

TY320 推土机操作与保养手册

TY320 Bulldozer Operator's Manual

徐工集团工程机械股份有限公司
XCMG Construction Machinery Co., Ltd.

目 录

CONENTS

第一章 整机结构、性能参数及操纵装置.....	1 ~ 13
CHAPTER 1 GENERAL LOCATIONS , SPECIFICATIONS AND CONTROLS	
第二章 操作规程.....	15 ~ 25
CHAPTER 2 OPERATION REGULATIONS	
第三章 推土作业.....	27 ~ 34
CHAPTER 3 BULLDOZER'S WORK	
第四章 长期停车中的保养.....	35 ~ 36
CHAPTER 4 STORAGE FOR A LONG PERIOD OF TIME	
第五章 维护保养.....	37 ~ 62
CHAPTER 5 MAINTAINING	
第六章 故障的排除.....	63 ~ 66
CHAPTER 6 TROUBLE SHOOTING GUIDE	
燃烧、冷却水和润滑油附表.....	67 ~ 68
TABLE OF FUEL , COOLANT AND LUBRICANTS	
TY320 推土机润滑图.....	69 ~ 72
TY320 BULLLDOZER LUBRICATING DRAWING	
TY320 推土机电气原理图.....	73
TY320 BULLDOZER ELECTRICAL DIAGRAM	

第一章整机结构、性能参数及操纵装置

CHAPTER 1 GENERAL LOCATIONS , SPECIFICANTS AND CONTROLS

1.1 整机结构(图 1-1)

General locations (Fig.1-1)

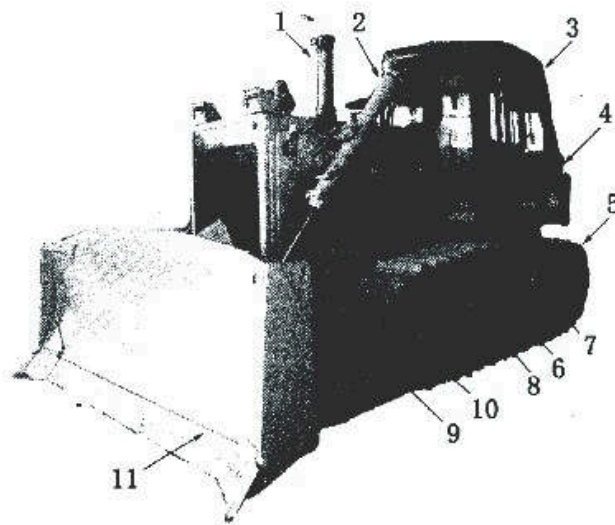


图 1-1

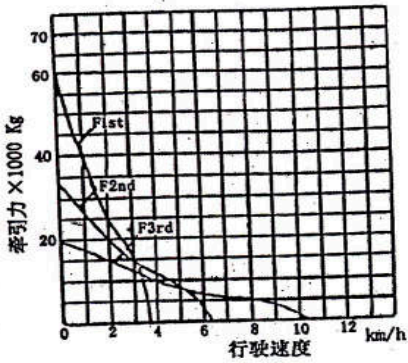
Fig.1-1

1) 排气管及消音器	Exhaust pipe with muffler
2) 铲刀提升油缸	Lift cylinder
3) 驾驶室	Cabin
4) 燃油箱	Fuel tank
5) 履带	Track shoe
6) 台车架	Track frame
7) 托轮	Carrier roller
8) 支重轮及防护装置	Track roller and guard
9) 推杆	Frame
10) 撑杆	Brace
11) 推土铲	Blade

1.2 性能参数 Specifications

参数名称 Specifications			数值 Valve	备注 Remtrks
外形尺寸（长×宽×高） （mm） Dimensions（L×W×H） （mm）			8824×4130×3780 .5 6680×4130×378 0.5	（带松土器）with ripper （不带松土器）without ripper
重量（Kg）（运输状态） Weight（Kg）（transport state）			35720 40070	不带松土器 without ripper 带松土器 with ripper
接地比压 Ground pressure			0.104Mpa	带推土铲 560mm 宽履带 With blade 560mm shoes
爬坡能力（） Ground pressure			30	
行驶速度 （Km/h） Truvel spccd	前进 （F） Forward	1	0～3.6	
		2	0～6.6	
		3	0～11.5	
	后退 （R） Reverse	1	0～4.4	
		2	0～7.8	
		3	0～13.5	
发动机 Engine				
型 号 Model		NTA855-C360	康明斯 Cummins	
额定转速 r/min Nated speed r.p.n		2000		
额定功率 Kw（马力） Rated power kw（HP）		235（320）		
最大扭矩 Nm（公斤米） Hax torque Nu（kg.m）		1509	约 1400r/min At 1400r/min	
启动方式 Surt mode		电机启动（24 伏 11 千瓦）		

行走速度—牵引力特性曲线
 Curve of travel speed-pulling
 performance



1.3 整体尺寸 (图 1-2) Dimensions(Fig.1-2)

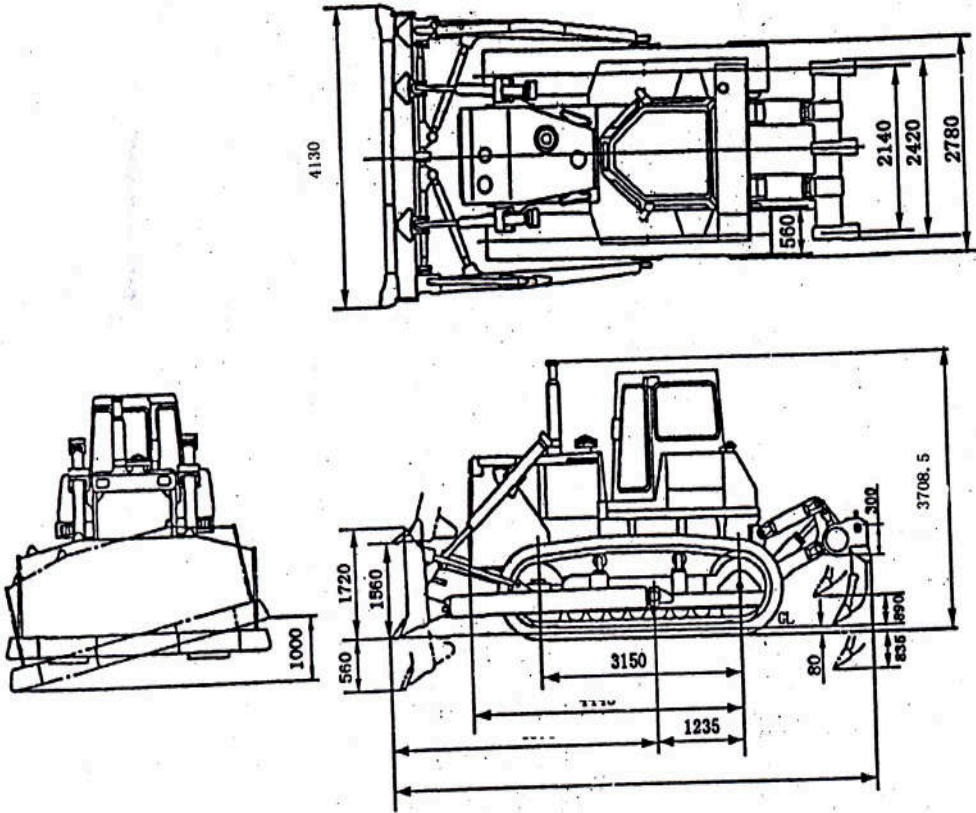
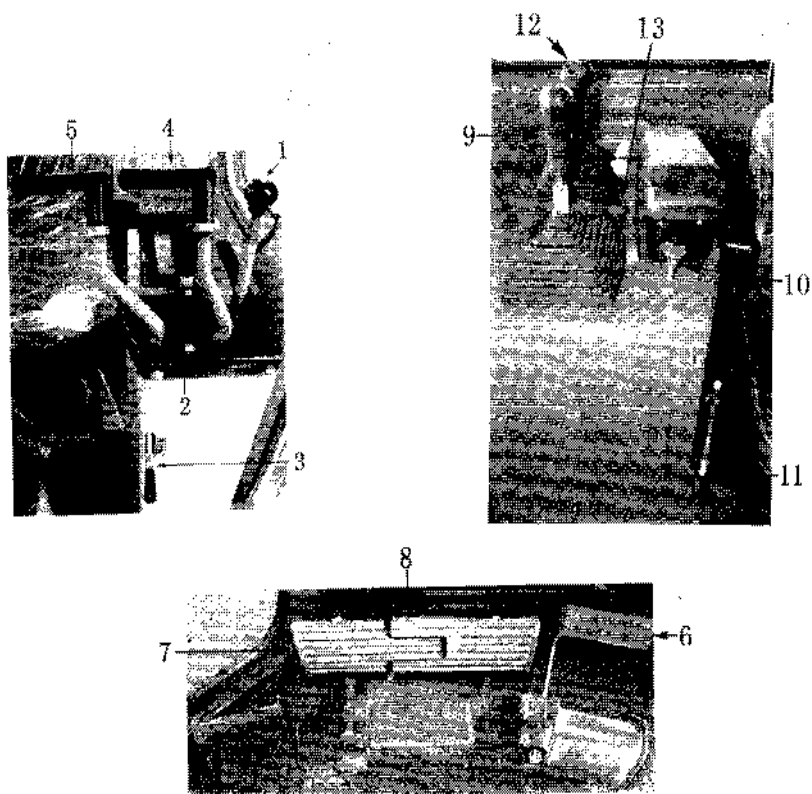


图 1-2

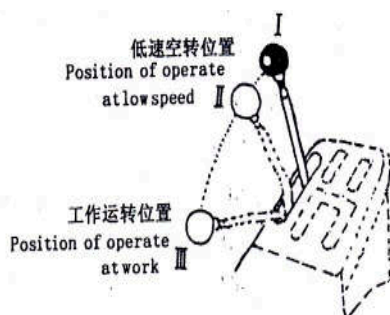
1.4 操纵系统 (图 1-3)

Controls (Fig.1-3



- | | |
|------------------|---|
| (1) 燃油控制杆 | Fuel control |
| (2) 变速杆 | Gear shift lever |
| (3) 变速安全杆 | Safety lever (for gear shift lever) |
| (4) 左转向杆 | Steering lever (L.H) |
| (5) 右转向杆 | Steering lever (R.H) |
| (6) 减速踏板 | Decelerator pedal |
| (7) 左制动踏板 | Brake pedal (L.H) |
| (8) 右制动踏板 | Brake pedal (R.H) |
| (9) 铲刀操纵杆 | Blade control lever |
| (10) 铲刀操纵锁紧按钮 | Lock button (for blade control lever) |
| (11) 制动锁紧杆 | Brake lock lever |
| (12) 松土器操纵杆 | Ripper control |
| (13) 松土器操纵锁紧按钮 | Lock |
- button (For ripper control le

1.5 操纵装置 Control equipment



lever

1.燃油控制杆

把控制杆推向前方，即如图 1-4 所示 I 位置是发动机低速——怠速运转位置。

控制杆向后拉，发动机转速就提高，如图示 II 位置。

控制杆处于如图示 III 位置时，是发动机处于额定转速运转，是推土机作业中，发动机通常运转的转速。

图 1-4 (Fig.1-4)

要使发动机停止，首先将控制杆处于“怠速”位置，如图 I 位置，然后将起动开关处于关的位置。

1.Fuel control lever (Fig.1-4)

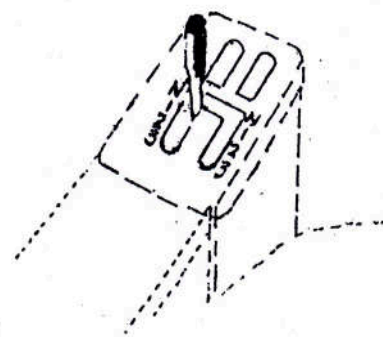
Push the lever fully as shown I position , that controls engine inlow—idling speed.

Pull the lever as shown II position , the engine speed increases ,

When put the lever to III position as shown in fig , the engine is running at rated speed , which is the normal speed in operation of bulldozer.

When stopping the engine , firstly push the lever to idling position as shown in fig , then return starting switch to OFF position.

图 1-5 (Fig.1-5)



2. 变速杆 (图 1-5)

推土机前进，后退各有三档行驶速度，都由此变速杆操纵；在发动机起动时，必须将变速杆处于空档“N”的位置；待发动机起动后，再操纵变速杆置于所要求速度档的位置。

2. Gear shift lever (Fig.1-5)

There are three travel speeds for FORWARD and REVERSE shifting by this lever, When starting the engine , must place the gear shift lever to “N” position

And after starting shift gear shift lever to a desired position.

