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LOCAL DEVELOPMENT II URBAN PROJECT

Submitted to
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Submitted by
WILBUR SMITH ASSOCIATES

in association with

**PUBLIC ADMINISTRATION SERVICE
DEVELOPMENT CONSULTING OFFICE**

**DELLOITTE AND TOUCHE
ENGINEERING AND GEOLOGICAL
CONSULTING OFFICE**

TRAINER MANUAL

**OPERATION AND MAINTENANCE INSTRUCTIONS
FOR
HEAVY TRUCK "NASR"**

**UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
LOCAL DEVELOPMENT PROGRAM II URBAN**

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**OPERATION AND MAINTENANCE
INSTRUCTIONS**

FOR

HEAVY TRUCK "NASR"

**OPERATION AND MAINTENANCE INSTRUCTIONS
FOR
NASR HEAVY TRUCKS**

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INTRODUCTION

Please study these operating instructions before using the vehicle. You will save yourself operating troubles if you carefully follow the instructions given. Pay continuous attention to steering, brakes, tires and lighting system. If a guarantee claim is to be filled, it is necessary to inform the dealer (by writing) as soon as a fault is detected, with the following details:

1. Chassis number.
2. Engine number.
3. Mileage done.
4. Registration date.
5. Vehicle's owner name and address.

The affected part must be forwarded for inspection. Where it is not possible to send it (being outside the country) then, you have to submit a photograph of it. Affected part must be retained together with its complete data until an opportunity occurs for it to be inspected by a factory delegate.

REMARK:

In this lecture, instructions for operating vehicles with front engines with two or three axles are explained. These two types are basically the same, the only differences being mentioned separately in the various groups.

1. Technical Specifications:

a. Engines Specifications:

Technical specifications for 4 stroke diesel engines - Appendix (A). Heavy truck NASR with 2 axles (4x2, 4x4) are equipped with engines type 913, 3 axles (6x4, 6x6) with engines 413.

b. Chassis Specifications:

Appendix (B) contains specifications of main groups (clutch - gearbox - rear axle - steering - front axle).

c. Comprehensive table of types and specifications for heavy trucks NASR with two and three axles Appendix (C). Tires size and pressure in Appendix (D).

2. Operation Instructions:

a. Operation instructions will include the following appendices:

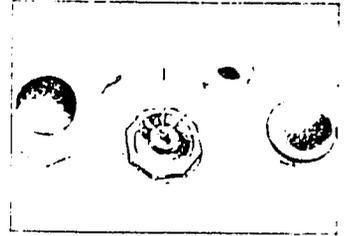
- 1. Control instruments Appendix (E)
- 2. Gauges and panel Appendix (F)
- 3. Switches Appendix (G)
- 4. Pilot lights Appendix (H)

b. Operation of some switches include the following:

1. Ignition Switch:

Upon insertion of ignition key, charging red light should light up.

- Position 0 = Light off
- Position 1 = Parking light
- Position 2 = Main beam or low beam

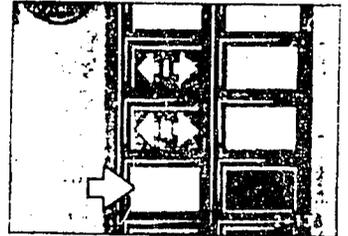


See Fig (1)

2. Charging Current Pilot:

When Pilot lights up (red) in idling speed, battery is not being charged.

Check. See Fig (2).



3. Heater Plug Starter Switch:

It is a pull switch.

- Position 0 = Off
- Position 1 = Preheating
- Position 2 = Starting

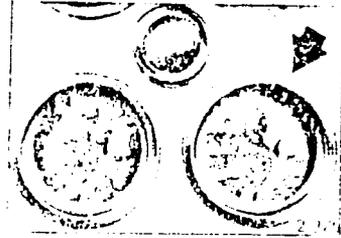
From 2 back to 1 = Reheating
See Fig (3).



4. Engine Temperature Gauge:

This gauge does not exist in line engine vehicles. When the pointer is in:

Black Sector = Normal
Temperature
Red Sector = Warning -
High Temperature.



In high temperature stop engine immediately and eliminate the cause of overheating.

See Fig (4).

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APPENDIX (A)

TECHNICAL SPECIFICATION OF 4 STROKE DIESEL ENGINES

ENGINE TYPE	F6L913	F6L413	F8L413	F8L413F	F10L413L	F10L413L
Number of Cylinders	6	6	8	8	10	10
Bore (mm)	102	120	120	125	120	120
Stroke (mm)	125	125	125	130	130	130
Displacement (cm ³)	6120	8482	11310	12763	14702	14702
Max. Output (HP)	142	188	248	274	290	325
Max. Effective Output (HP)	130	176	232	256	270	305
Engine Speed (R.P.M.)	2800	2650	2650	2500	2650	2650
Max. Torque (Kpm)	39	52.5	70	83.3	84	92
Engine Speed in rang of (R.P.M)	1500 1700	1300 1600	1300 1600	1500	1200 1600	1200 1600
Spraying Pressure (Bar)	175	175	175	175	175	175

APPENDIX (A)
cont..

TECHNICAL SPECIFICATION OF 4 STROKE DIESEL ENGINES

ENGINE TYPE	F6L913	F6L413	F8L413	F8L413F	F10L413L	F10L413L
Beginning of Delivery (BTDC)	26°	26°	25+1°	22+1°	26+1°	26+1°
Firing Order	153624	163524	1845 7362	1845 7362	110572 83946	110572 83946
Inlet valve clearance with engine cold (mm)	.15	.20	.20	.20	.20	.20
Exhaust valve clearance with engine cold (mm)	.15	.30	.30	.30	.30	.30
Inlet valve opens (BTDC)	32°	20°	20°	22°	20°	20°
Inlet valve closes (ABDC)	60°	54°	54°	52°	54°	54°
Exhaust valve opens (BBDC)	70°	66°	66°	67°	66°	66°
Exhaust valve closed (ATDC)	32°	22°	22°	27°	22°	22°
Position clearance from cylinder head (mm)	1±.2	1.2±.1	1.2±.1	1.15±.15	1.2±.1	1.2±.1

Chassis Specifications

1. Clutch

Single plate dry clutch F&S

Type: G 29
 G 350
 G 380
 G 420

2. Gearbox

Type: ZF AK 5-45
 ZF AK 6-70/3
 ZF AK 6-80/5
 ZF AK 6-90/5
 S 6-90 GP
 5 S/K-110 GP
 RT 9509
 RT 9513

3. Transfere Case

Types: ZF 65
 ZF 75
 Z 90/1
 Z 90/2

4. Rear Axle

o Vehicles 6x6 & 6x4
 Loading Capacity (10-13)T
 2 rear axles

o Vehicles 4x4 & 4x2
 Loading Capacity 8T
 1 rear axle

5. Steering

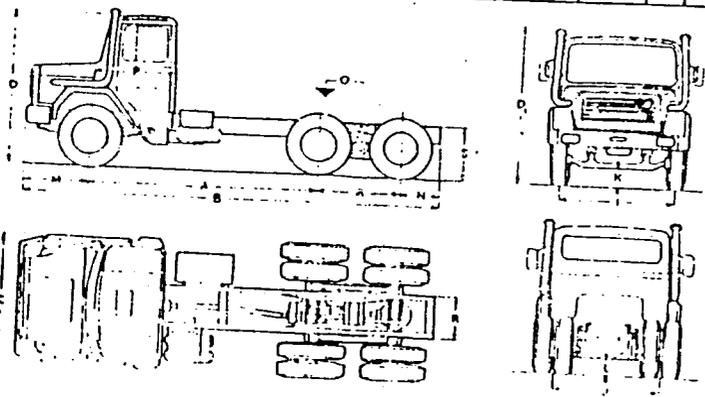
Type: ZF Hydraulic with Sphere and Nut

6. Front Axle

Toe - in 0-4 m.m.
 camber 1 30'
 Castor 3
 Incliation 4 in vehicles 6x4 & 4x2
 Incliation 5 in vehicles 6x6 & 4x4

