

**DIRECTORATE GENERAL BORDER ROADS**  
**GENERAL MAINTENANCE INSTRUCTION NO.109**

**ON**

**MAINTENANCE AND LUBRICATION**  
**OF**

**COLES CR NE 3/5 TON**

**Introduction**

1. Regular servicing and preventive maintenance are essential to prolong the life of the equipment, ensure timely repair to arrest defects from developing into major ones, to work equipment efficiently at all times, minimize breakdown and downtime losses.

**Aim**

2. (a) To enumerate the details of periodic and preventive maintenance and lubrication of COLES CR NE 3/5 Ton.
- (b) Issue CHECK CARD for use by Mobile Maintenance Team/

**Action by**

3. (a) User Units. To carry out periodic inspection, regular servicing and preventive maintenance tasks as laid down.
- (b) Filed Workshops (GREF)
  - (i) To check the record of 'Maintenance and Lubrication' in the log-book of the equipment during its inspection and repairs if carried as per maintenance and lubrication schedule given in this instruction.
  - (ii) Advise user units in respect of any discrepancy/ short comings noticed.
- (c) Mobile Maintenance Team. To ensure that proper maintenance is carried/and report accordingly to OC Field Workshop for necessary action.

**Details**

Details of maintenance and Lubrication alongwith the periodicity have been tabulated in Appendix "A " to this instruction.

**MAINTENANCE AND LUBRICATION OF COLES CRANE 3/5 TON**

S/No.	Item/Assy	Maintenance Task	Lubricant	No of points
1	2	3	4	5

**DAILY MAINTENANCE TASK**

1	General 1	(a) Clean the Crane dirt and dust.  (b) Check for exhaust smoke.  (c) Read all the gauges and meters.  (d) Check all the nuts and bolts if loose or deficient.		
2	Engine Oil Sump	Check oil level top up if necessary.	Engine Oil	1
3	Fuel tank	Check quantity of fuel if necessary	-	-
4	Air Cleaner	Check oil level in the air cleaner	Engine Oil	1
5	Cooling system	(a) Check the coolant level top up if necessary.  (b) When the Crane is operating in temperature below freezing points of water use anti-freezer.		
6	Battery	(a) Check battery leads,  (b) Top up distilled water.  (c) Apply mineral jelly to the terminals.		
7.	Oil pressure	Check Oil pressure (Engine Oil Pressure in Perkins Engine is 40-60 PSI at 1800 RPM.		
8	Ropes	Check that ropes are wound on the drums correctly and that they are reeved over to various pulleys.		
9	Tyre pressure	Check the tyre pressure. Inflate if necessary.		
10	Hydraulic brake	Check the level of fluid in the brake system supply tank and if necessary replenish	Brake fluid	1

1	2	3	4	5
11	Hoi stand Derrick Ropes pulleys	Lubricate with Grease	Grease No.2	
12	Snatch Block	Lubricate pulley and thrust bearing with grease	“	
13	Grab (When fitted)	Grease working parts through the lubricators fittings	“	
	<u>Note:-</u>			
	1.	<u>Engine Oil and air cleaners</u> (a) Above 80 <sup>0</sup> F (b) 30 <sup>0</sup> F to 80 <sup>0</sup> F (c) Below 30 <sup>0</sup> F	- - -	USE SAE 30 USE SAE 20 USE SAE 10
	2.	Gear Box, Front and rear Axle, Steering worm boxes and slow Gear boxes (a) Above 80 <sup>0</sup> F (b) 30 <sup>0</sup> F to 80 <sup>0</sup> F (c) Below 30 <sup>0</sup> F	- - -	Hoist, Derrick USE SAE 90 USE SAE 90 USE SAE 30
	3.	<u>Axle Differential (Spiral level type)</u> (a) Above 30 <sup>0</sup> F (b) Below 30 <sup>0</sup> F	- -	USE SAE 90 USE SAE 80
	4.	<u>Front and rear Wheel Bearings</u> (a) Above 15 <sup>0</sup> F (b) +15 <sup>0</sup> F to -15 <sup>0</sup> F	- -	Use wheel-bearing grease No.2 or No 3. Use Wheel bearing grease No.2 or Grease wide temperature range.
	5.	<u>Grease Nipples</u> (a) Above 15 <sup>0</sup> F (b) +15 <sup>0</sup> F to -15 <sup>0</sup> F	- -	Use Grease No.2 Use Grease No. '0'.
	6.	Check the function of automatic Safe load indicator circuit by pressing the button provided in the cabin prior to operating the Crane.		