3 . 变速安全杆 (图 1-6)

此杆是变速杆的闭锁装置。

⚠ 当推土机停放时，必须将变速杆置于空档“N”位置，并用此杆锁紧。

3 . Safety lever (for gear shift lever)

This is the locking device of the gear shift lever

⚠ When parking the machine return the

shift lever to “N” , and put the safety Lever to lock



4. 左转向杆 (见图 1-3)

把左面的转向杆向后拉，左面的转向离合器就分离，车体就向左边转弯；将左转向杆继续向后拉，拉到底，左面制动器即制动，车体即在原地向左边转弯。

4. Steering lever (L.H) (See fig.1-3) 图 1-6 (Fig.1-6)

Pull the L.H steering lever halfway , The steering clutch will be disengaged , allowing the machine to make a gradual left turn , Pull the L.H steering lever all the way backward , The L.H steering brake will be applied , Then , the machine Will make a pivot left turn.

5. 右转向杆

右面转向杆控制推土机向右转弯，其操作过程同左转弯一样。

5. Steering lever (R.H)

To make a gradual or povot right turn, manipulate the R.H steering lever in the same manner as described above.

6. 减速踏板 (图 1-3)

减速踏板用于降低发动机的转速，该踏板能控制发动机二档转速。常用于第一档，即为 800 ~ 850 转/分；若再进一步踏下该踏板，为第二档，即处于怠速运转。



当车开到斜坡顶部或开到悬崖边倾斜泥土等时，由于负荷减轻，会使车速加快，则要发生危险。此时，就踏上减速踏板控制车速，并使车辆适当降速。

6. Decelerator pedal (Fig 1-3)

This pedal is used to decelerator engine speed , The pedal is designed to be operated in two stages , Normally , the pedal is used at the first stage (800 ~ 850rpm) When required , the pedal can be further depressed so the engine runs at low idling speed (second stage) 。



When arriving at the top of a slope or when dumping earth from a cliff , the machine will increase its speed with the sudden loss of load 。 Slow the machine by depressing the decelerator pedal。

7. 左右制动踏板

为便于驾驶员操纵，推土机在转向时，除用转向杆外，还可同时用制动踏板。

其操作过程如下：先将转向杆向后拉，行程约 67 毫米，然后踏下与转向杆同一边的制动踏板，推土机就在原地转弯。

推土机在平地作业时，碰到特殊情况，须紧急刹车，此时即可踏下制动踏板的中部位置，使左右制动器同时制动。



注意：在不需要操纵制动踏板时，不要把脚踏在踏板上。

7. L.H and R.H brake pedal

To turn the machine except for using steering lever , at same time depress the brake pedal as follow ;

Pull the steering lever backward about 67mm , then depress the brake pedal on the same side as the lever at the same time machine make a pivot turn。

When operating for smoothing uneven ground surface must be emergency braked in case of accident , At this time apply brakes by stepping on center area of both brakes pedals , both right and left brakes are actuated。

 Caution : Do not place your foot on pedals unnecessarily。

8 . 推土铲操纵杆 (图 1-3)

此杆用于操作推土铲。操作方法请参照 “推土作业” 。

8 . Blade control lever (Fig 1-3)

This lever is used to operate the blade , See “Blade operation”

9 . 推土铲操纵闭锁按钮 (图 1-11)

此操纵安全杆是推土铲操纵杆的闭锁装置。

 在推土机停放及维修保养时，必须拔出该按钮锁紧推土铲操纵杆。

9 . Lock button (for blade control lever) (Fig 1-3)

This lock button is used to lock the blade control lever。

 When parking or servicing the machine , be sure to push the lock button to lock blade control lever。

10 . 制动锁紧杆 (图 1-3)

此杆是制动踏板的闭锁装置。闭锁后，脚即可离开踏板，制动器仍然处于制动状态。

操作过程如下：

首先须同时踏下左右制动踏板（即只要踏下制动踏板的中部位置），然后把此杆置于 “锁紧”

位置。这样制动踏板即被锁住了。若要解除闭锁状态，仍须首先踏下制动踏板的中部位置，然后再将此杆置于 “放松” 的位置即可。

 注意：利用制动锁紧杆锁紧制动踏板使推土机停止行驶，必须在发动机运转状态下进行。因发动机停止运转时，液压制动助力器处于工作状态，这样使制动力减小，特别注意在坡道上停车，危险性很。所以必须在发动机运转状态下操作此闭锁机构。

10 . Brake lock lever (Fig 1-3)

This lever is used to lock brake pedal , After Locking。The brake is yet actuated in function。But foot can leave from pedals。

Operating as follows :

Depress the center of the left and right brake pedals。Both when applying the lock lever in “lock” position and when releasing the lock lever in “Free” position。

 Caution : when locking or releasing brakes , be sure to KEEP THE ENGINE RUNNING When the engine is stopped and the hydraulic booster is not in operation , the brake force is reduced 。 That is dangerous。 Be especially careful when parking on a slope。

11 . 乙醚起动按钮 (如有的话)

在气温寒冷时使用的快速启动装置。操作时先把起动开关的钥匙转动到起动位置，使曲轴旋转；同时按下乙醚起动按钮时，乙醚就被喷射成为雾状被吸入进气管内，促使发动机容易起动。

11 . Ethylether starter button (If required)

Ethylether starter is a device for quick starting engine , When handling , firstly key-switch go to start station , at the same time , the axes of crankcase circumscribe.

At the same time press the press-button of the ether device.

The ethylether will spray into air intake tube , so the engine will be started easily.

1 . 6 组合仪表及其主要功能

1 . 6 Combined instrument and main function

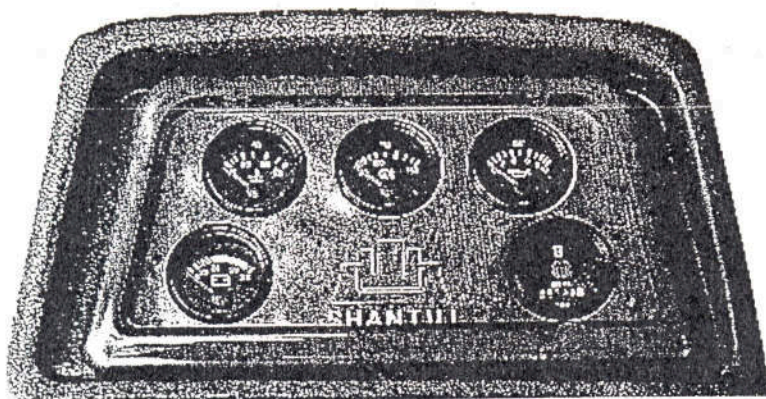


图 1-14)

14 (Fig.

1 . 6 . 1 组合仪表的功能 (见图 1-14)

组合仪表主要包括发动机油压表、水温表、油温表、计时表、报警单元。报警单元包括：发动机油压的低压报警，水温、油温的高温报警，空气滤清器的堵塞报警，发电机发电信号指示。

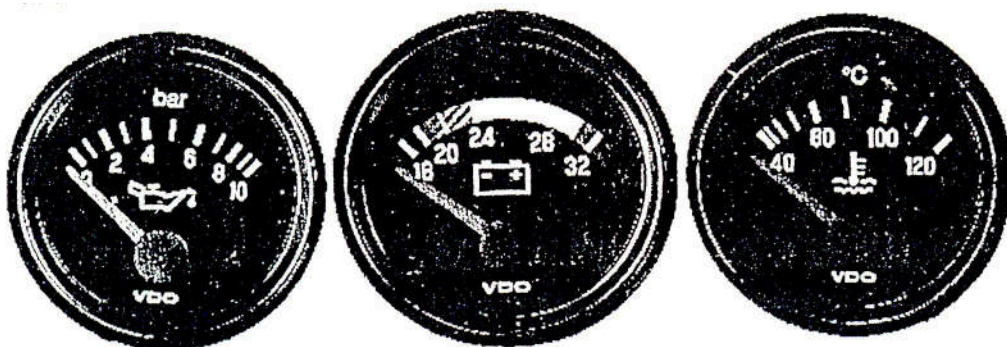


图 1-

15 (Fig.1-15) 图 1-16 (Fig.1-16) 图 1-17 (Fig.1-17)

1.6.2 发动机油压表 (图 1-15)

油压表的量程为 0bar ~ 10bar (约 0Mpa ~ 10Mpa) , 1bar ~ 10bar 为发动机的正常工作范围, 机油压力过低时, 报警灯亮。冷起动时压力有时偏低, 应先进行预热, 使指针在正常工作范围之内, 方可进行作业。

1.6.3 油温表 (见图 1-16)

指示工作油箱油温, 正常工作范围为 40°C ~ 100°C , 作业中, 若温度过高报警指示灯亮, 此时应减少作业负荷, 使指针回到正常范围之内。

补充充电。机器正常运转时, 电压表指针应在绿区, 28V 左右, 若电压偏低或偏高, 应查明原因, 故障排除后再操作。

1.6.4 水温表 (见图 1-17)

指示发动机水温, 机器正常运转时, 水温表指针在 40°C ~ 100°C 范围内, 如果温度过高, 报警指示亮, 此时应降低发动机转速, 使指针回到正常范围之内; 必要时停车检查水位。

1.6.5 油温表 (见图 1-18)

指示液力变矩器油温, 正常工作范围为 50°C ~ 120°C。在作业中, 若温度过高, 报警指示灯亮, 此时应减少作业负荷, 使指针回到正常范围之内。

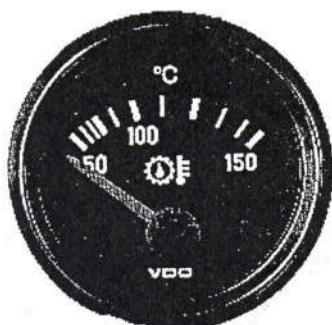


图 1-19 (Fig.1-19)



图 1-19 (Fig.1-19)

1.6.6 计时表 (见图 1-18)

记录发动机的运转时间, 作为定期保养及检测故障发生时间的依据。

1.6.1 Function of combined instrument (Fig 1-14)

The combined instrument consists of oil pressure gauge of engine , water temperature gauge , oil temperature gauge , voltage gauge , timemeter and alarm unit etc , Alarm unit consists of alarm of engine low oil pressure , alarm of high water and oil temperature , alarm of alternator trouble , indicate of neutral signal and indication of preheat signal.

1.6.2 Oil pressure gauge (Fig 1-15)

Limit of oil pressure gauge is 0bar ~ 10bar (about 0Mpa ~ 1Mpa) , work range of engine is 1 bar ~ 10bar , When oil pressure is low , alarm light flashes , When cold starting pressure is sometimes low , should preheat first

until the point is in normal work range。

1.6.3 Hydraulic oil temperature gauge (See Fig 1-16)

It indicates oil temperature of hydraulic system , The machine normal working range is 40-100°C , When the machine working , if hydraulic oil temperature is high alarw light flashes。 At the time , should reduce the working load until instrument indication returns to normal range。

1.6.4 Water temperature gauge (See Fig 1-17)

It indicates the water temperature of engine , When the machine normal working , the green light flashes , When the water temperature is high , the red light flashes。 At the time , should reduce the engine speed until the instrument indication returns to normal range and stop the machine to check water level as needed。

1.6.5 Oil temperature gauge (See Fig 1-18)

It indicates oil temperature of torque converter。 The machine normal working range is 50-120°C。 When the machine working , if oil temperature is high , alarm light flashes。 At the time , should reduce the working load until instrument indication returns to normal range。

1.6.6 Time meter (See Fig 1-19)

It records the running time of engine , which as the basis of periodical maintenance and trouble time。

1.7 其它装置

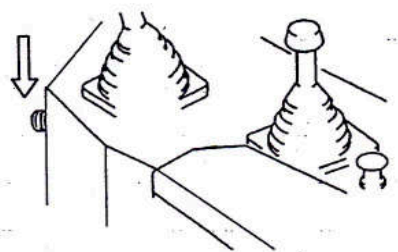
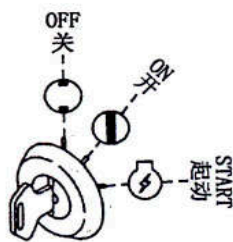


图 1-20

Fig.1-20

图 1-21 Fig.1-21

1) 起动开关 (图 1-20)



关：起动钥匙插入或拔出的位置。该位置电路全部断开。

开：钥匙向右旋转在该位置，电路接通。

起动：钥匙继续旋转在该位置，起动马达将驱动发动机。起动后应立即释放钥匙，将自动弹回开的位置。



2) 喇叭按钮 (图 1-21)

当按下该按钮时，喇叭发出响声。

3) 保险丝盒 (图 1-22)