المواصفات الفنية للواري الثقيلة نصر ذات المحورين والشلات محاور

مقاس الاطارات والبريد	البريد	القطر											المحور				القطر	نوع الشلات	طراز المحرك	نوع	الواري				
		S/S	R	P	D	N	M	L	K	J	I	D/D ₁	C	B	A	المحور						المحور	المحور	المحور	
400-14.5 RCPRIA	14.5/14.5	77	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	RT 9509 A	6x6	F 10 L 413 L	6x6	310 D 32 AK
400-14.5 RCPRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	RT 9509 B	6x6	F 10 L 413 L	6x6	310 D 32 L
400-14.5 Rc Ply 14.5	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	RT 9505 A	6x6	F 10 L 413 L	6x6	310 D 32 K
400-14.5 Rc Ply 14.5	14.5/14.5	77	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	5 K 110	6x6	F 10 L 413 L	6x6	310 D 26 AK
400-14.5 Rc Ply 14.5	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	AK 6-80-5	6x6	F 8 L 413	6x6	232 D 26 K
400-14.5 Rc PRIA	14.5/14.5	77	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	AK 6-80-5	6x6	F 8 L 413	6x6	232 D 26 AK
400-14.5 Rc PRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	AK 6-80-5	6x6	F 8 L 413	6x6	232 D 26 AK
400-14.5 Rc PRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	AK 6-80-5	6x6	F 8 L 413	6x6	232 D 19 S
400-14.5 Rc PRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	AK 6-80-5	6x6	F 8 L 413	6x6	232 D 19 K
400-14.5 Rc PRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	AK 6-70-3	6x6	F 6 L 413	6x6	170 D 17 AK
400-14.5 Rc PRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	AK 6-70-3	6x6	F 6 L 413	6x6	170 D 17 K
400-14.5 Rc PRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	S 5-35-2	6x6	F 6 L 913	6x6	130 U 13 L
400-14.5 Rc PRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	S 5-35-2	6x6	F 6 L 913	6x6	130 D 13 L
400-14.5 Rc PRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	AK 5-35-2	6x6	F 6 L 913	6x6	130 D 12 K
400-14.5 Rc PRIA	14.5/14.5	74	110	550/140	75	118	232	209	180	185	200/2	50	140	500/380	170	5700	7000	11000	11000	23000	AK 5-35-2	6x6	F 6 L 913	6x6	130 D 12 AK



- ل = العدد من محوري العجلتين الخلفيتين .
- ك = أهل إرتفاع بين المحور الأمامي وسطح الأرض .
- ل = أهل إرتفاع بين المحور الخلفي وسطح الأرض .
- م = العدد من محوري الازدواج الأمامية وواحد الخلفية .
- ن = المحامية وواحد الشاسيه .
- د = العدد بين المحور المركزي للشدق (العجلة الخلفية) ومركز الثقل .
- پ = البعد بين العجلة الأمامية وواحد الخلفية .
- ر = عرض الشاسيه .
- س = بعد الشاسيه من سطح الأرض بالمحولة .
- س = عدد دونه محموله .
- AK = قلوب والهدم بجميع المحاور .
- ل = لوروف مادة .
- ك = قلوب .
- س = جوار نصف مغطيه .
- أ = البعد بين المحورين .
- ب = الطول الكلي .
- ج = العرض الكلي .
- د = الارتفاع بالمحولة .
- د₁ = الارتفاع دون محولة .
- إ = البعد بين محوري الازدواج الأمامية .

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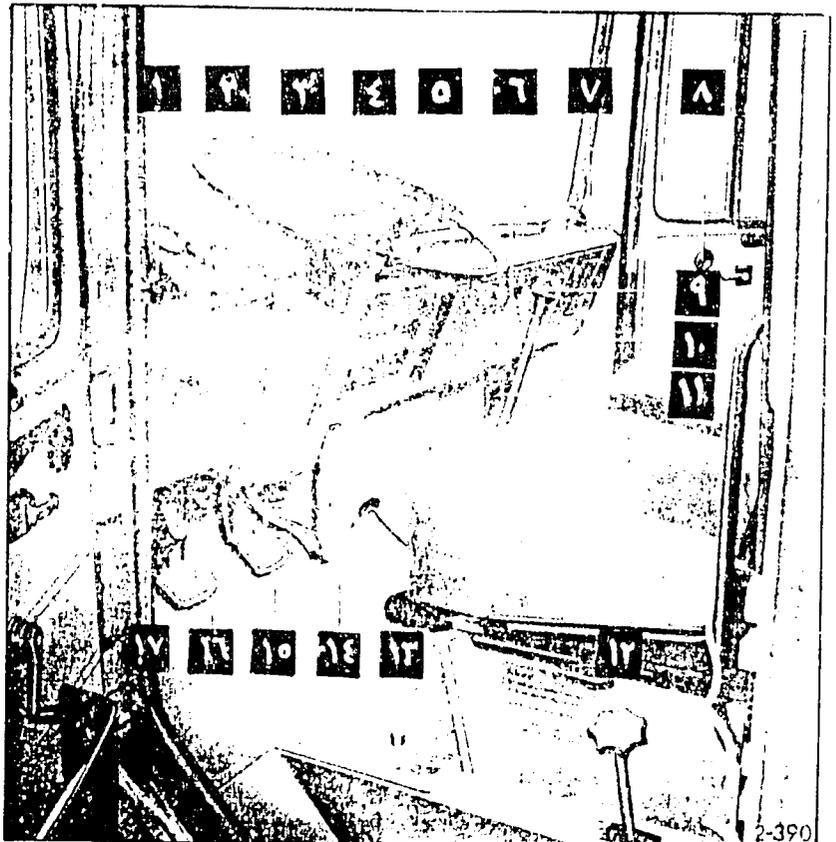
TIRES SIZE AND TIRES PRESSURES:

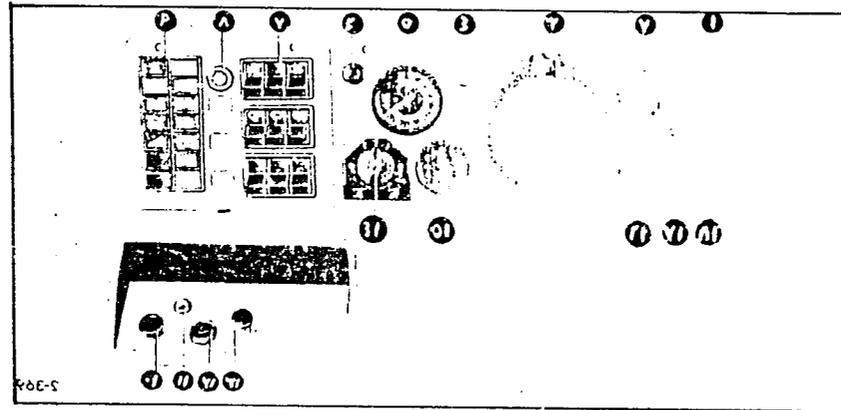
Appendix (D)

TYRE SIZE		TYPE PRESSURE Kg/cm2						
		5.00	5.50	6.00	6.50	7.00	7.50	8.00
900 X 20	Front Capacity Kg	---	---	---	4480	4610	4870	5000
	Rear Capacity Kg	---	---	---	8240	8480	8960	9200
1200 X 20	Front Capacity Kg	---	---	---	---	6600	6960	7320
	Rear Capacity Kg	---	---	---	---	11800	12280	12760
1200 X 24	Front Capacity Kg	---	---	6500	7000	7500	8000	---
	Rear Capacity Kg	---	---	11700	12600	13500	14400	---
1400 X 20	Front Capacity Kg	7000	7500	8000	8500	9000	---	---
	Rear Capacity Kg	12600	13500	14400	15300	16200	---	---

Panel/Controls

1. Maintenance indicator for air filter service
2. Steering wheel can be adjusted in height and angle
(for more details see steering section)
3. Steering column switch for blinker lights, head lights for main beam
4. Instrument panel for engine operation
5. Windscreen demister nozzle right, left.
6. Repository
7. Air outlet for side windows right and left adjustable direction of flow and volume
8. Knob for pivoted side window
9. Shift lever for gear change
10. Controls for heating and venting
11. Air outlet to lagroom
12. Tipping valve hand wheel (on tipper)
13. Foot plunger for engine brake and engine shutoff
14. Accelerator pedal
15. Brake pedal
16. Clutch pedal
17. Fusebox





