Sub-Total:				EMD personnel concerned.	
								Page 1 of _							

Note:

1. Define and describe "Failure Mode".

Republic of the Philippines

Department of Public Works and Highways

DPWH Regional Office No. 1

Bauang, La Union

PM WORK ORDER

EQUIPMENT TYPE, MAKE & MODEL			ENGI	NE MAKE	& MODEL	DPWH NO.	DREDGE N	O. TIME /	/ DATE IN	TIME / DATE OUT		NATURE OF WORK		
ASSIGNED TO:					AUTO MECHANIC/ ELECTRICIAN/								PRE-INSPECTION	
DATE OF A.R.E.					E.	ADOK		WEL	DER/ SERVICE	EMAN ASSIGN	WORK ORDER NO.	DATE		
					HRS		C	OST		NAM	lΕ			
ITEM													REQUESTED BY:	
NO.													•	
								Dredge Master III						
				-	1		PARTS	SUPPLIES	NEEDED	1			Inspected and Prepared By:	
			No.	Qty.	Unit	ITEM DES	CRIPTION (PF	R: <u>date</u>)	Part No.	Estimated C	ost %Me(t)	%R		
	~~~~~~						******	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					Regional Equipment li	nspector
													RECOMMENDING APPROV	AL:
													~	
													Chief, EMD	
													APPROVED:	
													Regional Direct	or
			******										PARTS/SUPPLIES	Р
													OIL/ LUBE	
													LABOR	
						SUMMAF	RY OF MAINTE	NANCE EXI	PENSES:				TOTAL	
						2014							CERTIFIED WORK ACCOM	PLISHED:
						2015							0	
	Copy furnis	shed:				2016								
						2017							Dredge Master	III
		BOE, Manila							<b>A I A I</b>				REMARKS:	
······									Sub-Total:				Materials, Parts, Oil and	lubricants will
													be taken from EMD stocks ar	id maintenance
					Den: 4	<u> </u>							EMD personnel concerned	euge crew and
					Page 1 c	or								

#### ANNEX "F"

# DPWH Regional Office No.

BOE-14326-01-Rev00

Equipment Management Division

#### Davao City

Post-Repair Inspection for Emergency/Outside Repair

EQU	EQUIPMENT MAKE & MODEL		& MODEL	ENGINE MAKE & MODEL	DPWH NO.	DREDGE NO.	Date of Repair	POST	INSPECTION REPORT #			DATE
ASSIG	NED TO	)			NAME & ADDP	RESS OF REPA	IR SHOP/STORE:				REQUESTED BY:	
DATE	OF ARE											
ITEM #	QTY. UNIT PARTS SUPPLIED/INSTALLED (PR: <u>date</u> )		PART NO.	OR / CR No.	DATE	COST	%Me(t)	%R	XX Dredge	<u>XXXX</u> master III		
											INSPECTED BY:	
											<u>xxx</u>	<u>(XXXXX</u>
											Regional Equ	ipment Inspector
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~									~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Recommending Appr	ov al:
											~	
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~									~~~~~~	<u>xxx</u>	<u>(XXXX</u>
											Chie	f, EMD
											APPROVED:	
											<u>xxx</u>	<u>XXXXX</u>
							TOTAL:				Regina	al Director
	Copy f	urnishe	ed:		SUMMARY	OF EXPENSES	FOR MAINTENAN	CE & REPAIR				NT:
					C.Y. 2	2012-					■ Lhereby ackn	owledge that the
					C.Y. 2	2013-					components/materia	als/parts was installed
		BOE Bu	reau Directo	r	C.Y. 2	2014-						
					C.Y. 2	2015-					<u>xxx</u>	xxxxx
					C.Y. 2	2016-					Dredge	emaster III

Department of Public Works and Highways

#### **BUREAU OF EQUIPMENT**

Floating Equipment Division

#### HISTORY OF REPAIR

DREDGE NAME:		MAKE & MODEL:				AREA OF OPERATION:			REGION:	YEAR	ACQUIRED:		DPWH NO.:								
DREDGE	EMASTER:	SIZE AND C	APACITY			ENGIN MGE [.]	E SERIAL NO:	DPF.	I	AF [.]			DATE OF	ARE:							
WORK ORDER NO.	FAILURE MODE	DATE/NO. HC previous replacement	OF SERVICE 2URS on the date of replacement	QTY	UNIT	MATE	ERIALS USED	N	PART NO.	TOTAL COST		TOTAL COST		TOTAL COST		TOTAL COST		Serviceman assigned	% Me(t)	% R	REMARKS
			(series/parallel)																		
									sub-total as of :												

* Cost of Material were based on the Program of Work submitted by the End-user.

Prepared By:

Submitted BY:

NOTED:

VICTOR J. JAVIER

FERDINAND R. FUGABAN Chief, Floating Equipment Division TORIBIO NOEL L. ILAO Director IV