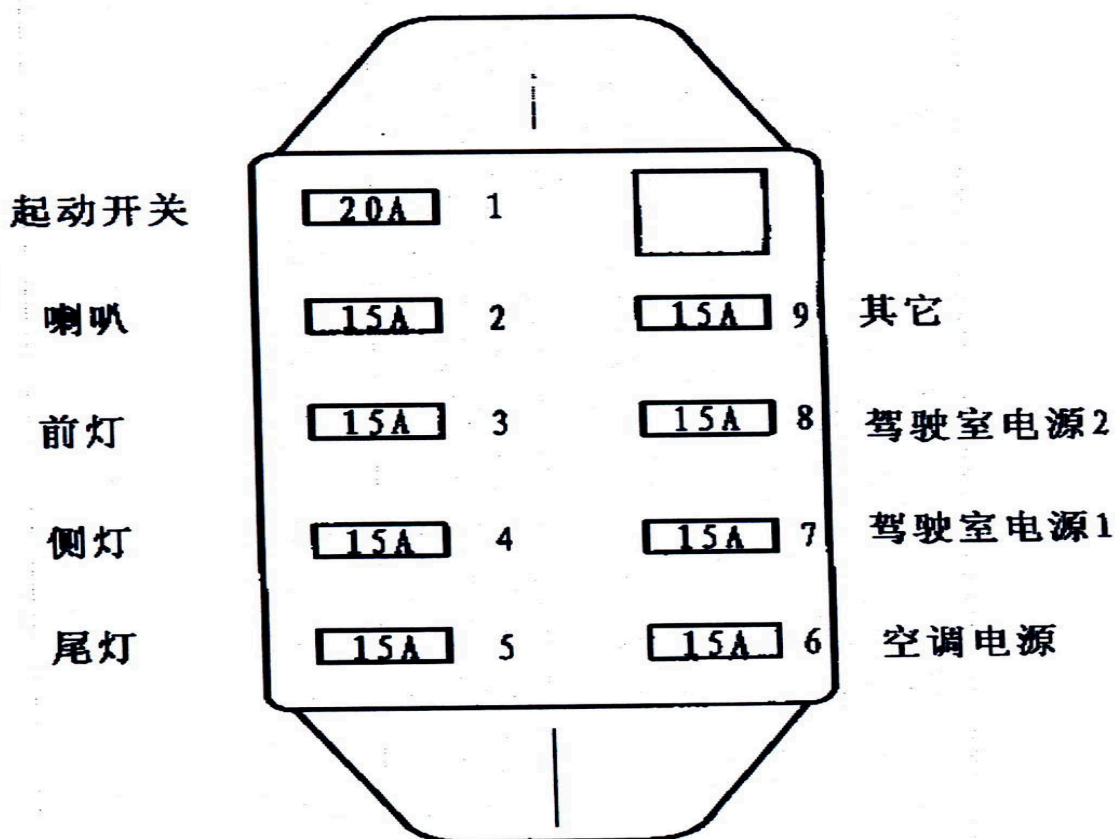
保险丝防止电气元件或导线烧坏，如果保险丝生锈或覆盖一层白色粉末，应更换。

★ 更换保险丝时，应用相同容量的保险丝。

⚠ 更换保险丝时，务必关闭起动开关。

保险丝的排列及电器电流容量：

熔断器盒中保险端子、保险片分布图



1.7 Other devices

1. Starting switch (Fig 1-20)

- Ⓐ OFF Key insertion withdrawal position , None of electrical circuits activate
- Ⓑ ON Charging and lamp circuits activate。 Keep key at ON positin after starting

Ⓒ START At this key position , the starting motor will crank the engine , release Key immediately after starting , The key will return automatically to the ON position。

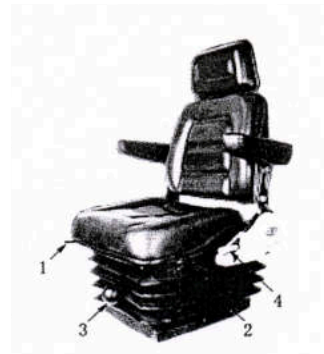
1.8 司机座的调整 (图 1-23)

前后调整：提起控制杆 “1”，调整前后所需位置。
调完后，放回控制杆。

升降调整：用双手提起手柄 “2”可使座位升降，
手柄 2 左右对称各一个。

靠背倾斜调整：提起手柄 “4”，倾斜度调整适当
后，松开手柄。

座的硬软调整：顺时针旋转手柄 “3”，使座位强硬。
逆时针旋转手柄，使座变软。可据体重，调至最佳舒适状态。



1 . 8 Operator's seat adjustment (Fig 1-23)

图 1-23 (Fig 1-23)

Forward and backward adjustment :

The control lever“1” is lifted , the seat can be adjusted forwards or backward in the desired position , then release the lever。

Height adjustment :

To raise and lower the seat by moving lever“2” to left or right。

Tilting adjustment :

lever“4” is lifted , set seat in desired position , then release lever。

Hard and soft seat adjustment :

To harden seat , turn lever“3” clockwise , To soften seat turn it counter clockwise , You can obtain the best condition as operator's weight。

第二章 操作规程

CHAPTER2 OPERATION REGULATIONS

推土机各操纵机构是否正确操作，会影响整机的使用寿命。操作不当，甚至会产生机械与人身事故。

Whether or not it is correct operation of machine , that have influence on service life of complete machine。 If handling improperly , that even will be caused machinery trouble or personal injury。

2.1 操作发动机 Operating engine

1.发动机起动前 (图 2-1)

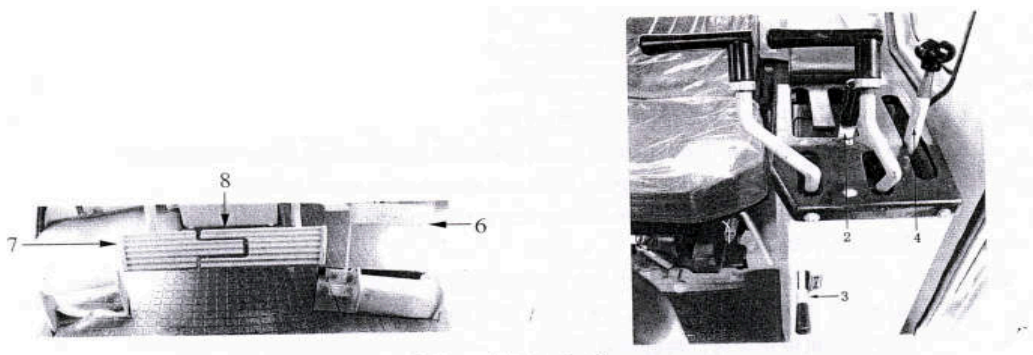


图 2-1 (Fig 2-1)

- (1) 日常检查项目 (检查项目参看 “定期保养”)。
- (2) 制动踏板要处于制动锁紧状态。
- (3) 变速杆2要置于空档 “N”位置, 且用安全杆3锁紧。
- (4) 推土铲下降使之触及地面, 用安全杆将推土铲操纵杆锁紧。
- (5) 燃油控制杆4置于怠速位置。

1 . Before starting the engine (Fig 2-1)

- (1) Carry out the daily check items (for detail of the inspection , see “Periodic Maintenance”)。
- (2) The brake pedal should be in lock position。
- (3) Place the gear shift lever 2 in N position and lock it with safety lever 3
- (4) Lower the blade to ground and lock the blade control lever 3 with safety lever。
- (5) Set fuel control lever 4 to low idling position。

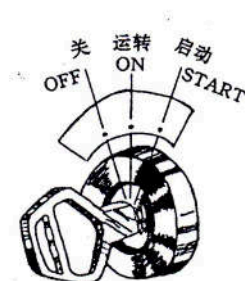


图 2-2 (Fig 2-2)

2 . 起动发动机 (图 2-2)

- (1) 钥匙插入起动开关, 转向起动位置, 发动机开始工作。
- (2) 起动时, 要注意观察发动机机油压力表压力是否正常。
- (3) 钥匙在起动位置, 不得超过 20 秒钟。
- (4) 起动不成功时, 应立即将钥匙置于关位置, 然后等待 2 分钟后再次起动。
- (5) 若发动机再次起动仍有困难, 可能是由于断油阀未打开, 此时可用手动操作旋钮来打开断油阀, 待起动后, 将旋钮返回。
- (6) 起动后须将钥匙回至运转位置 (能自动返回)。

2 . To start the engine (Fig 2-2)

- (1) Insert the key into starting switch , turn the key to START position and the engine will be started.
- (2) After starting the engine , check the engine oil pressure gauge for normal pointer position
- (3) Do not leave the key in START for more than 20 second.
- (4) If engine will not start , repeat the starting procedure after about 2 minutes
- (5) In case the engine will not start by repeat operation , the shutdown valuc may be not in opening , Open the valuc by tuning knob and after starting return knob back。
- (6) When engine has started , return starting key to ON (automatically)

3 . 断油阀手动操作

在断油阀电气系统发生故障时, 要采用手动操作。启动方法如下:

将旋钮 1 往里拧将阀门顶开, 使 “PT” 泵中的油能流入喷射器内, 使发动机启动。要使发动机停止运转, 将旋钮退回即可。

3 . Handling shutdown value

Carry out manual control the shutdown valve , when appears fajlure in electrical system , Handling as follows ;

Turn the knob 1 clockwise to stand up to open valve , so the fuel flows from “PT” pump into injector , then engine will started , When stopping the engine , return the knob back。

4 . 发动机运转

当发动机启动后，不要马上进行作业，首先要进行“预热运转”。

步骤如下：

1. 将发动机控制在怠速运转上（燃油控制杆置于“怠速运转”位置），怠速运转时间不能超过 20 分钟，不然会在增压器的底壳部出现漏油。
2. 操纵燃油控制杆，使发动机控制在中速、无载荷运转，运转时间需 5 分钟。
3. 使发动机轻负荷运转，直到水温表指针指向绿色范围为止。

预热运转后须检查：

1. 各仪表是否正常；
2. 发动机排气颜色是否正常，有无异常噪音和异常振动。
3. 油、燃油、水等是否有溢漏现象。

4 . Running the engine

After starting engine , do not begin operation as soon as , run the engine for warm-up as following :

- 1 . Control the engine running at the idling speed (put the fuel control in low idling position) , that the pointer of oil pressure gauge moves into green range , Do not run the engine at low idling for more than 20 minutes , oil may leak out form the bottom of the turbocharger turbine。
- 2 . Pull fuel control lever halfway to run engine at midrange speeds for about 5 minutes with no load。
- 3 . Run engine with light load until engine water temperature gauge indicator moves into green range。

Check after warm-up run :

- 1 . Check all gauges for proper operation。
- 2 . Check for normal coloration of exhaust , and any abnormal noise or vibration。

Check for any leakage of oil , fuel or water。

5 . 发动机的停止

(1) 在停止发动机之前，须进行 5 分钟的怠速运转，使发动机慢慢冷却后方可停止发动机运转。

(2) 停止时将起动开关上的钥匙拧到关位置，然后将钥匙拔出。

★当发动机还没有冷却时，就立即停止发动机运转，会影响发动机各部件的寿命，所以非必要时，不要进行紧急停机。

5 . To stop the engine

(1) Cool the engine by running it at low idling speed for about 5 minutes。

(2) Return starting switch key to OFF and remove key。

★If engine is stopped abruptly before it cools down , engine life may be greatly shortened 。 Never stop engine abruptly except in case of emergency。

2 . 2 推土机起步 Starting machine travel

发动机正常运转后，方可实现推土机起步（前进行驶），操作步骤如下：

- 1 . 将燃油控制杆向后拉，提高发动机转速；
- 2 . 操作安全杆，解除对推土铲操纵杆的锁紧作用；操纵推土铲操纵杆，将推土铲提升到离地 40 ~ 50 厘米左右；
- 3 . 踏住制动踏板的中部位置，操纵制动锁紧杆，解除对制动踏板的锁紧作用，使制动踏板复原至常态位置；

4. 操纵变速安全杆，解除对变速杆的锁紧作用，然后将变速杆置于一档速度位置，即推土机起步向前行驶；
5. 起步时，踏下减速踏板，再将变速杆置于前进一档位置，然后再慢慢释放减速踏板，使发动机转速逐渐增加，这样防止急剧起步；
6. 起步后，可将变速杆置于所需要的速度档位。

After normal running the engine , to move the machine off (forward travel) by handling as follows :

- (1) Increase the engine speed by pulling the fuel control lever。
- (2) Unlock the blade control with safety lever , put blade control lever in RAISE position to raise the blade 40 ~ 50cm off the ground。
- (3) Depress intersecting part of both brake pedals , place brake lock lever in free , and return the brake pedals to home position。
- (4) Unlock gear shift lever with safety lever shift gear shift lever into 1 position and start machine forward。
- (6) When the machine has started , depress decelerator pedal and release it slowly to shift gear shift lever to a desired position。

2.3 变速 (图 2-1) Gear shifting (Fig 2-1)

把变速杆置于所要求的速度位置，推土机在行驶中也可进行变速，不必停车变速。再变换前进、后退行驶档时，须踏下减速踏板，待发动机有所减速后，再操纵变速杆，改变推土机行驶方向。