Instrument Panel

1. Fuel gauge
2. Air pressure gauge
3. Tachometer
4. Rotary switch for instrument lighting where the brightness can be regulated
5. Revolution counter (optional)
6. Push button for air horn (optional)
8. Push button for warning blinker system
9. Pilot Lights
10. Starter switch
11. plug socket
12. Ignition switch
13. Knob for idling speed
14. Rotary switch for separate heating and ventilation (optional)
15. Operating hour counter or air pressure gauge (optional)
16. Engine temperature indicator. not for vehicles with in-line engine)
17. Warning light for supply pressure
18. Oil pressure gauge

Switch Group

Top:

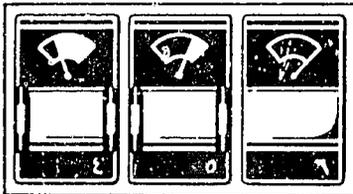
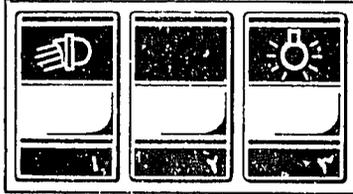
1. Fog lights (optional)
2. Fog tail lamp (optional)
3. Cab ceiling lights

Center:

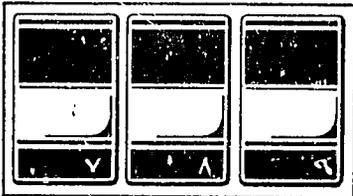
4. Windscreen wipper, fast
5. Windscreen wipper, slow
6. Windscreen washer

Below:

- 7-9 Additional options, otherwise blind cover



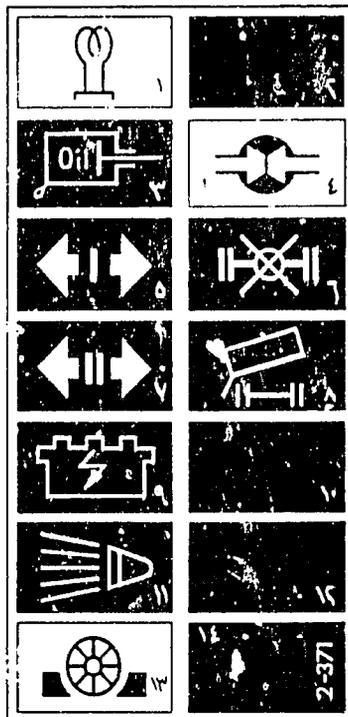
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Pilot Lights:

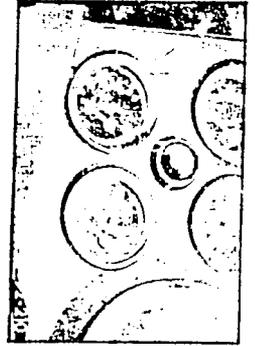
1. Heating plug pilot
2. Free for optionals
3. Warning light for engine oil pressure, and engine oil temprature
4. Pilot light for differential lock in transfere case at 6x6 and 6x4 (longitudinal lock)
5. Blinker pilot light for vehicle
6. Pilot light for differential lock in axle shaft drive of rear axle
7. Blinker pilot light for trailer
8. Pilot light for tipping operation in tipper vehicles
9. Charging current pilot light
10. Free for optionals
11. Main beam pilot light
12. Free for optionals
13. Pilot light for parking brake
14. Free for optionals



5. Oil Pressure Gauge:

Oil pressure approximately (3,5 - 4) bar.
When starting warm engine, the oil pressure gauge should immediately indicate pressure.

When starting the cold engine, the pressure will rise slowly and reach approximately 4 bar even at low speeds.

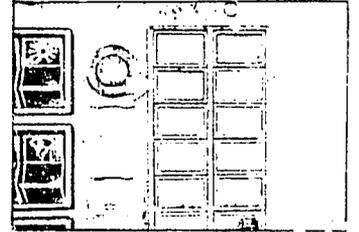


6. Indicator Lamp for Engine Oil Pressure:

This lamp comes on when oil pressure is too low or less than 0.5 bar - if the pressure does not rise as the engine speed increases, stop engine and eliminate defect.

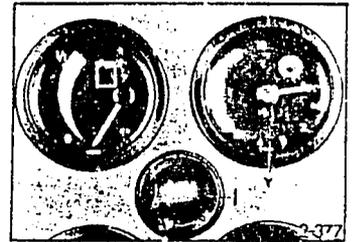
If the oil temperature is too high - above 130°C - and the lamp comes on, stop engine at once.

See Fig (6).



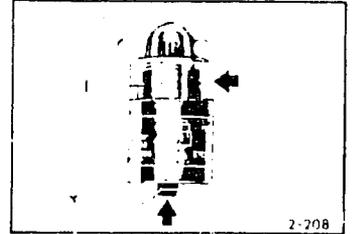
7. Air Pressure Gauge:

If supply pressure drops below 5.0 ± 0.2 bar or 5.5 ± 0.2 bar, warning light will come on. If operating pressure is between (6.5 - 8) bar, do not start moving vehicle unless warning light for supply pressure and warning light for parking brake are off (with storage spring force). See Fig (7).



8. Indicator for Air Filter Service:

With increasing contamination of air filter cartridge, red spot will become visible in inspection glass of maintenance indicator, increasing of this red spot continuously (1) shows the necessity of air filter cleaning. When red area does not return to base position by itself after stopping the engine, filter cartridge should be removed and cleaned. By pressure on release knob (2) the red area will disappear again.



3. Maintenance: (Lubrication)

- a. Recommended oils, and greases for use and changing periods are shown in Appendix (I).
- b. General remarks concerning lubrication are:
 1. Using high viscous oils cause high temperature and high rate of wear.
 2. Oil changing period is effected by vehicle operating conditions and oil type.
 3. Oil must be changed every 6 months in case the vehicle is not in operation.
 4. Transmission oil must be changed every 12 months in case the vehicle is not in operation.
 5. Dump system oil must be changed every 12 months in case the vehicle is not in operation.
 6. Magnetic Plugs:

The drain plugs on the main gearbox and on the rear axle beam are fitted with a magnetic core to collect metal abrasions. These deposits must be removed from drain plugs when changing oil.

٣ - الميانة (التزييت والتشحيم):

١ - بيان انواع الزيت والشحومات الموصى باستعمالها ومواعيد تغييرها موضدة بالملحق ط .

ب - ارشادات عامة خاصة بالتزييت والتشحيم وتشمل الاتى:

(١) يلاحظ انه عند استخدام زيوت لزوجتها اكبر من المطلوب فى المواصفات تؤدى هذه الزيوت الى الاستهلاك السريع للأجزاء كما تعمل أيضا على رفع درجة حرارتها.

(٢) يجب مراعاة فترات تغيير الزيت تبعا لظروف عمل السيارة واختبار نوع الزيت المناسب.

(٣) يجب تغيير الزيت كل (٦) ستة شهور على الاكثر فى حالة عدم تشغيل السيارة .

(٤) يجب تغيير زيت اجهزة نقل الحركة كل عام (١٢ شهر) فى حالة عدم تشغيل السيارة .

(٥) يجب تغيير زيت القلاب الهيدروليكي كل عام (١٢ شهر) فى حالة عدم تشغيل السيارة .

(٦) السدادات المغناطيسية :

تزود مسامير القلاووظ الخاصة بسد فتحات تفريغ الزيت فى مجموعات تروس التغيير وكبرى او كراسى المحاور ومجموعات تروس التوزيع (اذا كانت مركبة) ، تزود هذه المسامير بنواة مغناطيسية وظيفاتها اجتذاب وتجميع برادة الحديد والتي تكون على هيئة ذرات، وهننا يجب ازالة هذه السدادات من مسامير القلاووظ عند اجراء عملية تغيير

If minute steel particles are detected in addition to the usual deposits, this may be the result of abnormal wear. In such cases the component should be removed and repaired.

7. Grease Points:

The grease points are marked and must be carefully cleaned prior to greasing. No grease guns may be used which exceed & 400 bar greasing pressure for greasing the ball joints on the steering linkage (unless it is maintenance).

8. Universal Shafts:

Use hand grease guns (high pressure grease guns are not allowed). Grease universal joints at max. 80 bar until grease emerges from bearing points. On sliding sleeves, the lubrication area should not be filled completely with grease when universal shaft is not under load.