1	2	3	4	5
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7. Drain air system of moisture, check operation of foot brake by first waiting up till the air pressure is 85-110 PSI. Then apply the brake two or three times in fairly quick succession and observing reaction on the air pressure gauge. If pressure falls below 60 PSI and does not build up again fairly quickly examine the air system for possible leakage.

Warning :- Don't operate the Crane unless you are satisfied that the air system is intact.

### **50 HOURS MAINTENANCE TASKS**

1	General	Carry out daily maintenance tasks.		
2.	Air Cleaner	Check oil condition. If dirty change	Engine Oil	1
3	Transmission Gear Box	Check oil level with dip stick. Top up if necessary.	Gear Oil	1
4	Axle	-do-	-do-	
5	Axle differential (Special level type)	-do-	-do-	
6	Hoist, derrick and slow gear boxes	-do-	-do-	
7	Water pump	Grease	Bearing Grease	1
8	Fan Belt	Check tension of the fan belt		
9	King Pins	Lubricate upper and lower bushes through the grease nipples provided.	Grease No.2	2
10	Track rod bell joints	Grease with fun	-do-	2
11	Drag link ball joints	-do-	-do-	2
12	Propeller shaft	Lubricate needle rollers and slip joints	-do-	2

1	2	3	4	5
13	Indicator pulley	Apply Grease	Grease No.2	1

14	Main lever Axle pin	-do-	-do-	1
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Note:-

1. Engine Oil and air cleaners
  - (a) Above 80<sup>0</sup>F - USE SAE 30
  - (b) 30<sup>0</sup>F to 80<sup>0</sup>F - USE SAE 20
  - (c) Below 30<sup>0</sup>F - USE SAE 10
  
2. Gear Box, Front and rear Axle, Steering worm boxes Hoist, Derrick and slow Gear boxes
  - (a) Above 30<sup>0</sup>F - USE SAE 90
  - (b) Below 30<sup>0</sup>F - USE SAE 80
  
3. Axle Differential (Spiral level type)
  - (a) Above 30<sup>0</sup>F - USE SAE 90
  - (b) Below 30<sup>0</sup>F - USE SAE 80
  
4. Front and rear Wheel Bearings
  - (a) Above 15<sup>0</sup>F - Use wheel-bearing grease No.2 or No 3.
  - (b) +15<sup>0</sup>F to -15<sup>0</sup>F - Use Wheel bearing grease No.2 or Grease wide temperature range.
  
5. Grease Nipples
  - (a) Above +15<sup>0</sup>F - Use Grease No.2
  - (b) +15<sup>0</sup>F to -15<sup>0</sup>F - Use Grease No. "0".
  
6. Before setting the machine on work make sure that there are no unusual knock or noses and that the engine is running smoothly.
  
7. Service oil filter at early hours under adverse working condition.

Reference GMI No.109 dt 30 Nov 73

**CHECK CARD : PREVENTIVE MAINTENANCE**  
**ORIGINAL/DUPLICATE**

- |                     |                        |                           |  |
|---------------------|------------------------|---------------------------|--|
| 1. Project .....    | 4. Make & Type of Eqpt | COLES<br>CRANE<br>3/5 TON | <u>Action</u><br>After carrying out the preventive Maintenance Task, Mobile maintenance Team will enter its date in the months column below and initial. |
| 2. Task Force ..... | 5. BA/EM No. ....      |                           |  |
| 3. Unit .....       | 6. Location .....      |                           |  |

S/No.	Task	J	F	M	A	M	J	J	A	S	O	N	D
1	<u>Daily</u> (a)												
	(b)												
	(c)												
	(d)												
2	<u>50 Hours</u> (a)												
	(b)												
	(c)												
3	<u>100 Hours</u> (a)												
	(b)												
	(c)												
4	<u>200 Hrs</u>												
5	<u>500 Hrs</u>												
6	<u>1000 Hrs</u>												
7	<u>2000 Hrs</u>												

Signature of SO-1/SO-2 EME Project .....