Gears can be shifted into any position by the gear shift lever , There is no need to stop machine to shift gears , When shifting from Forward to Reverse (and Vice Versa) , first depress the decelerator pedal to lower to engine speed , and then operate the gear shift lever。

2.4 转弯 Turning

在行驶中，要向左（右）转向进，将该侧转向杆拉至中途，转向离合器就分离（此时手上有感觉的）即能作缓慢转向（大转弯）（图 2-3）；若将该侧转向杆拉到底，并踏下同一侧的制动踏板，即能作原地转向（小转弯）（图 2-4）。

To make a turn to one direction while traveling , pull steering lever halfway (to the detent) on the same side。 The steering clutch will be disengaged , allowing the machine to start turning slowly (gradual turn) (Fig 2-3)

Pull steering lever all the way backward to one direction , and depress the brake pedal on the same side , the machine will make a sharp pivot turn (Fig 2-4)



图 2-3Fid.(2-3)



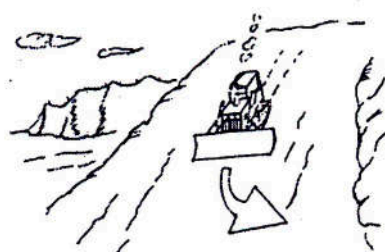
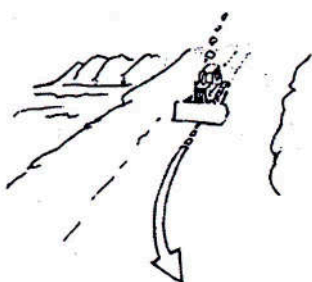
图 2-4Fid.(2-4)

在坡道上若要进行向左侧大转弯时，则要把右侧转向杆拉到中途，即能往左缓慢转向（可以逆操作）；若要进行向左侧原地转弯时，则要把左侧转向杆拉到底（不能逆操作）。

When turning machine on a slope , pull the R. H steering lever halfway to its stroke end , The machine will make a gradual left turn (compensation steering) 。

To make a pivot left turn , pull the L.H steering lever all the way backward (no compensation steering) 。

2.5 推土机暂时停车 To stop the machine



推土机暂时停车时，不必使发动机停止运转，其步骤如下：

1. 将燃油控制杆向前推，使发动机处于低速运转；
2. 将变速操纵杆置于空档 “N” 的位置，并操纵其安全杆使变速操纵杆锁紧；
3. 踏下制动踏板的中部部位，并操纵制动锁紧杆，使制动踏板锁紧；
4. 操纵推土铲操纵杆，将推土铲下降到触及地面，并操纵其安全杆，使推土铲操纵杆锁紧。

⚠ 尽可能将车辆停放于坚固的地面上，避免停在危险的地方。

To stop the machine no need to stop the engine , by operating as follows :

1. Lower engine speed by operating fuel control lever 1 ;
2. Place gear shift lever in N position , Lock gear shift lever with safety lever ;
3. Depress intersecting part of both brake pedals and lock the brake pedals with brake lock lever.
4. Put blade control lever in lower position to lower blade to ground , and lock blade control lever with safety locks.

⚠ Put the machine on the indurative ground and avoiding to put the machine on the deathtrap.

2.6 推土铲的操作 Blade operation

1. 推土铲操纵杆的操纵位置

- (1) 推土铲上升 (图 2-5a)
- (2) 闭锁 (保持) 使推土铲保持在某一位置上 ;
- (3) 推土铲下降 (图 2-5a)
- (4) 浮动, 使推土铲适应路面不平 (在外力影响下) 作自由升降。操纵杆在浮动位置, 即使手离操纵杆推土铲仍可保持浮动状态 ;

A 推土铲右倾斜 (图 2-5) B 推土铲左倾斜 (图 2-5)

操纵杆 A、B 位置仅使推土铲处于右、左倾斜位置。推土铲上升和下降位置上, 都可进行推土铲倾斜操作。但当推土铲处于最高和最低位置时, 则不能进行倾斜操作。倾斜操作时, 若倾斜油缸处于行程末端, 应及时将活塞杆退回。

1 . Blade control lever position (Fig 2-5)

- (1) RAISE (Fig 2-5) (2) HOLD The blade remains stopped and held position
- (3) LOWER (Fig 2-5a) (4) FLOAT The blade can move freely according to external force such as ierking motion on the rough road , When the lever is released while in position4 , the blade remains stayed in FLOAT

A . Right tilt (Fig 2-5) B Left tilt (Fig 2-5)

The control lever position A and B are possible only with blade RIGHT or LEFT tilting , Blade can be tilted at Raise and LOWER POSITION , Do not operate lever when blade is at top or bottom position , when operating for tilt , the position rod should be returned quickly at the end of tilt eylinder stroke。



图 2-5(Fig.2-5)



图 2-5a(Fig.2-5a)

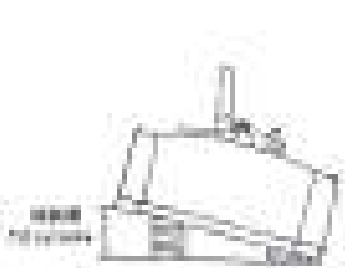


图 2-5b(Fig.2-5b)

2 . 推土铲倾斜量调整

通过操纵杆的操纵, 推土铲倾斜量可达到 560 毫米。若需进一步增加倾斜量时, 需改变推土铲与连杆连接的处于左面支撑 1 的长度, 经调整后左右倾斜量最大可达 1000 毫米。

调整方法

用调整杆转动支撑, 若接头之间的距离增长, 则

左倾斜量 减少 右倾斜量 增加

若接头之间的距离缩短, 则

左倾斜量 增加 右倾斜量 减少

接头间的距离的标准长度 1388 毫米。为此调整支撑时只能使倾斜量调整在 1000 毫米的范围内。若超过此范围, 各部杆件会发生干扰。做以上调整时要在推土铲离开地面状态下方可进行。

2 . Adjustment of tilt angle

Tilting up to about 560mm is possible by simply operating the blade control lever, but if required , further tilting up to 1000mm is also possible by changing the length of left brace .

The adjustment procedure as shown in figure

If distance between joints lengthened by turning the brace using adjustment rod :

Left tilting ——Decrease Right tilting ——Increase

If distance is shortened :

Left tilting——Increase Right tilting——Decrease

The length of brace L is normally 1388mm and the blade can be tilted within a range of 1000mm , Do not attempt to tilt the blade over this range to prevent arising of an undue condition。

When turning brace by using the adjustment rod , keep blade off the ground

图 2-6 (Fig.2-6)

图 2-7 (Fig.2-7)

3 . 球接部补偿调整

推土铲球接部有七处，须进行补偿调整，保证轴向间隙在 1 毫米之内（如图 2-6 箭头所示方向）。调整方法如下：（图 2-7）

- (1) 拧松螺栓先取下垫片①，然后将螺栓②紧固，使球接部无间隙；
- (2) 测量间隙 A 大小，然后松开螺栓②；
- (3) 把垫片①的厚度调整到轴向游隙在 1 毫米以内；
- (4) 调整以后，必须紧固全部螺栓。螺栓紧固程度要保证球接部能灵活转动。

3 . Ball joint adjustment

There are 7points of ball joint on the blade , when carries out shim adjustment , be sure that the ball joint play in the axial direction (shown by the allow Fig 2-6) no exceed 1mm , Adjusting as following (Fig 2-7)

- (1)Remove shim 1and tighten bolts 2 to eliminate the ball joint play。
- (2)Measure clearance (A) and remove bolts2
- (3)Adjusting thee axial play within 1mm by installing shim thickness。
- (4)Confirm that ball joint cab move smoothly after adjusting paly and tightening bolts。

2 . 7 寒冷期作业 Cold weather operation

1 . 寒冷期作业前的准备

当气温变低时，发动机起动就比较困难，冷却水容易产生冻结等现象，因此要在冷却水中添加防冻液，气温在 0℃以下时，根据说明书添加防冻液。

防冻液使用时，先将冷却水全部放空，清洗内部，除去污垢等，检查散热器、水泵、送水软管等处是否泄漏，然后注入清水（即自来水等软水），按比例加入防冻液。

⚠防冻液是易燃物品，使用时严禁火种！

在运转中要经常注意水温是否在绿色范围内。

蓄电池随着气温下降，蓄电池的功能要下降，充电量要减少，为此先要把充电率提高到 75%以上，并注意保温。

充电率根据温度变化见下表——按测出电解液的比重用下表换算。

另外，当蓄电池需补给蒸馏水时，为了防冻，不要在作业完后补加，应在次日作业开始前进进行补给。

1 . Preparation or low temperature

If the temperature becomes low under 0℃ , it becomes difficult to start the engine and the coolant may freeze , so must be added antifreeze to coolant according to instruction.

Before using antifreeze , drain all coolant and clean inside cooling system , then check the radiator , water pump and water hose for leakage 。 Pour in clean water (city water) and antifreeze per specified mixing rate.

⚠Antifreeze is flammable , so keep it away from any flame.

Always pay attention to the water temperature , whether it is normal green range , during running.

As ambient temperature drops , battery capacity will drop and battery charge also will drop , hereby firstly increase the rate of charge to 75% up and pay attention to heat——retaining.

Measure specific gravity of electrolyte and obtain rate of charge from the following conversion table :

When electrolyte level is low , add distilled water in the morning before work instead of after the day's work , This is to prevent fluid from freezing.

温 度 Temperature	20℃	0℃	-10℃	-20℃
充电率 Charge rate				
100%	1.28	1.29	1.30	1.31
90%	1.26	1.27	1.28	1.29
80%	1.24	1.25	1.26	1.27
75%	1.23	1.24	1.25	1.26

2 . 起动发动机

寒冷期发动机不易起动时，可采用乙醚装置。使用方法步骤如下：（如有的话）

2 . To start engine

If it is difficult to start the engine in cold weather , use the ether device (if equipped) Operate it as following :

把起动开关的钥匙转到起动位置，使发动机起动，同时按下乙醚起动按钮，这时乙醚即喷射出雾状气体，帮助发动机起动，按钮按下时不要超过 2 秒钟，起动后释放起动开关使其自动回到正常运转位置。一次不能起动成功，隔 2 分钟后按上述方法再次操作，起动后当发动机速度减慢将要停止时，请用乙醚喷雾，在发动机的转速低于 1000 转/分时，可使用乙醚辅助起动，当发动机运转时，绝对不要进行上述操作。对发动机喷入过量的乙醚，会引起异常爆炸，所以严禁使用过多乙醚。

使用乙醚时要注意以下几项：

- ① 严禁接近火种；
- ② 使用乙醚气体时不能碰到人体。万一碰到时，请速用水冲洗；
- ③ 用完以后的乙醚筒，把顶端的阀芯关闭，消除内压，使内部的液状气体全部散发；
- ④ 备用的乙醚筒应保管在车体以外的安全场所。对大量存放的场合，要遵守有关的存放规定。

Firstly key-switch go to start station , and then open the starting switch to start engine ; at the same time press the press-button of the ether device , that spray ether as soon as to assist engine in starting , But press the press-button no exceeds 2 seconds , After starting return the starting key to on position (auto-return) , If engine , will no start , repeat above starting procedure after about 2 minutes , When engine is running with reduced speed after starting and will stopping , spray the ether , In this time operate the engine speed no exceed 1000 rpm , In case of normal running never carry out above spraying ether , Avoid overfed ether into engine to prevent from abnormal explosion。

When using the ether , should be given attention to following :

- ① Never place fire or fire close to ether vessel。
- ② Avoid contact with the skin , If contacted , it should be washed with large quantities of water。
- ④
- ③ Lose off the valve core on the of ether vessel after operating , that will give out inside vessel all liquid gas and dispel inner pressure。
- ④ Place the spare ether vessel on the safety location outside machine body 。 In case of a mass storage must be accorded with related rules of storage。

3 . 每日作业完毕

- (1) 要清洗粘在车体上的泥和水，把车子停在坚固、干燥的水泥地上，如没有，可在地面上铺上木板，将车辆停在木板上，是为了防止附着物结冻或行走装置冻牢在地面上影响次日推土机不能开动。
- (2) 要把液压缸的活塞杆表面的水擦干净，不然杆上的泥和冻结的水珠一起进入密封环内，会使密封环损坏。
- (3) 打开排水阀门，把燃料系统积压的水排泄掉，以防夜间冻结；
- (4) 在冷却水里，如没有防冻液，要将散热器下部放水阀和汽缸部件右侧后面的阀门打开，将冷却水放尽，以防夜间冻结。但要注意，如水里含有防蚀剂，此水不要抛弃，次日再向水箱里注水时，此冷却水仍可使用。