RECOMMENDED OILS, GREASES FOR USE AND CHANGING PERIODS

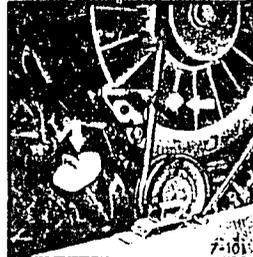
S	UNITES\LUBRICATION POINT	SPECIFICATIONS	CHECK	CHANGE FOR 1st TIME	PERIODIC CHANGE	REMARKS
1	Engine and attachments (Injection Pump - Charger)	Diesel Engine Oil HD MIL - L - 2104C	Daily	1000	3000	Diesel oil SAE L/O
2	Transmission (gearbox, transfere case, differential, wheel hub drive, spring bearings between 2 rear axles)	MIL - L - 2105 or API : GL4	Monthly	3000	20.000	SAE 80
3	Power steering	Dexron II	Weekly	60.000	60.000	Shell Oil
4	Clutch	SAE J 1703e DOT 3 or DOT4	Weekly	Fill up 10.000	Year	Brake oil, hydraulic
5	Propeller shafts, grease nipples on chassis	Branded multipurpose grease lithium saponified with 3% MOS2 additive consistency 1 for operating tempreature from - 40 to 1200	---		10.000	Grease, multipurpose
6	Wheel hubs	Branded multipurpose grease lithium saponified consistency 2	---		40.000	Special grease for hub
7	Springs	Graphite grease	---		40.000	
8	Brake cylinders, compressed air	Branded brake fluid as per SAE J 1703e DOT3 and/or DOT4	---		Each time the cylinder is disassem- bled	
9	Dumper system	Dexron II	Weekly	60.000	60.000	Hydraulic instrument oil

4. Engine:

* In-line Engine Type F6L 913:

a. Engine Oil Level:

Check daily, oil dipstick and oil filter neck are accessible after taking radiator grill out. The check is carried when the engine has been stopped, oil is still filling the whole system.



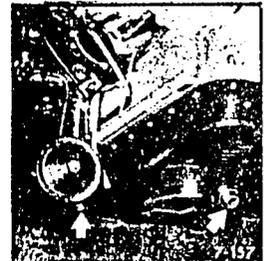
Add engine oil also after the engine has been stopped (if necessary). Oil level on dipstick must be checked after wiping it with lint - free cloth. See Fig (9), (10).

b. Engine Oil Change:

2 oil drain plugs, one in crank case, the other in filter.

To change engine oil unscrew both drain plugs of a warm engine and install them again after draining the oil. Add new engine oil through the oil filter neck.

Check level once more after starting the engine, refill if necessary see Fig (11).



c. Opening and Closing Engine Hood:

1. Fold up radiator grill and insert prop.
2. Pull hood lock holder, this will cause the engine hood to rise up and stand in place by spring.
3. Pressing spring to the rear, engine hood will move up under spring pressure to the top position and stay there. See Fig (12), (13).

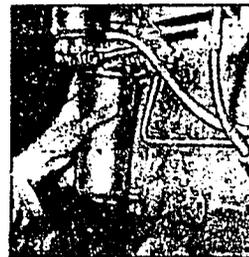


4. Pressure down engine hood against the spring pressure until it engages in the holders.
5. Shut radiator grill again. See Fig (14).

d. Replaceable Oil Filter:

First after 3000 km, then every 10.000 km.

See Fig (15).



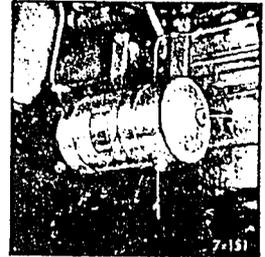
1. loosen filter with mandril or screw driver and then unscrew manually.
2. Clean sealing surfaces on filter bracket.
3. Lubricate rubber seals of new filter slightly.

4. Screw on new filter and tighten with both hands without using other aids.
5. Check for leaks and oil pressure during a short trial run.

e. Fine Filter for Side Circuit:

The cartridge is replaced every 10.000 km. See Fig (16).

1. Loosen screw (1) to drain the oil, wait for complete drain.
2. Loosen screw (2); which tightens the cover to the body, remove cover.
3. Remove fine cartridge, then clean the body.
4. Check condition of sealing ring, replace if necessary.
5. Replace the oil drain plug, install new fine cartridge, and mount the cover.
6. Check for leaks during trial run.

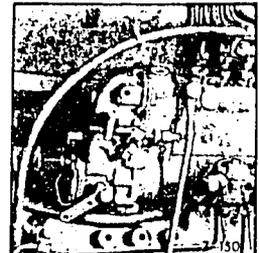


f. Injection Pump:

(Not connected with engine oil) Check oil level in injection pump every 10.000 km. (or at the time of engine oil change).

Unscrew oil check bolt (1) on governor case, leave excess oil to drain outside, if no oil appears add engine oil through neck (2) till the oil drain from (1).

See Fig (17).



g. Warning Switch Connected to the Fan:

1. Insert contact switch for starting.
2. Push operating button, you must hear audible warning, otherwise the electric circuit of warning device is defected.



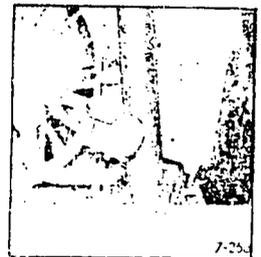
* V - Engine Type FL 413:

a. Engine Oil Level:

Check daily (with vehicle in horizontal position).

Oil dipstick is accessible after swinging radiator grill out. See Fig (19)

The oil dipstick has two marker symbols. The oil level is measured according to the dot method when engine has been stopped for some time. The marking lines indicated the minimum and maximum oil level of the engine one minute after shut down. In this case oil is still filling the whole system. Consequently, oil in sump is at a lower level.

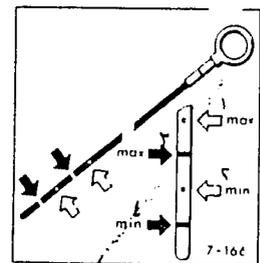


b. Measuring Method According to Date Marks:

(Prior to starting, after extended period of static).

Pull out dipstick, wipe with lint-free cloth, insert again and pull out once more. Dipstick should be coated with oil up to top dot mark (1).

See Fig (20).



If oil level extends only up to bottom dot mark (2), add engine oil immediately through filter pipe to dot mark.

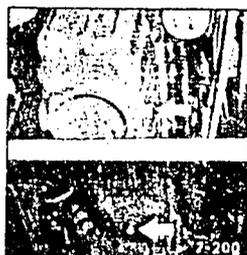
c. Measuring Method According to Line Mark:

(Wait for one minute after stopping engine). Pull out oil dipstick, wipe with lint-free cloth, insert again and pullout once more. Dipstick should now be coated with oil. If oil level extends-only-up to bottom dot mark (4), add engine oil up to top line mark. After one minute of operation, stop engine, check oil level once again, and add oil if required. See Fig (20).

d. Engine Oil Change:

Engines of (6-8-10-12) cylinders have oil drain plug in crankcase.

See Fig (21-a), (21-b), (21-c), (21-d).



To change oil, unscrew bath drain plugs (one drain plug on 6-cylinder engines Fig 21-a) of a warm engine and install them again after draining the oil. Add new engine oil through the oil filter neck until the level is at the top dot mark on the dipstick. Oil change intervals and oil types must be restrictley followed.

e. Oil Change Filter:

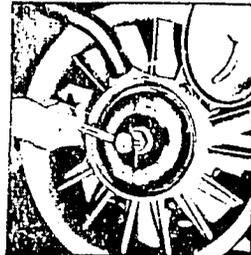
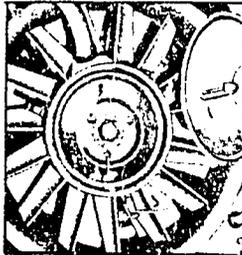
First change after 1000 km.



1. Loosen filter with mandrel or screw driver and then unscrew manually (on double filter, remove filter lock first).
2. Clean sealing surfaces on filter bracket.
3. Lubricate rubber seals of new filter slightly.
4. Screw on new filter and tighten with both hands without using other aids.
5. Reattach filter lock on double filter.
6. Check for leaks and oil pressure during a short trial run.

f. Centrifugal Oil Filter:

Clean every 10.000 km. See Fig (23).