Date .....

Remarks .....

Note : Columns 'J' to 'D' stands for months of the year.

1	2	3	4	5
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**100 HOURS MAINTENANCE TASKS**

1	General	Carry out Daily and 50 hours maintenance tasks		
2	Prefilter fuel lift pump	Clean		1
3	Tecalemit fuel filter	Clean		1
4	Engine Oil	Change Engine Oil	Engine Oil	1
5	Air Cleaner	Clean air cleaner, replenish oil	-do-	1
6	Steering worn box	Check oil level. Top up with oil	Gear oil	2
7	Brake lever clevis pins	Lubricants with a few drop of oil	Engine oil	1
8	Chassis air equipment	With the hand parking brake engaged operate the foot brake and insect the chassis piping for possible leakage		
9	Axle locking hooks	(a) Apply light coat of grease to engaging edge of the hooks and screw threads  (b) Apply with grease gun grease to nipple on the screw cross head.	Grease No.2	1
10	Wire ropes	Apply grease	Grippe 60/S	
11	Control switches	Apply switch contact compound	Switch contact compound.	
12	Dash pots	Lubricate with oil	Engine Oil	
13	Jib tube	Apply grease	Grippe 60/S	



1	2	3	4	5
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Note:-

1. Engine Oil and air cleaners
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  - (c) Below 30<sup>0</sup>F - USE SAE 10
  
2. Gear Box, Front and rear Axle, Steering worm boxes Hoist, Derrick and slow Gear boxes
  - (a) Above 30<sup>0</sup>F - USE SAE 90
  - (b) Below 30<sup>0</sup>F - USE SAE 80
  
3. Axle Differential (Spirial level type)
  - (a) Above 30<sup>0</sup>F - USE SAE 90
  - (b) Below 30<sup>0</sup>F - USE SAE 80
  
4. Front and rear Wheel Bearings
  - (a) Above 15<sup>0</sup>F - Use wheel-bearing grease No.2 or No 3.
  - (b) +15<sup>0</sup>F to -15<sup>0</sup>F - Use Wheel bearing grease No.2 or Grease wide temperature range.
  
5. Grease Nipples
  - (a) Above +15<sup>0</sup>F - Use Grease No.2
  - (b) +15<sup>0</sup>F to -15<sup>0</sup>F - Use Grease No. "0".
  
6. Service oil filter at early hours under adverse working condition

**200 HOURS MAINTENANCE TASK**

- 1 General Carry out daily, 50 hour and 100 hours maintenance task.
  
- 2 Oil filter elements Clean oil filter element.

1	2	3	4	5
3.	Air brake cylinder	Ensure that gaiters are not checked or perished. If a unit fails to release or shows sign of sluggish release examine the breather (when fitted) and clean felt pads and plates with the hand parking brake engaged. Examine the outside of the cylinder for grit; drain any accumulation of moisture by adding lubricant.		
4.	Air brake valves	Apply oil	Engine Oil	
5.	Steering chain and pinions	(a) Check tension of the chains and adjust if necessary.		
		(b) Grease the chains thoroughly	Grease No.2	
6.	Slew rack and pinion	Apply grease	Grippa 60/S	
7.	Grease cup on slew gear box	Apply grease	Grease No.2	
8.	Centre post sprocket	Use grease gun to grease the lubricator fitted to the spacer between the upper and lower chain wheels.	Grease No.2	1
9.	Brake linkage	(a) Lubricate pins with oil wing oil can	Engine Oil	
		(b) Apply to road ends with protective grease.	Grease No.2	
		(c) Apply one or two shots of grease to the fuel drum pins on the rear axle housing. There is a lubricator in each of the two fulcrum, brackets.	Grease No.2	2
10.	Stabilizer beam and screw jacks	Apply grease	Grippa 60/S	
11.	Steering control Unit	Apply one or two shots of grease to the ball stud and sleeve through the lubricators in the unit housing.	Grease No.2	