- (5) 若冷却水全部换新的，则防蚀装置中的防蚀剂也要同时换新的，要放入三支 DCA-4L 防蚀剂；
- (6) 为防结冻，夜间要把防腐蚀罐卸下，用棉丝等保温，次日再装上。卸下后应封好管扣。
- (7) 蓄电池在低温中，其机能将显著下降，所以要注意保温，把它盖好或搬到室内暖和地方，次日再装上。

3 . Cautions after completion of every day work

(1) Mud and water on the machine body should be completely removed , Park the machine on concrete or bard ground , If this is impossible , park the machine on wooden boards , This will prevent the accessories from freezing or the track and undercarriage from freezing to the ground thereby preventing machine movement the next morning。

(2) The water drops collected on the surface of hydraulic cylinder piston rods must be fully wiped off because if water is frozen to the rod when the cylinder is utilized , the cylinder oil seals may be damaged。

(3) Drain water colleted In fuel system so that such water may be frozen at night。

(4) When using the cooling water without antifreeze , should be loosen drain valve at the bottom of radiator and drain valve at the right side of cylinder block Drain off the cooling water to prevent radiator from freezing at night , If the water is mixed with antifreeze , do not throw it away , collect drained coolant for next using。

(5) When replacing all cooling water with new water , at same time replace inhibitor with new one in corrosion resistor bottle , add three pieces of DCA-4L inhibitor。

(6) Remove the corrosion resistor bottle at and wrap it with cotton waste to prevent from freezing Seal the nozzle and pipe joint after removing , Remount the bottle next day 。

(7) As battery capacity drops at low ambient temperature , cover the battery or remove from the machine to be kept warm at night。

4 . 寒冷期过后

- (1) 随季节变化，天气暖和时，要把各装置内的润滑油都换成规定粘度的油。
- (2) 把防冻液全部排泄，清洗冷却系统后放入干净的软水，并要新加防蚀剂。
- (3) 把乙醚筒卸下来，保管在专门场所，且放在阴暗处。

4 . After cold weather

(1) When weather becomes warm , replace lubricating oil for various units with the ones specified for warm-weather use 。

(2) Drain the cooling system completely , then clean out the inside of the cooling system thoroughly , fill with fresh water and add new inhibitor。

(3) Remove the ether vessel and put it on dark or special place in storage。

第三章 推土作业

CHAPTER3 BULLDOZER'S WORK

推土机在作业时，要有步骤，不可急躁、轻率地进行操作；要掌握安全施工技术；应始终保持思想集中，这样才能安全运转防止机械损坏以及防止重大人身事故发生。

Carry on bulldozer's work step by step, guard against impetuosity and careless operation. Master the techniques of safety work and always focus self attention on operation. That is necessary for normal running to prevent from damage to machine and seriously personal injury.

3.1 一般作业 General operation

1. 在不平整场地上作业时，尽量低速行驶；避免急剧变换速度；不可高速转向。特别在岩石、粘土场地作业时，如高速或急转向，会使履齿磨损加快，有可能造成履带脱轨。
2. 驾驶时，不允许从大石块，倒下的树木和其它障碍物上开过。应利用作业装置，排除后再通过。在无法排除障碍物而必须越行时，应以低速通过，减小振动，保护车辆。
3. 在水中作业，首先检查水的深浅、流水速度以及水下土质不得进入越过限度水中进行作业。在水中泥泞地作业前，应将各放泄塞紧固。水深的允许值，应以托轮全部露出为准。如超过此深度就不能进行作业。

■ 注意：冷却风扇求能着水。

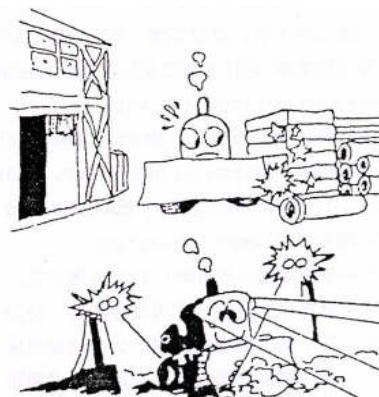
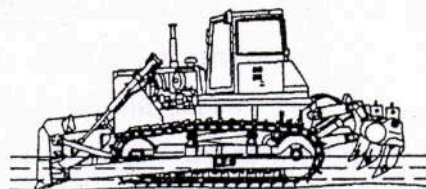
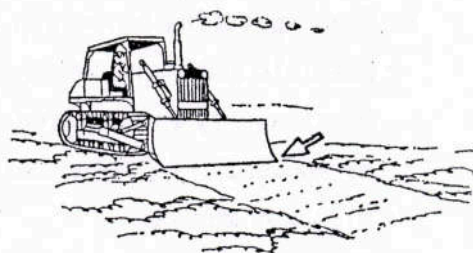
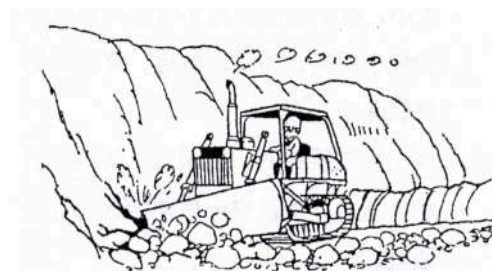
在水中泥泞地作业完毕后，要清除各部位泥土。对发动机的油底壳、液力变矩器壳、转向离合器箱、终传动箱、液压装置行走部分等要进行油位情况及是否有漏油，渗水等情况检查，必要时要在油箱中进行排水等检查。

- 4、通过狭窄场地时，要注意通道的宽度与高度，必要时须配备指挥人员。

- 5、在夜间作业时，要布置恰当的照明设备。如设置照明有困难，必须使用本机前车灯，作业灯，保证安全作业。

- 6、在有雾、烟等视野不清的场地作业时应特别注意，如影响安全操作，应停止工作。

- 7、在电线附近作业时，要尽可能将电线移设他地。若不能移设，应在电线周围设置障碍物，并在电线上加绝缘防护装置。为防止触电，根据输送电



压大小，在下表中规定了车辆离电源的最小距离。为防止触电，驾驶员要穿胶鞋或皮鞋。

8、推土机过桥梁时，应预先了解桥梁的承载能力，确认安全后才能低速行驶通过。

9、推土机越过铁路时，应垂直于铁路，并以低速行驶，禁止在铁路上转向。

1、When operating on uneven ground, travel at as a low speed as possible and avoid sudden shifts speed and changes in direction, Particularly in rock area or clay ground if steering is speedily or suddenly, it may cause shoe shank to wear quickly and track will not run off.

2、Wherever possible, avoid traveling large rocks, fallen trees and other such obstacles. Either use the working equipment to remove them, or travel round them. When it is possible to avoid traveling over them, reduce speed in to a low position, that will reduce shock to protect machine.

3、When operating in water, first check the bed soil condition and the depth and flow speed of water, then proceed, taking care not to go beyond the permitted depth.

Before operating in water or in muddy areas, tight various drain plugs. Do not operate machine in such a depth that carrier rollers are submerged.

Further, be careful so that the cooling fan will not come in contact with the water.

Upon completion of work in muddy water, clean the various location and check the engine oil pan, torque converter housing, steering clutch case, final drive case, hydraulic unit and undercarriage for oil level and for leakage of oil and water permeance. If necessary, carry out the water drain inspection in oil tank.

4、When passing through a narrow space, be careful of the side and overhead clearance. If necessary, have someone outside the machine call out instructions.

5、When operating at night, be sure to arrange an adequate lighting system. In case of shortage of lighting system, for the sake of safety should be operated with front lamp and working lamp.

6、When operating in fog, mist or smoke where visibility is bad, be especially careful to confirm when visibility drops below safety level, stop work.

7、When operating near electric wire, it should be translated to other place as possible as, or arranged the obstacle around the wire, and add the isolated protector over wire to prevent from contact electricity.

In the light of voltage value have specified min distance from machine to power source as following:

Wear the rubbers or leather shoes to prevent from contact electricity.

8、Check the load limits of bridges before crossing. Confirm that the bridge is safety, then pass through at low speed.

9、When crossing the railway, travel at low speed in vertical direction and inhibit steering on the railway.

输送电压（绝缘子数） Transmission pressure(quantity of isolator)	最小离开距离（米） Min. distance(m)
6.6KV（配电线） 6.6KV（only wire）	3
33.0KV（1~3个） 33.0KV（1~3）	4
66.0KV（5~8个） 66.0KV（5~8）	5
154.0KV（10~18个） 154.0KV（10~18）	8
275.0KV（16~30个） 275.0KV（16~30）	10

3.2 悬崖、路边作业

Operation at the edge of a cliff on the shoulder of a road

1、在危险地段作业时，不要接近悬崖、路基边操作。当按前次留下的履带轨迹行驶时，若发现土质有少量下沉，应立即倒退，进一步对作业地段土质进行调查。



- 1、When operating on dangerous areas, do not approach the edge of the cliff on road shoulder by mistake. When traveling along the pervious track, if the soil has sunk in the few, travel reverse as soon as, and study the soil further.



3.3 坡道上作业

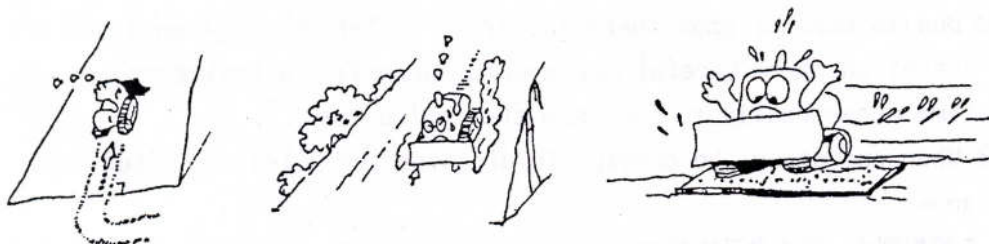
Operation on slope

- 1、在坡道上行驶，应与斜坡平行的方向上坡和下坡，若斜向行驶，容易发生翻车或打滑。
- 2、在上坡与下坡，根据坡道的斜度，应预先选用合适的速度，严禁在坡道上换挡变速。
- 3、在下陡坡或长坡时必须低速行驶，利用发动机作制动，严禁溜坡，当下坡车速仍有加快趋势时，应把制动踏板踏下。此时驾驶员须特别注意控制踏下制动踏板的速度快慢和行程大小，并可降下推土铲，以切入土内来进一步减速，让推土铲触及地面增加阻力下行。这是由于车辆虽以低档下长坡，但因下坡有加速运动趋势，所以行驶速度将会超过该档在平地行驶时的最大速度。因此下坡行驶须特别注意，以防发生事故。
- 4、在坡道上禁止用制动踏板进行急刹车。

5、斜坡驾驶，应尽可能避免转向。尤其是在松软地、粘土地斜坡上转向，易产生滑移而发生翻车，须特别注意，若必须转向时，应选择硬质或缓坡地带。

6、在道上行驶，碰到铁板要避开。碰到山林中的倒树或在堆放的枝叶上行驶，要特别注意，防止车辆产生滑移而造成事故。

7、在斜坡上，发生发动机熄火时，应首先放下推土铲，将车停稳，再把变速杆置于空档，然后再重新起发动机。



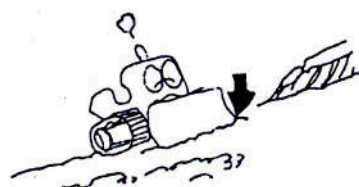
- 1、When traveling on a slope, always travel directly up or down it. Never travel horizontally across the slope, as this may cause the machine to roll over or slip sideways.
- 2、Before going up or down a slope, select a travel speed most suited to the slope. Do not change gear on the slope.
- 3、When going down a slope, travel at low speed and use the engine as a brake. If the machine speed yet increase, depress the brake pedal. At same time can also lower the blade into ground in aid of further red reducing speed.
- 4、Never use the brake to stop suddenly on slope.
- 5、As far as possible, avoid turning the machine on a slope. It may cause the machine to roll over or slip sideways. If this is unavoidable, select the hard ground or slight slope for turning.
- 6、When traveling on the way, always travel round steel plate and fallen trees. Be especially careful; when traveling over piled branches or leaves. The slip may cause the machine to make an accident.
- 7、When traveling on a slope, if the engine abruptly stopped, first lower the blade and park machine well, then place the gear shift lever to “Neutral” and start the engine again.

3.4 除雪作业 Operation of cleaning snow

1、在雪地进行除雪作业时，要注意地面倾斜，防止横滑，要特别注意选择合适的作业速度。

2、由于雪的质量不同，会使负荷变化很大，为此作业时，在注意车辆打滑的同时，要随时增减发动机负荷。

3、在作业中要注意埋在雪中的堆物等。



- 1、When operating in snow or cleaning snow, be careful to firm whether the ground is on grade and be careful to select proper operating speed to prevent from horizontal slipping.
- 2、Due to mass of snow there was great difference between loads of operation, so be careful to prevent machine from slipping and at same time occasionally to increase the engine load.
- 3、When operating, be careful to discover the piles of matter under snow.