1. Remove cover (1) after loosening closing springs (2).
2. Unscrew hex bolts (3) and remove together with washer (4).

3. Insert puller into hex hole and pull off filter bowl. The filter bowl can also be removed upon insertion of a pipe spanner (22) and turning clockwise.
4. Clean filter bowl well inside.
5. Reinstall filter bowl carefully, watching out for accurate seat of rubber rings. Replace damaged rings.

g. Fuel Change Filter:

Replace every 10.000 km.

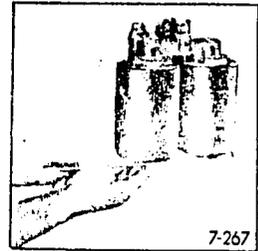
See Fig (24)

1. Loosen change filter manually, clean sealing manually, clean sealing surfaces on filter bracker.
2. Lubricate rubber seals slightly for accurate sealing.
3. Screw on new filter and tighten with both hands without using other aids.
4. Following assembly, check for leaks during a short trial run.



h. Venting the fuel system:

1. Loosen venting screw on fuel change filter by 2 or 3 turns.
2. Actuate hand pump until fuel comes out free from bubbles at the loosened venting screws.
3. Again tighten venting screws. Following the venting, be sure to well tighten handle of hand pump again. No venting is provided for injection pump, no fuel lines may be loosened for venting.



* In-line Engine 913 and V Engine 413

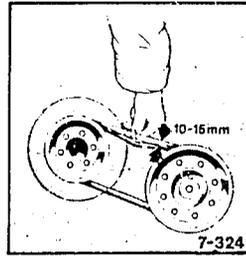
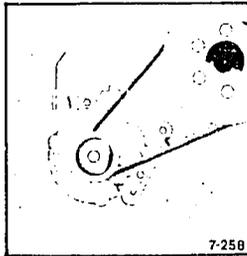
a. Cooling Fins:

Check for dirt every 10.000 km.

Cleaning is particularly required under dusty operating conditions. Dust deposits result in reduced cooling. We recommend dry cleaning of cooling fins and oil cooler. When using diesel fuel for cleaning, thoroughly wash with a soda solution after the cleaning to remove grease deposits. Engine warm, so that any remaining water will evaporate and no rust will develop.

b. Tightening Alternator Belt:

Check condition and tightness every 10.000 km.
See Fig (26)



For checking tightness, the belt must deflect by about 10 mm under thumb pressure.

1. Loosen hex head screw (3).
2. Loosen screws (1), (2) slightly.
3. Swing out alternator, until belt tightness is correct.
4. Tighten the screws again.
To replace the belt, swing back alternator completely.

c. Tightening Air Compressor Belt:

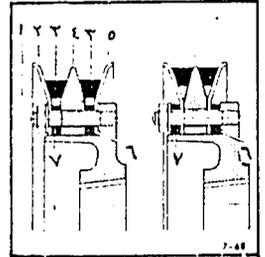
1. Remove hex head screws on pulley.
2. Take off front half of pulley.
3. Remove one, or more if required, metal washer from inside.
4. Place removed metal washers on the outside under the mounting screws.
5. Assembly pulley again.



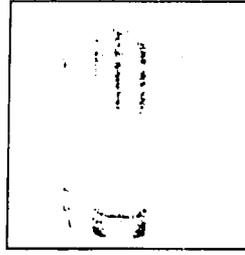
d. Tightening Double Belts:

(In case it is mounted in vehicle).
See Fig (27).

1. Remove hex nuts (1) on pulley.
2. Take off pulley halves (2), (5), intermediate rings (6), (7), and intermediate piece (4).
3. Insert one intermediate ring (6) behind and one intermediate ring (7) front, to assure alignment of the belts (3).
4. Assemble pulley again.
The maximum belt tightness is attained when all of the intermediate rings (6), (7) are mounted outside of the pulley halves.



e. Dry Air Filter with Dust Collector:



Check dust collector (6) regularly, clean if it is half full. Check also air line between filter and engine for dust leaks during daily engine inspection.

When vacuum gauge indicates drop of pressure, clean main filter cartridge (3), this cartridge could be cleaned many times when engine stops, or in case this drop of pressure appears as soon as the engine starts.

In this case main filter cartridge must be replaced. Maintenance could be carried as follows: See Fig (29-b).

1. Open bath clamps (2)
2. Take cover (5) off of dust collector and empty collector.
3. Unscrew hex nut (4), remove main filter cartridge (3), clean and check (or replace if necessary, keep a stock of replacement cartridges on construction site).
4. Clean fins fixed on filter housing (1) from dust with brush.
5. Make sure cover (5) and collector (6) are assembled correctly, recess in cover rim and lug collector must mate.

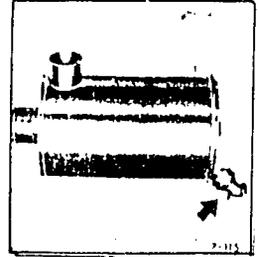
f. Pilcon Dry Air Filter with Dust Extraction Valve:

Dust extraction valve should be checked regularly to ensure that the extraction slot is not blocked. See Fig (30).

The mark must be over the top of cleaner body directed upwards in case of horizontal filter mounting.

Any accumulation adjustment can be removed by pressing valve. See Fig (31).

The cover is screwed by a hand nut. Carry out maintenance of the filter cartridge according to maintenance indicator.



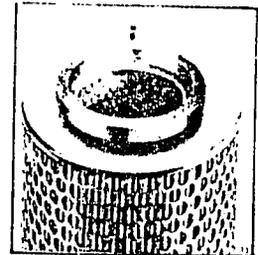
g. Cleaning Filter Cartridge:

Cleaning process is carried by tap end face against your hand or vehicle tyre to release dust. Hard way must not be applied in the cleaning process. Using dry compressed air (pressure 5kg/cm²), blow out cartridge at inclined angle from inside to outside. See Fig (32).



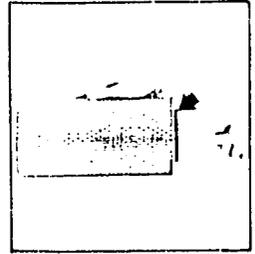
h. Checking Filter Cartridge Gasket:

Replace the filter cartridge, if the gasket is damaged. See Fig (33).



i. Checking Filter Cartridge:

An electric torch can be used to check for cracks, holes and other damage. Replace the filter cartridge if it is damaged. See Fig (34).

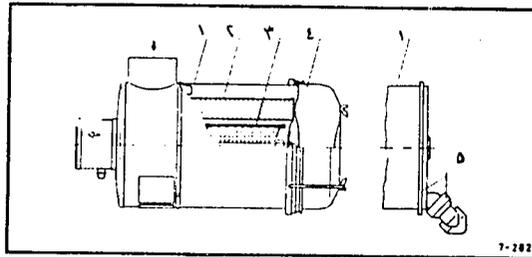


j. Service Indicator:

After servicing the cartridge, press in the release button on the vacuum gauge, the red range will move down and disappear. See Fig (35).



k. Pilcon Dry Air Cleaner with Main and Safety Cartridges:



1. Main cartridge: paper filter cartridge.
2. Safety cartridge - wool cloth.
3. Cover for dust collector.
4. Dust collector valve.

Some types of dry air cleaner have a safety cartridge in addition to the main cartridge, not necessarily cleaned but must be replaced after a period of time (more than one year). Dry air cleaners are to be serviced in accordance with the directions given on the preceding pages.

Air filter service indicator must be continuously observed after cleaning the main cartridge. If the red field fails to disappear, replace main cartridge, and if main cartridge is found damaged, exchange both main and safety cartridges.

To replace safety cartridge, remove the main cartridge and then proceed as follows:
See Fig (36).

1. Unscrew hex nut (1) on center belt (2).
2. Pull safety filter cartridge (3) out of filter housing and replace with a new one.
3. Install and tighten hex nut again. Assemble the air cleaner according to the directions given on the preceding pages.



Never clean safety filter cartridges or reuse discarded cartridges.

e. Fuel Change Filter:

Change filter every 10.000 km
See Fig (37).