1	2	3	4	5
12.	Steering Serve Cylinders	Apply one or two shots of grease to the piston rod	Grease No.2	
13	Hoist drum clutch cylinder	Change Oil	Engine Oil	
14	Dynamo and starter	Check commutator surface, if unclean, clean		

Note:-

1. Engine Oil and air cleaners
  - (a) Above 80<sup>0</sup>F - USE SAE 30
  - (b) 30<sup>0</sup>F to 80<sup>0</sup>F - USE SAE 20
  - (c) Below 30<sup>0</sup>F - USE SAE 10
  
2. Gear Box, Front and rear Axle, Steering worm boxes Hoist, Derrick and slow Gear boxes
  - (a) Above 30<sup>0</sup>F - USE SAE 90
  - (b) Below 30<sup>0</sup>F - USE SAE 80
  
3. Axle Differential (Spiral level type)
  - (a) Above 30<sup>0</sup>F - USE SAE 90
  - (b) Below 30<sup>0</sup>F - USE SAE 80
  
4. Front and rear Wheel Bearings
  - (a) Above +15<sup>0</sup>F - Use wheel-bearing grease No.2 or No 3.
  - (b) +15<sup>0</sup>F to -15<sup>0</sup>F - Use Wheel bearing grease No.2 or Grease wide temperature range.
  
5. Grease Nipples
  - (a) Above +15<sup>0</sup>F - Use Grease No.2
  - (b) +15<sup>0</sup>F to -15<sup>0</sup>F - Use Grease No. "0".
  
6. Inspect drained engine oil for metal particles, if any found suggest holding units to report to Field Workshop immediately. DON'T RUN THE ENGINE TILL RECTIFIED.

1	2	3	4	5
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**500 HOURS MAINTENANCE TASK**

1. General Carry out daily, 50 hours, 100 hours and 200 hours maintenance task.
  
2. Road Wheel brake adjustment (a) Check lining wear. Adjust brake.  
(b) Apply a smear of light grease to the plunger rod of the air cylinders.
  
3. Pilot switches  
(a) Hand Operative type Check to see that all screws and connections are secure.  
  
(b) Foot brake type -do-
  
4. Inter lock relay Check gap of Armature (8/16")
  
5. Voltage relay and inter lock contact fingers and coils. Check for proper function. The inter locking finger contacts of the normally closed pattern should be arranged to brake the circuit 3/32" before the main circuit make contact.
  
6. The 'H' type contactor Inspect for proper function. For inspection always remove blow out assembly before servicing armature coils for main contacts. This action safe guard the arc shield.
  
7. Electro-Mechanical brake Check the function of electro Mechanical brakes fitted to each of hoist, derrick (boom hoist) slew (swing) and adjust gap if necessary.
  
8. D.C Motors and Generators (a) Check commutator surface and clean.  
  
Note :- Clean commutator with a piece of Fine glass paper, folded over a piece of wood and applied to the commutator running at full speed will usually remedy the fault.

1	2	3	4	5
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(b) Adjust the brush and measure the brush pressure. The correct pressure on each brush is 2 to 2 ½ lbs contact area, on the service of brush.

For example :-

Attach the spring balance to the pressure finger and pull the spring balance until the pressure finger just began to move. Then note the reading at this point. Divide this reading by sectional area of the brush. A brush 1 ¼ " x ½ " has an area for example 5/8 square inch and correct reading on the spring balance for 2 ½ PSI brush pressure will be 1 lbs 4 ozs.

**1000 HOURS MAINTENANCE TASKS**

1. General Carry out daily, 50 hours, 100 hours 200 hrs and 500 hours maintenance tasks.
2. Travel Motor Check the brush gear and inspect the commutator.
3. Cylinder head Check compression pressure of each cylinder. If excessively low check wear of piston rings. If required, change piston rings.
4. Fuel tank Remove the fuel tank and clean it thoroughly and refit.
5. FIP Calibrate FIP and adjust pressure of the injector nozzles.
6. Cooling system Open the drain cock fitted on cylinder block and radiator. Flush out the system thoroughly.
7. Sump Change of engine oil, remove the engine oil sump. Clean and refill.