3.5 挖掘硬土、冻土及开沟作业 Cutting into hard or frozen ground ditching

1、在硬土或冻土作业时，应使用松土器。

1、 Use the ripper when working on the hard or frozen ground.

3.6 平地作业 Leveling

1、对表面的积土进行平整作业时，先平整高差较大的地方，然后再在整个区域内逐刀顺序推平。作业速度要以低速进行，对最后一道工序，可将推土铲处于浮动位置，并可用低速后退来平整地面。对于岩石和多石地，不能采用后退平整地面，否则会损坏推土铲本体。

1、 When giving a smooth finish to a surface that has been excavated or

made from piled soil, push a full blade of soil and drive forward

while operating the blade up and down in small movements. Finally

set the blade at FLOAT, and drive at low speed in reverse, dragging the blade across the surface.

When doing this, to protect the blade, be careful not to drive over stones or rocks.

3.7 推土作业 Dozing

1、推土、运土、掘削沙土作业，一般在 70 米以内较适宜。若超出这一距离，则使用铲运机比较经济。对斜坡的掘削，一般应从上而下进行，这样可提高工作效率。

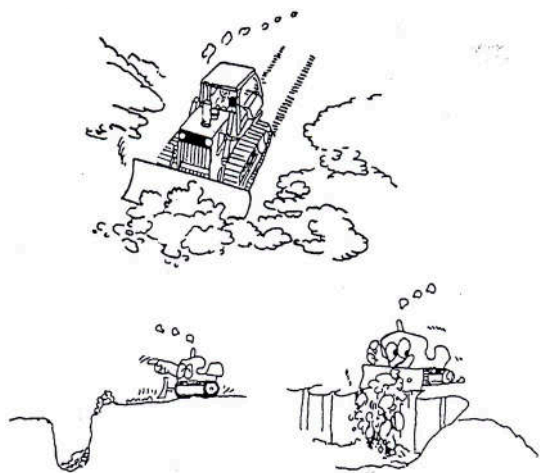
2、在往悬崖下进行推土作业时，应悬崖旁保留一次推土量，用下次推的土将上一次保留的土推到悬崖下面去。推土铲不要接近悬崖尾角以防发生意外。

3、在悬崖正面卸土或车辆爬坡到坡顶的瞬时，必须缓慢踏下减速踏板在降低车速同时，将变速杆推入“空档”位置，以防由于负荷突然减轻，车辆自动加速而产生事故。

1、 In general case a bulldozer properly dozes, digs and transports sand or earth within 70m distance. If the distance exceeds his scope, be economical to use the scraper. Slope excavation can always be most effectively carried out by proceeding from the top downward.

effectively carried out by proceeding from the top downward.

2、 When dumping soil over a cliff, dump the first excavated soil without dumping it over and use each succeeding excavated soil to push previous excavated soil over. Be sure not to approach the edge by mistake.



3、At the instant when the soil is dumped over the cliff or when the machine passes the summit of a slope, press the decelerator pedal to reduce the speed and push the shift lever to “Neutral” to prevent machine from automatically increasing speed by unloading.

3.8 伐木、拔根作业

1、若是直径在 10~30 厘米左右的树木，可将推土铲抬高，推 2~3 次即倒；然后用推土板刃角掘根部，且边掘边推，掘起根部后不要以高速给以冲击。

1、A tree, 10 to 30 cm in diameter, can be felled by giving 2 or 3 pushes with the blade off the blade to cut into the earth. Break the roots and push them forward while digging.

Never allow the machine to butt against or give strong impact to a tree by operating at high speeds.



3.9 提高行走装置寿命的施工技术 Tips for longer undercarriage life

行走装置的寿命，随施工技术的高低，有着明显的差别，因此要注意以下几点：

- 1、要使用适合土质的履带板。
- 2、运转中不能使履带打滑，若发现开始打滑，应立即减轻负荷。
- 3、应尽量避免急剧地起动、加速、停止及不必要的高速动转和急转弯。
- 4、在行驶时要尽量保持直线作业，在作业时不能总往一个方向转弯，并在转弯时，尽量使转弯半径大些。
- 5、在作业路上，要尽量排除大石块或其它障碍物。因为在松土作业及推土作业中，如碰到坚固的障碍物，会产生引导轮或链轮抬起的现象，因此要避免这种不利作业。
- 6、在推土掘削中，若地面上有左右倾斜地段时，不能始终在倾斜地段掘削，应退到水平地段，再继续掘削。

Undercarriage life greatly varies depending on operation method,

Keep the following points in mind:

- 1、Select the track shoe that best suit the type of soil to be encountered in service.
- 2、Do not allow shoe slipping to occur during operation. If shoe slipping occurs, reduce load until slipping stops.
- 3、Avoid sudden starts, acceleration or stops unnecessarily high speeds and sharp turns.
- 4、Always operate machine in a straight line whenever possible. When making turns, be careful not to allow the machine to stay to one side, so operation in both turning directions can be done

properly. Make turns with the largest possible radius.

5、Prior to operation, clear boulders and obstacles to prevent machine from riding over them while operating. When idlers or sprockets are lifted due to obstacles during dozing and ripping, do not attempt to force the machine to perform.

6、When ground inclines to left or right during digging operation, do not continue to dig with machine. Move machine back to level ground and start to dig again.

第 四 章 长期停车中的保管

CHAPTER 4 STORAGE FOR A LONG PERIOD OF TIME

推土机长期停用时，须按以下规定执行：

To place the machine in storage for an extended period of time, the following measures must be taken:

4.1 停车前的准备

1、清洗各个部位，然后将整机在干燥的室内，不应放在室外。在不得已的情况下，若放在室外时，要选平坦的地面铺上木板。停放后要用罩布盖好。

2、进行给油、涂脂、换油等保养工作。

3、液压缸的活塞杆、引导轮的调整杆等的露出部分，要充分涂上黄油。

4、对蓄电池，要把“负极”拆下，把蓄电池盖好，或从车上搬下来另外保管。

5、气温在 0°C 以下时，若冷水不排掉，要在冷却水中添加防冻液。

★ 6、将燃油控制杆置于怠速位置，各操纵杆置于自然位置，并用安全杆锁紧，百制动踏板不要锁紧。

4.1 Before storage

1、After every part is washed and dried, the machine shall be housed in a dry building. Never leave it outdoors. In case it is indispensable to leave it outdoors, lay wood plates on the ground, and park the machine on the wood plates and cover it with canvas etc.

2、Completely fill fuel tank, lubricate and change oil before storage.

3、Apply a thin coat of grease to metal surface(hydraulic piston rods and front idler adjusting rods)

4、As to batteries, remove the negative terminals and cover them, or remove them from the machine and store separately.

5、When the ambient temperature is anticipated to drop below 0°C, always add antifreeze in the cooling water.

★ 6、Set fuel control lever to low idling position, set other control lever to neutral and lock them with safety lever, and brake pedal shall not be locked.

4.2 停车中的保管

1、在停车期，应每月一次，开启发动机，作短距离行驶，使各零件的润滑处建立起新的油膜，预防零件生锈。

2、操作工作装置时，要把涂在液压缸活塞杆上的黄油除去，操作后再涂上黄油。

3、蓄电池要充电，充电时必须关闭发动机。

4.2 During storage

1、Operate the engine and move the machine for a short distance once a month so that new oil film will be coated over movable parts and component surface to prevent parts from rust.

2、Before operating the working equipment, wipe off the grease on the hydraulic piston rod ,and coat grease again after operating.

3、When charging the battery, the engine must be switched off.

4.3 停车后注意

经长期停车后，若在停车期每月末进行一次防锈运转时，在使用前，要作如下处理：

1、把油盘、各箱体的排泄塞打开，排了混入的水。

2、卸下气缸盖，给气阀和摇臂杆充分加油，了解气阀的工作状态，不正常时给予调整。

3、卸下增压器进油口的油阀法兰，加入 0.5~1 升的发动机油，然后将法兰处于不紧固状态；将发动机处于柴油无喷射的减压状态，用起动机转动发动机；当有油从法兰盖处流出，即可将法兰紧固，然后方可起动发动机。

4、发动机起动后，要作预热动转，使各部充分磨合。

4.3 After storage

After storage(When the rust-preventive operation once a month is not made), you shall apply the following treatment before operation:

- 1、Remove the drain plugs on oil pan and other cases and drain mixed water.
- 2、Remove the rocker housing cover and lubricate sufficiently valves and rocker arms. Inspect the valve operation and adjust when valve is abnormal.
- 3、Remove the oil pipe flange on the turbo-charge oil inlet, fill with 0.5~1L engine oil, and leave the flange lightly loosened. Then, rotate the engine by the starting motor without fuel injection and compression release so that the discharge of oil is confirmed.
- 4、After the engine is started, operate it until it is warmed up completely.

第五章 维护保养

CHAPTER 5 MAINTAINING

正确及时地进行技术保养，即对机械要经常地、定期地进行检查、清洗、润滑、调整、紧固等技术保养工作，这样才能提高生产效率、减少磨损和避免发生意外故障，同时也提高了推土机工作的经济性，延长了推土机的使用寿命，降低了修理费用。

本机规定的保养小时时间，由仪表盘上的“计时表”记载。

在作业环境条件较差时，应比规定的保养时间提前进行。

Proper and timely maintenance, such as regularly and periodic checking cleaning, lubricating, adjusting and tightening etc, assure the higher efficiency of operation, reduce wear and trouble-free operation. It also will get the economy of machine's work, long machine life and reduce service cost.

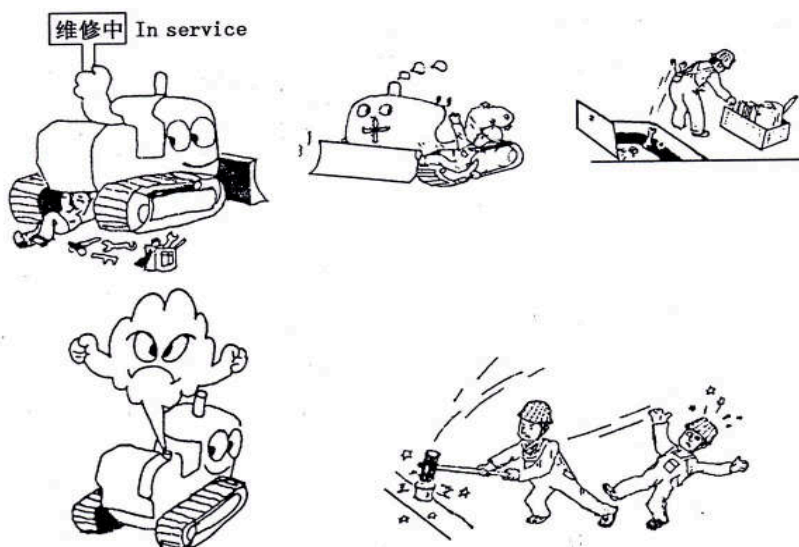
All hourly figures given in the descriptions are based on service meter readings.

Under tough job site or operating conditions, it is necessary to somewhat shorten the maintenance intervals stated in this manual.

⚠5.1 保养时注意事项 Precautions for maintenance

- 1、在车辆下面进行保养时，应在驾驶座上挂出标记，必要时可在车辆周围做上标记。
- 2、根据保养内容，需要把推土铲提升时，必须在铲下进行支撑以防落下。
- 3、当使用推土铲将车体抬起时，要把操纵杆锁紧，同时在履带下要填实，以防整机落下。
- 4、对车辆打扫、加油、检查风扇皮带涨紧度以及对动转部分和其附近的各部分进行检查时，必须停止发动机的运势。
- 5、对电池作保养、检查与充电时，要关闭发动机，同时要卸下电池盖头。当电池和充电器接头拆卸时，应将充电器开关关闭。
- 6、在保养时严禁明火接近，包括吸烟、电火花等到火种。
- 7、打开齿轮箱等时，应注意不要铁落东西。
- 8、对液压系统进行给油、排油与其它检查保养时，要先进行降压。其方法：把推土机铲刀下降至地面，关闭发动机，把各操纵杆操作二三次后，才能慢慢松开各盖子。
- 9、在调整油压时，要采用专用调整工具，不然在进行难度较大的保养时，会发生事故。
- 10、在检查保养中，除必要人员外，其他人员不要接近。
- 11、在加油部位，油标表面及所用加油容器都要保持清洁；油、黄油等要使用清洁品；在检查更换油类时，应在灰法尘较少的环境中进行，这一切都为防止灰尘、污物混入。
- 12、在滤油器保养后，应将发动机以中速运转 5~10 分钟，排除油路内的空气。
- 13、加注润滑油脂的量要适宜，不能过多或过少。

1、When
out



carrying
the

maintenance under the machine, hang a caution sign in the operator's compartment. If necessary, make the sign round the machine.