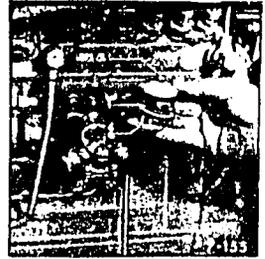
1. Loosen fuel filter (1) from bracket manually.
2. Clean sealing surface (2) from any dirt.
3. Screw on new filter, considering the proper position of sealing ring.



m. Fuel Strainer to Injection Pump:

Clean every 500 km
See Fig (38)

1. Unscrew hex bolt (1), and remove cover away.
2. Clean sealing surface (2) from any dirt.
3. Clean fuel strainer carefully.



Warning:

Take care of complete seal during reassembling.

n. Venting the Fuel Injection System:

1. Loosen hex screw mounted on fuel injection pump by two or three turns.
2. Actuate hand pump mounted on injection pump several times until fuel comes out free of bubbles.
3. Again tighten hex screw.
See Fig (39).



o. Injection Pump:

Check annually (or maximum every 100.000 km). Any service station, or Boch service to dismount the pump and check on the pump test equipment. Adjust injection timing, and venting the system when remount the pump. In case of self lubricating pump, change pump oil simultaneously with engine oil.

5. Overheated Engine:

Attached appendices (J), (k) show possible causes and remedy for overheated engine, as follows:

In-line Engine F6L 913

Overheated engine (stop engine immediately)

POSSIBLE CAUSE	REMEDY
<p>A. Cooling Air:</p> <ol style="list-style-type: none"> 1. Cooling fins heavily contaminated 2. Fan belt, cut (audible warning will be heard directly) <p>B. Unadjustable Fuel Pump Timing:</p> <ol style="list-style-type: none"> 3. Injection nozzle defective 4. Too much fuel injected 	<ol style="list-style-type: none"> 1. Clean 2. Replace new one. (one pair of belts always mounted at same time) (Air pump belt must be removed before mounting the new pair of belts) 3. Check in service station 4. Adjust injection pump in service station

V Engine FL 413

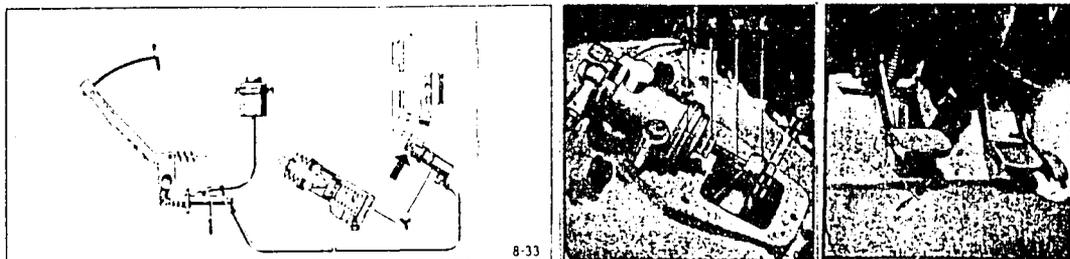
Overheated engine (stop engine immediately)

POSSIBLE CAUSE	REMEDY
<p>A. Cooling Air:</p> <ol style="list-style-type: none"> 1. Cooling fins heavily contaminated. (Clogged) 2. Oil cooler laminations contaminated. (Clogged) 3. Air scoop not tight 4. Lack of air on cooling air blower (contaminated) 5. Rotor in cooling air blower binds <p>B. Hydraulic Power Control:</p> <ol style="list-style-type: none"> 6. Oil pressure too low 7. Oil lines leaky or clogged 8. Centrifugal oil filter leaks 9. Exhaust gas thermostat defective <div data-bbox="415 589 670 832" style="text-align: center;"> </div> <p>C. Injection System:</p> <ol style="list-style-type: none"> 10. Injection nozzles defective 11. Too much fuel injected 12. Unadjusted fuel pump. 13. Air filters clogged 14. Unadjusted valves clearances 	<ol style="list-style-type: none"> 1. Clean 2. Clean 3. Tighten 4. Clear air delivery (clean) 5. Repair in service station 6. Repair in service station 7. Seal or clean 8. Seal 9. Set thermostat to full passage for check up: <ol style="list-style-type: none"> 1. Stop engine. 2. Unscrew adjusting screw and remove copper seal (1) 3. Again, tighten adjusting screw. If the blower rotates fully in this position and the thermostat is defective, replace as soon as possible in services station. If the blower does not rotate fully, and if none of the above mentioned faults is present, see service station 10. Check in service station 11. Adjust injection pump in service station 12. Adjust 13. Clean/replace 14. Adjust

6. Clutch:

a. Check Pedal Play:

Check play every 10.000 km, idle travel in clutch pedal is approx. (30-40)mm, it means (3-4) mm on clutch lever. See Fig (40-B).



To adjust the clutch

1. Loosen counternut (2) a few turns.
2. Hold push rod on recess with an open end snapper and turn push bolt at hexagon (1) in such a manner that the push rod will be shortened, and the play at the clutch lever is between (3-4) mm.
3. Secure push rod again with counternut (2) once more.

Fig (40-c) shows self-adjusting hydraulic clutch actuation. It consists of:

- a. Master cylinder
- b. Slave cylinder with internal thrust spring.

This type do not need adjustment, because clutch bearing constantly rotates when engine is running, the internal thrust spring always overcome the abrasion in the disc. It is not necessary even after exchanging of clutch discs, to carry readjustment. The clutch actuation is maintenance - free except for observing the prescribed oil level in the compensating tank, and bleeding the air from the circuit.

b. Reservoir For Hydraulic Clutch:

Check fluid level every 10.000 (add if necessary), do not remove filter strainer outside.

Make sure that no dirt gets into fluid, always keep reservoir cap tight. Breather hole in cap must not be clogged.

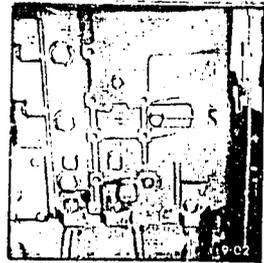
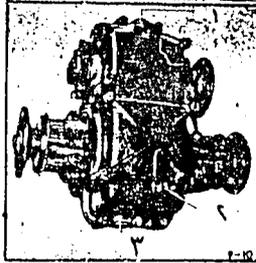
Be careful with fluid as it attacks the paint work. Change fluid once a year.



7. Gearbox:

Checking oil level every 10.000 km. Changing oil every 20.000 km.

There are three types of gearboxes. See Fig (42), (43), (44).



a. Checking Oil Level:

Unscrew inspection plug screw (1), the oil level should reach bottom edge of inspection hole.

b. Changing Oil:

Unscrew oil drain plug (2) and wait till used oil is drained. Screw back again. Fill up with fresh gear oil through inspection hole (1). Open closing screws with ring spanner.

8. Axles:

a. Front Axle Housing:

Check oil level every 10.000 km.

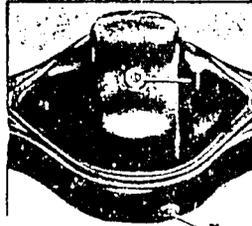
Change oil every 20.000 km. See Fig (45).

1. Check Oil Level:

Unscrew inspection screw (1), the oil level must reach up to bottom edge of inspection hole.

2. Changing Oil:

Unscrew oil drainage plug. (2) Wait till used oil is drained. Screw back again. Fill up with fresh gear oil through inspection hole.



b. Wheel Hub Drive of Front Axle:

Check oil level every 10.000 km, change oil every 20.000 km. See Fig (46).



1. Checking Oil Level:

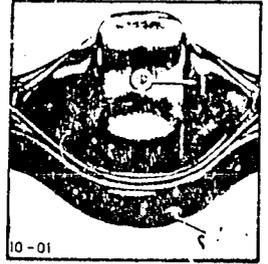
Position filling bolt (1) vertically at the top. Unscrew inspection bolt (2), the oil level must extend up to the lower edge of the inspection hole.

2. Changing Oil:

Position inspection bolt (2) vertically at bottom and unscrew, unscrew filling bolt (1) likewise. Wait till used oil is drained, position filling bolt vertically at the top and add fresh transmission oil through filling bolt (1).

c. Rear Axle Housing:

Check oil level every 10.000 km
Change oil every 20.000 km.
See Fig (47).



1. Checking Oil Level:

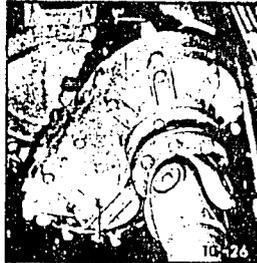
Unscrew inspection screw (1), the oil level must reach up to bottom edge of inspection hole.