Chief, MDSS

								BURE	AU OF EQU Manila	IPMENT						
							PM	Complianc	e Sticker Gu	ide CY-201	6/2017					
END-	USER:	:						•								
CONT	ACT #	¥						Amp	hibious Exca	avator				C	ontrol No.:	160818DMSS-001
			Month of CY-2016:	January	February	March	April	May	June	July	August	September	October	November	December	REMARKS
			Day:													
			PM to be performed:	PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4	PM 1,2	PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4,5	PM 1,2	
			Hourmeter reading:													
			PM-stage Done				ļ									
			Status of Dredge:								ļ					
			Signature of DM III:													
			Month of CY-2017:	January	February	March	April	May	June	July	August	September	October	November	December	REMARKS
đ			Day:				DI LO	DIL 0 (		514.0					<b>DN</b> 4.0	
gdge			PM to be performed:	PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4	PM 1,2	PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4,5	PM 1,2	
Dre	· : 0		Hourmeter reading:													
e of	Z T	tion	PM-stage Done													
ame	РМ	ocat	Status of Dredge:													
Z		<u> </u>	Signature of DM III:				05 .	10040			1					
IN OTE:	1. PIV	I stage	es were derived from P		r the Departm	ient Order no	). US Series C	DT 2016	Status:	A- Idle, Re	ady to opera	te		TOD		
	2. D0	not lea	ave anytning blank. Ar	iy adjustmer	it snall be rep	ported to BO	E IVIANIIA acc	coraingly.		B- Operation	onal			IORI	SIO NOEL L	. ILAO
	з. <del>к</del> е	iusai k	comply will be sunct	oned admini	stratively.					C-Under F	kepair			E	Sureau Direct	or
								BURE								
								DURL	Manila							
							РМ	Complianc	e Sticker Gi	ide CY-201	6/2017					
END-								oompilailo			0.2011					
CONT	ACT #	¥						Amn	hibious Exca	vator				C	ontrol No.:	160818DMSS-001
			Month of CY-2016:	January	February	March	April	May	June	July	August	September	October	November	December	REMARKS
			Dav:	,	, í			,		, ,	Ŭ					
			PM to be performed:	PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4	PM 1,2	PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4,5	PM 1,2	
			Hourmeter reading:													
			PM-stage Done				1				1	1		1		
			Status of Dredge:				1				1			-		
			Signature of DM III:				1				1					
			Month of CY-2017:	January	February	March	April	May	June	July	August	September	October	November	December	REMARKS
			Day:	,	Í			Í		, í	Ť					
Φ			PM to be performed:	PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4	PM 1,2	PM 3	PM 1,2	PM 3	PM 1,2	PM 3,4,5	PM 1,2	
ð																
redg	· .		Hourmeter reading:					1	}	}	3	5		0		
of Dredg	No.:	:uC	PM-stage Done													
me of Dredg	WH No.:	cation:	PM-stage Done Status of Dredge:													
Name of Dredg	DPWH No.:	Location:	Hourmeter reading: PM-stage Done Status of Dredge: Signature of DM III:													
Name of Dredg	:"ON HMdd 1. PM	Focation:	Hourmeter reading: PM-stage Done Status of Dredge: Signature of DM III: as were derived from P	Annex "B" o	f the Departm	nent Order no	p. 05 series c	of 2016	Status:	A- Idle, Re	ady to opera	te				
Name of Dredg	: on hwdd 1. PM 2. Do	Location: Location: I stage	Hourmeter reading: PM-stage Done Status of Dredge: Signature of DM III: as were derived from A ave anything blank. Ar	Annex "B" o ny adjustmer	f the Departm	nent Order no	p. <mark>05 series c</mark> E Manila acc	of 2016	Status:	A- Idle, Re B- Operatio	ady to opera	te		TORII	BIO NOEL L	. ILAO
Name of Dredg	: ON HMdd 1. PN 2. Do	Location: Location:	Hourmeter reading: PM-stage Done Status of Dredge: Signature of DM III: swere derived from A ave anything blank Ar	Annex "B" o	f the Departm	ient Order no	). <mark>05 series c</mark> E Manila acc	of 2016	Status:	A- Idle, Re B- Operatio	ady to opera	te		TORI		