- 2、If lift the blade for maintenance, must be supported the blade to prevent from falling down.
- 3、If raise the machine body by lowering blade, lock the control lever and at the same time apply a block to the track so as to prevent fall of the machine.
- 4、Stop the engine when carrying out the cleaning, oiling, adjusting fan belt tension and checking running part or other nearly part.
- 5、When inspecting, servicing or charging a battery, be sure to stop the engine
And remove all battery plugs. When disconnecting cables from the battery to charger, be sure to switch off the charger.
- 6、While servicing, do not bring fire, sparks or smoking cigarette near the battery.
- 7、When open a gear case, do not drop anything in the case.
- 8、When feeding or draining the oil or carrying out inspection and maintenance, release the pressure first. The procedure for releasing the hydraulic pressure is as follows: lower the blade to the ground, and stop the engine, move the control levers to each position two or three times and then slowly loosen the oil filler cap.
- 9、When adjusting the oil pressure, be sure to use the special tool, if not, it may cause a trouble in case of difficult service.
- 10、During maintenance do not allow any unauthorized person to stand near the machine.
- 11、Be sure to keep the oil filler, oil level gauge and containers clean . Always use pure oil or grease.
When checking or charging or changing the oil, do it in a place free of dust, and prevent any dirt from getting into the oil.
- 12、After maintenance of filter run the engine with middle speed for 5-10min, bleed the air from the circuit.
- 13、Add the proper amount of lubrication, never feed excessive or less than.

5.2 技术保养一览表 Maintenance table

(一) 每日保养一览表 Every day service

保养项目 Item	全面检查 General check
检查漏油、漏水 Leakage of oil and water	○
各冰螺栓、螺母松弛检查 Tightness of bolts and nuts	○
电线短路断线接触不良 Short circuit or poor contact in electrical wiring	○
检查补充冷却水量 Check and add coolant	○
检查燃油量 Check fuel quantity	○
检查发动机油底壳油量 Check engine oil pan oil quantity	○
检查变矩器、变速箱、转向离合器、终传动箱油量 Check torque converter、transmission、steering clutch and final drive case oil quantity	○
排除燃油箱水及沉淀物 Obviate fuel tank(drain water and sediment)	○
检查转向杆行程 Check steering control level travel	○
检查制动踏板行程 Check brake pedal travel	○

(二) 250、500 小时保养一览表 Every 250、500 hours service

保养时间 Time	250 小时以后
-----------	----------

保养项目 Item	Every 250 hours	
加润滑脂 (黄油) Add lubricating(grease)	○	
冷却风扇转轴 (1 处) Fan shaft (1 point)	○	
涨紧轮轴 (1 处) Tension pulley shaft (1 point)	○	
撑杆 (1 处) Brace screw (1 point)	○	
球座 (2 处) Brace ball joint (2 point)	○	
油缸球铰 (2 处) Cylinder ball joint (2 point)	○	
油缸支架 (4 处) Cylinder support bracket (4 point)	○	
油缸支架横梁 (4 处) Cylinder support bracket beam (4 point)	○	
倾斜油缸球铰 (1 处) Tilt cylinder ball joint (4 point)	○	
斜支架球铰 (2 处) Oblique arm ball joint (2 point)	○	
支架球铰 (3 处) Arm ball joint (3 point)	○	
燃油滤清器更换 Replace fuel filter	○	
机油滤清器更换 Replace oil filter	○	
保养时间 Time	250 小时以后 Every 250 hours	500 小时以后 Every 500 hours
保养项目 Item		

检查补充油量 Check and add fuel quantity		
终传动油箱 Final drive case	○	
工作油箱 Hydraulic tank	○	
交流发电机传动皮带涨紧度检查、调整 Check and adjust alternator drive belt tension	○	
变矩器变速箱转向滤油器无件清洗更换 Replace element(torque converter, transmission case, steering clutch oil filter)	○	
履带螺栓松弛、检查、紧固 Check and tight track shoes bolt	○	
电液组液面检查 Check level of battery electrolyte	○	
通气孔清洗 Clean breathers		○
终传动箱 Final drive case		○
转向离合器箱 Steering clutch case		○
乙醚启动装置检查 Check ether starting device		○
防腐剂储存器的更换 Replace inhibitor bottle		○

(三) 1000 小时保养一览表 Every 1000 hours service

保养项目 Item	保养时间 Time 1000 小时以后 Every 1000 hours
加润滑脂 (黄油) Lubricating (grease)	
台车斜撑 (2 处) Diagonal brace (2point)	○
万向接头 (2 处) Universal joint (2 point)	○
液力变矩器主轴 (1 处) Torque converter coupling (1 point)	○
涨紧轮 (2 处) Recoil gear (2 point)	○
散热器检查与清洁 Radiator (check and clean)	○
变矩器、变速箱、转向离合器、伞齿轮箱油的更换 Torque converter, transmission, steering clutch and bevel gear cases change oil	○
变矩器、工作油箱滤油器滤芯的清洁 Torque converter, hydraulic tank and filter (clean strainer)	○
工作油箱油的更换及滤油器滤芯的更换 Hydraulic tank(change oil) and filter element(replace)	○
终传动油箱油的更换 Final drive case (change oil)	○
行走装置组件油量检查、补充 Undercarriage components(cheek lubricating condition)	○

(四) 2000 小时保养一览表 Every 2000 hours service

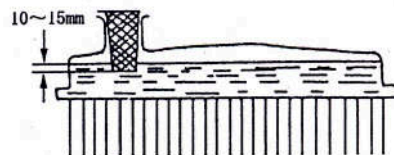
保养时间 Time	2000 小时以后 Every 2000 hours
保养项目 Item	
加润滑脂 (黄油) Lubricating (grease)	
平衡梁转轴 (1 处) Equalizer bar shaft (1 point)	O
减速踏板转轴 (2 处) Decelerator pedal level shaft (2 point)	O
变速杆操纵转轴 (3 处) Gear shift lever shaft (3point)	O
制动踏板连杆机构转轴 (6 处) Brake pedal lever shaft (6 point)	O
燃油操纵杆连杆机构转轴 (4 处) Fuel control lever shaft (4 point)	O
推土铲操纵杆连杆机构转轴 (7 处) Blade control lever shaft (7point)	O

(五) 不定期保养项目 When required

更换冷却水 Change coolant	每处二次 (春、秋) 或 1000 小时以后 2 time per year (Spring and Autumn) or after 1000 hours service
空滤器检查清洁更换 Air filter(check, clean and replace)	不定期保养 When required
履带张力检查调整 Track tension(check adjust)	随时调整 Occasionally

5.3 每日保养 Every day's service

- 1、漏油、漏水检查。车辆转动后，要检查是否有漏水、漏油的痕迹，特别是高压软管的接头、液压缸、浮动油封及其散热器等部位；若发现有渗漏时，应分析其渗漏原因，给以及时维修。
- 2、对各部件的螺栓和螺母的紧固程度，要进行检查；若有松动，要紧固，特别是空气滤清器、清音器、履带支重轮支架及履带板等部位螺栓。
- 3、对电气部分进行检查，各线路是否正常。
- 4、冷却水量的检查、补给打开加水口盖子，如图 5-1 所示，是否能在过滤器底部看得见冷却水，如看不



见，

即从加水口加水，加水至如图位置；加水时要关闭发

动机。加水停止后，

要使发动机急速动转 5 分钟左右，图 5-1 (Fig.5-1)

然后再次检查水量，如不符图示要求，再次加水。若发现加水量比平时增量较大，则应检查冷却系统是否漏水。在水温高时，不要立即打开盖子，以防热水喷出果缓慢地找开盖子，让水中压力降低后再打开。

5、检查燃油

如图 5-2。当作业结束后，打开帽盖，用油尺 G 检查油量，从加油口处加油，要确保燃油加满。

图 5-

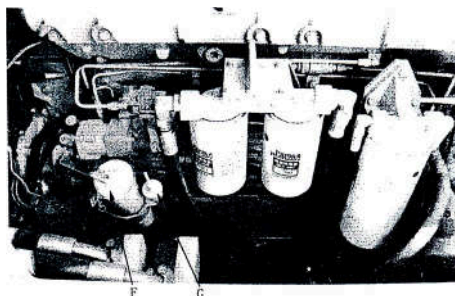
2 (Fig.5-2)

6、发动机油底壳油量检查

如图 5-3。用油尺 G 检查油量，如油量不足，从加油口 F 补给。在发动机停止状态中检查油量时，油尺要使用刻有“ENGINE STOPPED”的一面。

若在发动机怠速动转状态中检查油量时，首先要使发动机油压表水温表的指针指向绿色范围，然后使用刻有“ENGINE IDLTNG”一面的油尺来检查油量。

图 5-3 (Fig.5-3)



ENGINE STOPPED——发动机停止达 ENGINE IDLING——发动机怠速运转

- 1、Check for oil and water leak particularly at high pressure hose joints and hydraulic cylinder; at float seal and radiator, After running the machine, check for any leakage of oil and coolant, if appears any leakage of oil and coolant, immediately repair it and get analysis for reason.
- 2、Check tightness of all bolts and nuts particularly at air cleaner, muffler, track roller bracket and track, shoes ate, If any part is loosen, light it.
- 3、Check electrical wiring for abnormal condition.
- 4、Check coolant and supply (Fig.5-1)

Remove radiator cap and check that coolant is above the bottom of strainer as shown in Fig. If necessary, add water, To refill the radiator. First stop the engine and pour in water. Then, start the engine, cheek the water level again after a 5 minutes idling and add water if necessary.

If more water than normal is required to fill up to the specified level. coolant is considered to be leaking somewhere. If the water temperature is high, do not remove the cap. This is because of the possibility of scalding water sporting out. When removing cap, turn cap slowly to allow pressure to be relieved.

5、Check fuel level(Fig.5-2)

After each operation, remove cup. Pull out fuel dipstick G and check. Fuel level.

Fill up the fuel tank through the filler F. A clogged cap breather bole may stop the fuel flow to the engine. Check it from time to time and clean.

6、Check oil level in engine oil pan (See Fig.5-3)

Use dipstick G to check the oil level. If necessary, add oil at oil filler F. When checking the oil level with engine idling may be allowed, if engine oil pressure gauge and water temperature gauge show green range. Read the dipstick on its reverse side when it is stumped “Engine idling”.

7、转向离合器箱体内油量检查站

此项检查包括变速箱、变矩器的油量检查，首先卸下右边扶手，如用油尺 G 检查，油量不足时从加油口入规定量的油。

7、Check oil level in steering clutch case

This check includes transmission and torque converter cases. Firstly renege the handle on right side as shown in Fig5-4. Use dipstick.

G to check the oil level. If necessary add oil at oil filler F.

8 . 燃油箱中水和沉淀物的排除 (图 5-4)

把燃油箱底部开关打开，排除积压在底部的沉淀物和水，在排除过程中有油也随之而出。

8 . Drain water and sediment in duel tank (Fig.5-4)

Loosen valve at the bottom of the tank and

图 5-

4 (Fig.5-4)

drain sediment accumulated on the bottom together with mixed water and fuel.

9 . 制动踏板行程检查 (图 5-6)

发动机在怠速运转时，制动踏板标准行程为 150~170 毫米，不在正常范围内，须调整，其方法参照 “各部调整”。

10 . 转向操纵杆并行检查 (图 5-7)

当摩擦片表面磨损后，操纵杆行程就增大，这时必须调整。

操纵杆行程从 0~18.5 毫米时，转向离合器分离。进一步拉动操纵杆，使行程从 18.5~67 毫米，制动器开始制动。制动器完全刹住的行程为 124 ± 10 毫米。

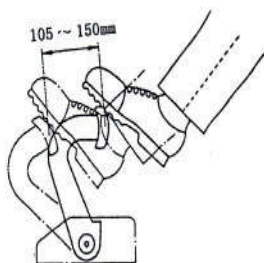
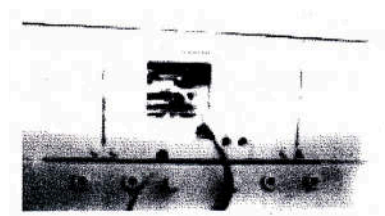
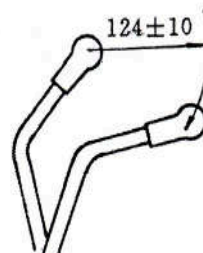


图 5-

图 5-

9 . Check brake pedal travel(Fig.5-6)

The brake pedal stroke with the engine running at low idling speed is 150 to 170mm. If it isn't in the normal range, adjust, referring to the section “Adjustment”.



6 (Fig.5-6)

7 (Fig.5-7)

10. Check steering control lever stroke(Fig.5-7)

When the friction disk wears, the stroke of steering control lever will increase, in that case should be adjusted. When steering lever travels from 0 to 18.5mm, the steering clutch will disengage. Continuously pull the lever, it travels from 18.5 to 67mm. The brakes begin to act. The brake stroke will be completed by traveling 124±10mm.