2. Changing Oil:

Unscrew oil drainage plug (2) and wait till used oil is drained. Screw back again. Fill up with fresh gear oil through inspection hole (1).

d. 1st Rear Axle with Spur gearing, (in 3 Axles Vehicles):

Check oil level every 10.000 km. Change oil every 20.000 km. See Fig (48).



1. Checking Oil Level:

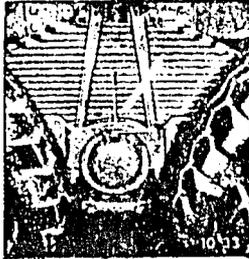
Remove inspection plug (1), make sure that oil reaches bottom edge of inspection hole.

2. Changing Oil:

Remove oil drainage plugs (2), (4), put back after allowing oil to run out. Pour fresh gear oil into spur gearing through filter hole (3), and into rear axle housing through inspection hole (1) so that oil reaches bottom edge of inspection hole (1).

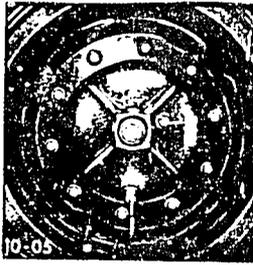
e. Rear Spring Bearings (3 Axles Vehicles):

Check oil level every 10.000 km.
Remove inspection plug (2), make sure that oil level reaches bottom edge of inspection hole. Unscrew plug (1) for air scape before top up with gear oil. See Fig (49).



f. Wheel Hub Drive at Rear Axle: (Type I)

Check oil level every 10.000 km. Change oil every 20.000 km. See Fig (50).



1. Checking Oil Level:

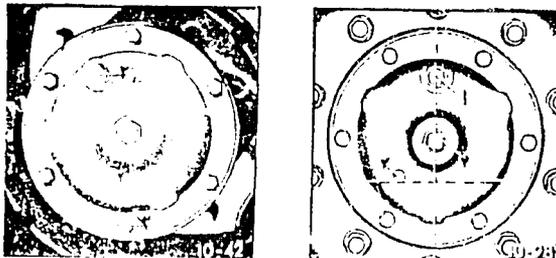
Position inspection bolt at 30° position to vertical and unscrew, the oil level must be up to the lower edge of the inspection hole.

2. Changing Oil:

Position drainage plug (1) facing downwards and unscrew, also unscrew inspection bolt, after the oil had drained out, position inspection bolt in 30° position and add fresh transmission oil through filter plug (1).

g. Wheel Hub Drive at Rear Axle: (Type II)

Check oil level every 10.000 km. Change oil every 20.000 km. See Fig (51)



1. Checking Oil Level:

Turn filter plug (1) vertically upwards, and unscrew inspection plug (3), oil must reach bottom edge of inspection hole.

2. Changing Oil:

In order to drain oil, move cover bolt (3) vertically downwards and unscrew. Also remove filter plug, allow oil to run out. Screw cover bolt (3) back in with sealant. Adopting same procedure as in oil level checking, move inspection plug vertically downwards and pour fresh gear oil through filter hole (2).

Any one of the 6 cover bolts can be used as a drainage plug.

h. Wheel Nuts:

The wheel nuts must be tightened after the first 500 kms. This tightening should also be performed every time the wheel is changed.

Tightening Torques for Wheel Nuts:

a. On disc wheels and wheel rims:

M	18x1.5	=	343 ±	30 Nm
M	20x1.5	=	392 ±	20 Nm
M	22x1.5	=	392 ±	20 Nm

- b. On tr lex wheels with clamping shoes or clamping segments:

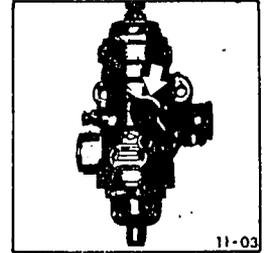
M	16x2 =	225 ±	20 Nm
M	18x2 =	265 ±	20 Nm
M	20x2 =	392 ±	20 Nm

9. Brakes:

- a. Pressure governer "Westinghouse" with air cleaner and tyre inflation connection

Clean filter every 10.000 km

For inflating tires, remove cap nut, check the arrow, Fig (52) Screw tyre inflation hose, compressed air will pass through hose.



Note:

For tyre inflation, it is necessary to drain tanks from air, screw the hose and operate the engine.

- b. Hydraulic brakes reservoir:

Check level of hydraulic oil every 10.000 km.

Do not remove filling strainer for filling up brake fluid.

Change brake fluid annually. See Fig (53)



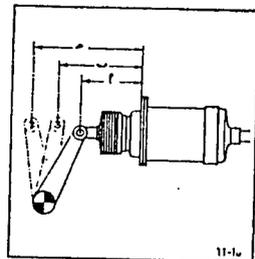
c. Instructions for adjusting brakes:

A further brake adjustment can be determined by measuring the brake shoe air gap. Insert a feeler gauge through the inspection holes, and measure the gap between brake shoe and brake drum. If the brake shoe air gap is more than 1.5 mm, adjustment is recommended. Above 2 mm adjustment is absolutely necessary. A properly adjusted brake has an air gap of .5 mm.



d. Instructions for adjusting front wheel brakes with single cylinder:

The need for brake adjustment is determined by measuring piston stroke of front wheel brake cylinders. See Fig (55).



a = Released position

Determine measuring distance yourself from a fixed point, i.e. from brake cylinder flange. After kick-down of brake pedal -brake shoes attach to brake drum.

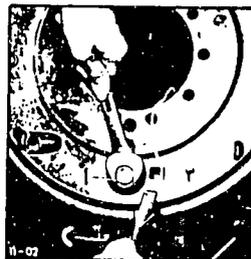
b = Well adjusted brake at 1/2 piston stroke. (a + 45 mm)

c = Weak position stroke (a+70 mm).
Brake adjustment is required, if this value is exceeded.

e. Rear Wheel Brakes:

Check every 10.000 km, adjust if necessary.

- a. Jack up axle.
- b. Release hand brake (with storage spring force).



- c. Release hex. Screw by 2 turns and loosen by hammer blows.
- d. Turn square head (1) in right direction until shoes rest against brake drum and the wheel can no longer be turned by hand.
- e. Step on pedal brake and turn square head in right hand direction until shoes rest against brake drum and the wheel can no longer be turned by hand.
- f. Turn square head one turn (4 quarters) to loosen, just the wheel can rotate freely.
- g. Tighten hex screw.

10. Steering:

a. Steering Wheel Adjustment:

For adapting to driver's body proportions steering wheel can be adjusted continuously in its height and its tilt, as follows:

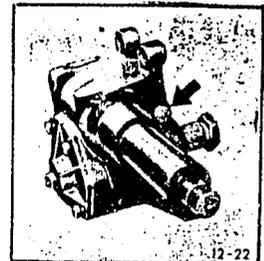
1. Loosen clamping screw on top steering spindle bearing with socket spanner in arrow direction. See Fig (57).
2. The position of steering wheel now can be changed in the height by 40 mm, and in the tilt by 10°. Hold steering wheel by both hands and move into desired position by changing its height or its tilt.
3. Tighten clamping screw again.



b. Gemmer Steering:

Check fluid level every 10.000 km. Lift closing plug. See arrow Fig (58).

The oil level should reach up to oil check hole.



c. Hydraulic Steering with Spherical Nut:

Check hydraulic level every week. See Fig (59)

Check fluid level on dipstick with engine turned off.

If fluid is down to upper mark, this is a sign that fluid has already been lost.



Turn engine off, remove reservoir cap and top up until level is (1-2) cm above upper mark. Put back cap and dipstick, start engine, oil level then drops.

Important Note:

In case power steering fail (as a result of pump failure), you will still be able to steer the vehicle, although much greater effort will be needed.

11. Electrical System:

a. Batteries:

Top up distilled water every month. Check density every 10.000 km. Acid must be (10-15) mm above plates. Top up with distilled water (not acid) if level is inadequate.

Make sure acid drops does not get on clothing. When dealing with battery, keep open lights away to avoid risk of explosion. Keep batteries clean and dry, protecting terminals with acid - resistant grease against corrosion.