1	2	3	4	5
8.	Cut out and Voltage regulator	Check contact points. Set the gap if necessary		
9.	Inlet and exhaust valves	Check valve seats. If necessary, grind or replace valves.		
10.	Transmission gear box	Change oil	Gear Oil	1
11.	Steering Box Worn box	-do-	-do-	1
12.	Axle Differentials (Spirial level type)	-do-	-do-	1
13.	Axle Differential (Worn type)	-do-	-do-	1
14.	Hoist derrick and slew gear box	-do-	-do-	1

Note:-

1. Engine Oil and air cleaners
  - (a) Above 80<sup>0</sup>F - USE SAE 30
  - (b) 30<sup>0</sup>F to 80<sup>0</sup>F - USE SAE 20
  - (c) Below 30<sup>0</sup>F - USE SAE 10
  
2. Gear Box, Front and rear Axle, Steering worm boxes Hoist, Derrick and slow Gear boxes
  - (a) Above 30<sup>0</sup>F - USE SAE 90
  - (b) Below 30<sup>0</sup>F - USE SAE 80
  
3. Axle Differential (Spirial level type)
  - (a) Above 30<sup>0</sup>F - USE SAE 90
  - (b) Below 30<sup>0</sup>F - USE SAE 80

1	2	3	4	5
4.		<u>Front and rear Wheel Bearings</u>		
		(a) Above +15 <sup>0</sup> F	-	Use wheel-bearing grease No.2 or No 3.
		(b) +15 <sup>0</sup> F to -15 <sup>0</sup> F	-	Use Wheel bearing grease No.2 or Grease wide temperature range.
5.		<u>Grease Nipples</u>		
		(a) Above +15 <sup>0</sup> F	-	Use Grease No.2
		(b) +15 <sup>0</sup> F to -15 <sup>0</sup> F	-	Use Grease No. "0".

**2000 HOURS MAINTENANCE TASK**

- |    |                                  |  |             |
|----|----------------------------------|--|-------------|
| 1. | General                          | Carry out daily, 50 hours, 100 hours, 200 hours, 500 hours and 1000 hours maintenance tasks  |             |
| 2. | Travel Motor                     | Apply one or two shots of grease to the motor bearings   | Grease No.2 |
| 3. | Brake cylinders (Front and Rear) | Remove the air hose and inject one or two shot of light oil into the pressure side of the cylinder. Replace hose and check system for leakage. | Engine Oil  |
| 4. | Rear hub bearing                 | Apply one or two shots of grease through the lubricator in each hub.   | Grease No.2 |
| 5. | Front hub bearing                | -do-   | Grease No.2 |

**Note:-**

- |    |  |   |            |
|----|--|---|------------|
| 1. | <u>Engine Oil and air cleaners</u>         |   |            |
|    | (a) Above 80 <sup>0</sup> F                | - | USE SAE 30 |
|    | (b) 30 <sup>0</sup> F to 80 <sup>0</sup> F | - | USE SAE 20 |
|    | (c) Below 30 <sup>0</sup> F                | - | USE SAE 10 |

1	2	3	4	5
2.		<u>Gear Box, Front and rear Axle, Steering worm boxes Hoist, Derrick and slow Gear boxes</u>		
		(a) Above 30 <sup>0</sup> F	-	USE SAE 90
		(b) Below 30 <sup>0</sup> F	-	USE SAE 80
3.		<u>Axle Differential (Spirial level type)</u>		
		(a) Above 30 <sup>0</sup> F	-	USE SAE 90
		(b) Below 30 <sup>0</sup> F	-	USE SAE 80
4.		<u>Front and rear Wheel Bearings</u>		
		(a) Above +15 <sup>0</sup> F	-	Use wheel-bearing grease No.2 or No 3.
		(b) +15 <sup>0</sup> F to -15 <sup>0</sup> F	-	Use Wheel bearing grease No.2 or Grease wide temperature range.
5.		<u>Grease Nipples</u>		
		(a) Above +15 <sup>0</sup> F	-	Use Grease No.2
		(b) +15 <sup>0</sup> F to -15 <sup>0</sup> F	-	Use Grease No. "0".
6.		Don't over charge with grease to travel motor and front hub bearing.		

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