DPWH Regional Office No.

Equipment Management Division Davao City

**REQUEST FOR POST-REPAIR INSPECTION** 

EIR No.: ______ DATE: ______

CHIEF, EMD Equipment Management Division This Region

This pertains to the repair made by <u>(name of private shop)</u> with postal address at <u>(exact address of private shop)</u> on the dredge <u>(name of dredge)</u> presently located at <u>(exact location of the dredge)</u> consisting of the following Materials, Parts and some Work Activities, to wit

ITEM #	QTY.	UNIT	PARTS SUPPLIED/INSTALLED	OR/CR #	DATE	UNIT COST	TOTAL COST

Relative hereto, may I respectfully request your team to conduct a Post-Repair Inspection on the said dredge, for the abovementioned materials, Parts and Work Activities at your most convenient time.

Further, we are please to conduct an actual operation of the dredge to have you attest its functional condition, reliability, and environmental compliant.

For your information and appropriate action.

xxxxxxxx Dredgemaster III

**ASSIGNMENT ORDER** 

DATE:

TO:

Regional Equipment Inspector This Region

You are hereby directed to inspect and conduct equipment operation test regarding the Corrective Maintenance made on the above-mentioned Dredge and shall promptly submit to this Office your Post Inspection Report (PIR), Waste Material Report (WMR) and Inspection and Acceptance Report (IAR), taking into consideration the existing accounting and auditing rules and regulations.

#### Republic of the Philippines

Department of Public Works and Highways

DPWH REGIONAL OFFICE

Bauang, La Union

CM WORK ORDER

EQUIP	MENT TYPE	, MAKE & MODE	Ľ		ENGIN	IE MAKE	& MODEL	DPWH NO.	PLATE N	O. TIME	/ DATE IN	TIME / DATE	OUT	NATURE OF WO	ORK
ASSIGNED TO:							•	AUT	O MECHANIC	/ ELECTRICIA	N/	PRE-INSPECTI	ON		
DATE	OF A.R.E.						E.	ADOK		WELI	DER/ SERVIC	eman assign	WORK ORDER NO.	DATE	
						HRS		C		NA	ME				
ITEM		EAU												REQUESTED BY:	
NO.		FAIL													
														Dredgemaster	III
								PARTS	SUPPLIES	NEEDED				INSPECTED BY:	
				Item	Qty.	Unit	ITEM DES	CRIPTION (PR	R: <u>date</u> )	Part No.	Estimated C	cost %Me(t)	%R		
	*****													-	
														EMD Inspectorate	Team
													••••••	RECOMMENDING APPROV	AL:
														~	
														Chief, EMD	
														APPROVED:	
														Regional Direct	or
														PARTS/SUPPLIES	Р
														OIL/ LUBE	
														LABOR	
							SUMMAF	RY OF MAINTE	NANCE EX	PENSES:				TOTAL	
	Copy furn	shed:					2014							CERTIFIED WORK ACCOMF	PLISHED:
							2015								
							2016								
		BOE Bureau Dire	ector				2017							Dredge Master	Ш
														REMARKS:	
										Sub-Total:				Materials, Parts, Oil and	lubricants will
														be taken from EMD stocks ar	nd maintenance
														shall be performed by the Dre	edge crew and
								Page 1 of 2	2					EMD personnel concerned. (	or private shop)

#### DPWH REGIONAL OFFICE NO. 1 Bauang, La Union

# EQUIPMENT DEADLINE ORDER

MEMORANDUM	FOR:
------------	------

Regional Director					
Address:					Date
Effective immedia	ately, equipment	listed hereu	Inder is hereby	given o	deadline and the following
CORRECTIVE measures	be implemented.		,	0	5
Equipment (type)		(Make)			(Model)
DPWH Number:	(Plate No.)		n/a	(Uni	it Serial No.)
Engine (Make)			(Engine Serial	No.)	
Hourmeter Rdg.:		Latest PN	Performed:		Date:
Place of Inspection:		_			
F I N D I N G S :					
RECOMMENDATI	ONS:				
Received Advance Copy:			Inspectorate	Team:	
			·		
				1	
Dredgen	naster III				Dredge Equipment Inspector
					(Official Ordering Deadline)
				2	
					Member
				3	5
RECOMMENDING APPR	OVAL:				Member
Chief,	EMD	_			
			APPROVED:		
Copy Furnished:			_		Regional Director
BOE-Manila					