Batteries are to be charged at least every 6 weeks if vehicle is left to stand for lengthy periods.

b. Table of Acid Densities:

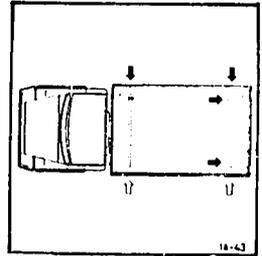
Acid density	<u>Normal</u> Kg/dm3	<u>Tropic</u> Kg/dm3	<u>Normal</u> inch	<u>Tropic</u> inch
Full charge Battery	1.285	1.23	0.23	0.23
Half charge Battery	1.2	1.14	0.24	0.18
Dead Battery	1.12	1.08	0.16	0.11

12. Tipping System (Type Miller):

a. 3 Way Tipper, and End Tipper:

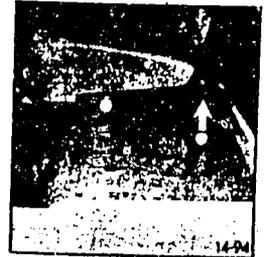
1. Define Tipper Direction:

Insert guide pins into tipping bearings on side toward which the platform will be tipped. Do not insert diagonally. Secure the plug pins by means of spring cutters. See Fig. (60).



2. Engaging the Power Take-off:

Disengage clutch, pull out shift lever (arrow). Fig (61) then engage clutch.



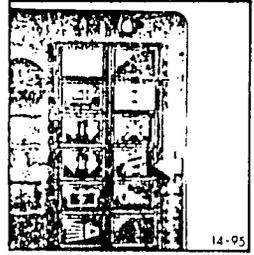
3. Tipping:

Close hand wheel tightly by turning toward the right. Tipping platform -NASR- will rise. See Fig (62).



4. Pilot lamp on instrument panel:

When the tipping platform is raised, the red pilot lamp will light up. See Fig (63).



b. Safety Instructions for Operating Tipper:

1. Tipping bridge raised and supported on the left, standing under a non-supported tipping bridge is a safety hazard and therefore prohibited. For this reason the tipping bridge must be supported when working under raised bridge (removing spare wheel or checking the oil level ...etc).
2. Do not exceed permissible load. Always load in such a way that the center of gravity is in the center of the tipping bridge.
3. The operating pressure set by the manufacturer may not be increased.
4. Torn safety cables must be immediately replaced. Operate tipper only on firm horizontal ground.
5. Be careful when unloading on dumps.
6. Secure the plug pins by means of spring cutters.
7. When tipping, tail-gate of three way tipper should not be permitted to rest on ground.

c. Maintenance and Lubrication:

1. Do not coat pistons of tipping gear with grease. Only rub pistons with dry, clean cloth.
2. Replace seals in case of unusual oil losses on positions of tipping gear.
3. Replace damaged high pressure hoses.
4. Nearly all the hydraulic oil types for tipping systems can be used during summer and winter.

5. Oil change is required as soon as evidence of contamination (including water), or of long operating time. Adding fresh oil will not improve the oil still in the tank. This is why we recommend an oil change once a year. For this purpose, unscrew high-pressure hose on pump, most suitable at the point where the hose enters the fixed oil line.
6. Clean strainer of tipper oil tank every 10.000 km.
7. The oil level of the tipping system is checked with the vehicle in horizontal position.
8. Oil level in tank must be approximately 4 cms, when tipping mechanism extended to the limit.
9. Do not remove strainer in tank when refilling.
10. Venting holes in tank lock should be lean. clean washing the tipper, do not direct water jet against filter neck of oil tank.

13. Preventive Maintenance Schedule, and the Driver Responsibilities:

For heavy trucks NASR ((6x6), (4x6)), preventive maintenance schedule can be divided into:

- a. Items performed by the driver, which we called driver responsibilities, these are shown in appendix (L).
- b. Other items performed by mechanics in service center, these are shown in appendix (M).

14. The Essence:

The preventive maintenance schedule must be carried on in the proper time for any vehicle or equipment, in a similar way as vaccination for new babies must be carried. This is the way to guarantee long life and best condition for both the human being and the vehicle or equipment.

PREVENTIVE MAINTENANCES DRIVSER'S RESPONSIBILITIES

NO	ITEM TO BE PERFORMED	DAILY BEFORE WORK	WEEKLY
1	Check engine oil level, make sure the filling neck cover in place, note level of oil between the marks, report irregularity	X	
2	Check oil leakage under the vehicle Report if found	X	
3	Check tires, specially rear axles	X	
4	Check spare wheel, and Jack, wrenche, tire inflation hose, driver hand tools	X	
5	Check side mirrors, wind screen - clean	X	
6	Check lights, horn and wipers	X	
7	Check fuel from indicator, check the operation of panel	X	
8	Check air hoses for trailer	X	
9	Start the engine, check oil pressures: * (3-5) Kg/cm ² in high speeds. * Not less than . 7 kg/cm ² in idle speed with hot engine	X	
10	Check the lock systems for shafts and axles	X	
11	Check tipper hydraulic lift	X	
12	Drain condensate in air tanks	X	
13	Note air indicator, report if red field appears	X	
14	Do not start moving before warning red light disappear, air pressure must exceed 6. 5 kg/cm ²	X	
15	Check free distance of clutch pedal, brake pedal and the operation of shift lever for gear change	X	
16	Check brake performance at the begining of movement	X	
17	Check oil level in steering, tipping, and transmission systems	X	
18	Check electrolite level, fill if necessary with distilled water	X	
19	Drain 1 litre of diesel fuel from tank if the vehicle stand without movement	X	
20	Check tires pressure, adjust if necessary	X	
21	After the engine starting, do not take off the starting switch in order to maintain the electric circuit in good condition	X	

PRINCIPLES OF PREVENTIVE MAINTENANCES FOR
NASR HEAVY TRUCK (6x6), (4x6)

NO	ITEM	1000	3000	10.000	20.000	50.000	100.000
1	Re-tightening all vehicle parts	X					
2	Change oil for the first time	X				X	
3	Check oil for transmission, steering, clutch and elyctrolite level in battery	X					
4	Change oil filters for the first time, change engine oil		X				
5	Change both engine oil filters		X				
6	Clean cetrifugal filter mounted on cooling fan			X			
7	Check and clean oil cooler			X			
8	Clean crank case and oil pump strainer						X
9	Clean fuel cleaner (water and dirt trap)		X				X
10	Change both fuel filters			X			
11	Clean fuel connection tube from tank				X		
12	Drain one litre from fuel tank, if the vehicle without operation			X		X	
13	Disassemble and clean fuel tank						
14	Check injector pressure						X
15	Check fuel injection pump on testing m/c					X	
16	Check cylinders pressure						X
17	Check cooling fan thermostat						X
18	Check engine temprature indicator					X	
19	Clean air filters, and at red field on air filter indicator			X			X
20	Check belts tightening			X			
21	Clean air strainer of air pressure regulator			X			
22	Check charger						
23	Disconnect charger cover, check valves					X	X

PRINCIPLES OF PREVENTIVE MAINTENANCES FOR
NASR HEAVY TRUCK (6x6), (4x6)

NO	ITEM	1000	3000	10.000	20.000	50.000	100.000
24	Drain condensate from air tanks for vehicle and trailer		X				
25	Clean and lubricate engine brake cylinders						X
26	Check adjustment of rocker arm clearances		X		X		
27	Check rocker arm cover seals, make sure that no leak from return oil pipes.				X		
28	Wash, clean the engine			X			
29	Check clutch pedal free distance			X			
30	Check clutch oil reservoirs, main and secondary						X
31	Check oil level in rear spring balance casing				X		
32	Change transmission oil					X	
33	Change steering oil and filter				X		
34	Replace tires					X	X
35	Check camber angle				X		
36	Adjust bearing clearance of front wheel hubs, change grease				X		
37	Adjust bearing clearance of rear wheel hubs					X	
38	Adjust receprocatng clearance of rear axles				X		
39	Check bearings of wheel reduction gear						X
40	Check brake lining				X		
41	Lubricate cardan joint, bearings, sliding joint and all pins			X			
42	Lubricate front rear spring leafs					X	
43	Clean strainer in hydraulic system oil tank of tipper			X			
44	Change hydraulic system oil of tipper						X
45	Check electrolite denisty of battery				X		
46	Dismount alternater, check and test						X
47	Dismount starter, check and test						X
48	Dismount cut-out and test						X