5.4 每隔 250 小时保养 Every 250 hours service

包括推土机开始运转的最初的 250 小时保养，并和“每日保养”一起进行。

Carry out the maintenance after the first 250 hours together with everyday service.

1. 加润滑脂

按下列图示箭头处加注黄油（图 5-8~图 5-12）

(1) Lubricating Apply grease to the grease fitting shown by arrows.(Fig.5-8~Fig.5-12)

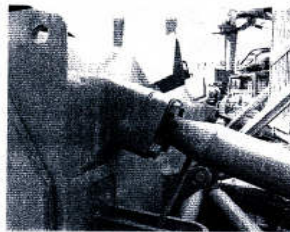


图 5-8 (Fig.5-

8) 图 5-9 (Fig.5-9)

1—冷动风扇转轴 (1 处) 1—Fan shaft (1 point)

2—撑杆 (1 处) 2—Brace (1 point)

3—球座 (1 处) 3—Ball joint (1 point)

10 (

图

11 (Fig.5-11)

4—油缸支架 (4 处) 4—Cylinder support yoke (4 points)

5—倾斜油缸球节 (1 处) 5—Tilt cylinder ball joint (1 point)

图 5-

Fig.5-10)

5-

图 5-12 (Fig.5-12)

6—斜支架球节 (2 处)

6—Arm ball joint (2 points)

7—支架球节 (3 处)

7—Oblique arm ball joint (3 points)

2.油量检查

(1)终传动箱

如图 5-13，打开盖子 G 查看，如油量达不到下孔边缘，则从给油口 F 加油。

(2)液压箱检查

先将推土铲下降，使发动机停止运转，约过 5 分钟以后，按图 5-14，查看油脂示器 G。若油脂示器中的油位不处在油窗的上下线之间，则须项检查应在作业前进行。

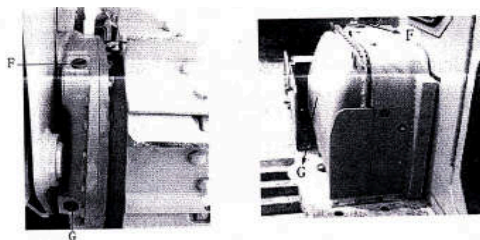


图 5-13 (Fig.5-13)

图 5-14 (Fig.5-14)

2.Check oil level

(1) Final drive case (Fig.5-13)

Remove plug G and when it is found that the oil is not filled nearly to lower edge of plug hole, Add engine oil through the filler F.

(2)Fuel tank (Fig5-14)

Lower the blade to ground and stop the engine. After stopping engine about 5 minutes, check the fuel gauge G as shown in Fig. If the fuel gauge indicate the fuel level lower than low line of gauge,

add fuel through the filler F.

3 . 发电机传动皮带涨紧度检查

如图为正常涨紧度，即用手指约 (6kg) 的力，只能压下约 10 毫米位移量；超过此数据，须进行调整，即将螺栓 1、螺母 2 旋 图 5-15 (Fig.5-15)

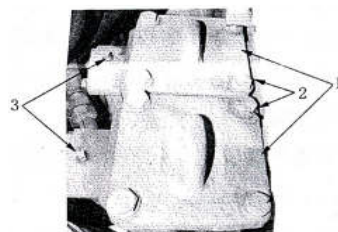
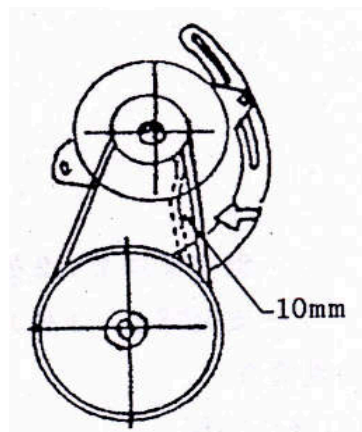
松，然后移动发电机的位置，使之达到正常涨紧度。然后移动发电机的位置，使之达到正常涨紧度。当三角皮带应同时换新的，更换后，须经 1 小时试运转。再进行涨紧度的检查和调整。

3 . Alternator drive belt

As shown in Fig. the correct tension of belt is 10mm belt slack.(Approx 6kg finger pressure). If it exceeds this range, must be adjusted.

To adjust, loosen bolt(1) and nut(2) to shift alternator. (See Fig.5-16) Replace two belt at the same time if it has stretched, leaving on allowance for adjustment, or if there is a cut or crack on belt. When the belt is replaced. check just tension after running for an hour.

4.滤油器零件的清洗和更换 (图 5-16)



变速箱和转向离合器的滤油器零件的清洗与更换，按图；拧下螺栓 2，打开盖子 1，取出零件，然后清洗壳体内部和零件，必要时应更换新的零件。在零件更换后，要进行排气。即将发动机起动，将放气塞 3 拧松，当油喷出后立即紧固。

4. Replace or clean oil filter (Fig.5-16)

图 5-16 (Fig.5-16)

Clean and replace the parts of transmission oil filter and steering clutch oil filter as shown in Fig.

Remove the bolt 2 and cover 1, the element can be taken out. Clean the inside of the case and the removed parts, and install a new element in the filter, if necessary.

After replacing element, start the engine and loose the plug 3 to bleed air and tight the plug as soon as, when oil spraying.

5. 电池液面检查

若液面没有达到规定液面（过极板 10~12 毫米以上），则要补充蒸馏水。若电解液减少时，应加入同等浓度的稀硫酸时，不能使用金属漏斗。在检查液面时，同时须保养电池盖的通气孔。

5. Battery electrolyte

If the electrolyte level is lower than prescribed level (10 to 12mm above the plate), supply distilled water. When refilling electrolyte, should be mixed with acid of same gravity as battery. Do not use the metal funnel to replenish the acid. When inspecting electrolyte level, clean the air hole of the battery cap.

6. 履带板螺栓检查

发现履带板螺栓松弛，应紧固。其紧固扭矩为 $1100 \pm 100 \text{Nm}$ 。

6. Check track shoe bolt

You are required to retighten every time when you find a loosened track shoe bolt. The tightening torque is $1100 \pm 100 \text{Nm}$.

5.5 每 500 小时的保养 Every 500 hours service

包括“每 250 小时保养”一起进行。

Maintenance for every 250 hours should be carried out at the same time.

1. 通气装置清洗

取下通气装置，用清洁的柴油将内部的杂质清洗干净。

1. Clean breathers

Remove the breather and wash out dust remaining inside with diesel fuel oil.

2. 乙醚起动装置检查

(1) 取下乙醚筒检查阀和控制钢丝。

卸下乙醚筒时，要将阀口擦净，以防灰尘进入阀内；若发现阀的托架有损坏，应予更换；

在卸下乙醚筒后，控制钢丝应能很好活动。

(2) 在更换乙醚筒时，要按上面内容检查。

(3) 检查接头处是否漏油，安装螺栓要紧固。

(4) 按下列顺序作试验

(a) 将尼龙管从喷雾器上取下

(b) 取下喷雾器

(c) 再把喷雾器接在管子上

(d) 把控制钢丝置于运转位置，待 2 秒钟后，检查喷雾器各小孔的喷射情况，是否有雾状喷出，然后再置于关位置。

2. Ether starting device

(1) Remove ethylether cylinder, check valve and control cable. Always clean dirt away from the top and exterior of the top and exterior of the valve before removing ethylether cylinder, the control cable is yet active.

(2) When replacing ethylether cylinder, check above mentioned items.

(3) Check fittings for leaks and check all mounting bolts to make sure that they have not loosened.

(4) Carry out the test as following procedures

(a) Remove the nylon tube from atomizer

(b) Remove the atomizer

(c) Connect the atomizer with the tube

(d) Put the control cable in switch on position, waiting for 2 seconds and check the nozzle orifices for normal spray, then switch it off.

5.6 每 1000 小时保养 Every 1000 hours service

包括“每 250 及 500 小时保养”一起进行。

Maintenance for every 250 and 500 hours should be carried out at the same time.

1. 加润滑脂 按图示箭头处加注黄油

1. Lubricating Apply grease as shown by arrows

图 5-17)

17 (Fig.5-

图 5-18 (Fig.5-18)

(1) 台车斜支撑 (2 处) 图 5-17

(1) Diagonal brace (2 points) (Fig.5-17)

(2) 引导轮涨紧固调整杆 (2 处) 图 5-18

(2) Idler adjusting rod (2 points) (Fig.5-18)

(3) 万向节联轴节 (2 处)，通过两处润滑油嘴加注润滑脂。

(3) Universal joint (2 points), fitting grease through two elbows.

(4) 液力变矩器主轴 (1 处)，通过润滑油嘴加注润滑脂

(4) Torque converter coupling (1 point), fitting grease through elbow.

2. 散热器检查

把散热器叶片上的泥土、垃圾、树叶等用压缩空气吹净，也可用水冲洗。

对橡胶软管随时进行检查，若发现龟裂、老化现象要及时更换，同时检查软管夹子是否紧固。

2.Radiator fins

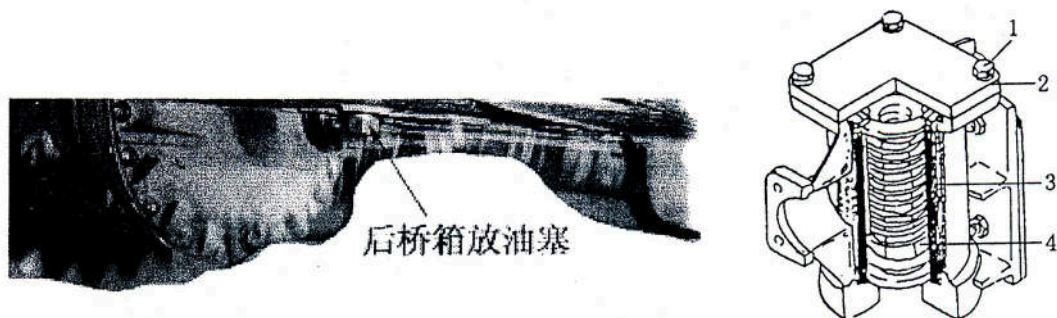
Mud, dust or leaves blocking the fins shall be blown off by compressed air. The water may also be employed instead of compressed air. Check the rubber hose on this occasion and replace hose that is cracked or fragile. Further, also inspect loosened hose clamps.

3.后桥箱内油的更换及滤油器清洗（图 5-19）

包括变速箱、液力变矩器、后桥箱内的油更换。

3.Steering clutch case(Incl. Transmission, torque converter and bevel gear cases)(Fig. 5-19)

图 5-19 (Fig.5-19)



(1) 从车体下部的放油塞（包括后桥箱和变矩器两处）排油，排泄完毕后，将放油塞紧固。
(2) 打开左边的底板，卸掉螺栓①，拆下盖子②，然后取出转向离合器的滤油器滤网③和磁铁④。

(1) Drain oil from plug P1 and P2 on the bottom of the machine body.

(2) Remove the floor plate on left hand. Remove bolts ① and cover ②, and take out the steering clutch case strainer ③ and magnet ④.

(3) 拆下螺栓，把盖子和液力变矩器的滤油器一起取出来。

(4) 从箱体内部取出的零件，滤油器等到加以清洗并按原样装好。如果滤油器滤网、磁铁等堆件有破损，应及时更换新的。

(5) 凡是滤油器堆件更换后，须按照“每 250 小时保养”的规定，从加油口加注规定量的机油。后桥箱内的油量约 136 升。

(3) Remove bolts and take out the torque converter case strainer together with cover.

(4) Thoroughly clean the case interior and the removed parts and strainers. Install them to the original positions. If the strainer or the magnet is damaged, replace it with a new one.

(5) After replacing the oil filter element(See Every 250 hours service, pour the specified quantity of engine oil filler. Refill capacity of steering clutch case:136L.)

4. 工作油箱内油的更换及滤油器清洗

(1) 把工作油箱下部的放油塞卸下，然后拧松排油阀进行排油，排泄完毕后，将排油阀拧紧。

(2) 在油箱后部卸下螺栓，取下盖子从箱内取出滤油器零件。

(3) 清洗过滤器内部及其零件，若有破损的零件，须及时更换新的，然后按原样装好。

(4) 零件更换后, 从加油口 F 加入规定量的机油。工作油箱内的油量约 103 升。

4. Hydraulic tank and filter

(1) Remove drain plug on the hydraulic tank bottom and loosen drain valve to drain oil. After draining, tighten plug and valve.

(2) Remove bolts and take out parts of filter together with cover.

(2) Clean the removed parts and filter case interior. If any one of parts is damaged, install a new one to the original position.

(3) After replacing the part, pour the specified quantity of engine oil into the oil filler F. Refill capacity of hydraulic tank: 103L.

5. 终传动箱油的更换 (图 5-20)

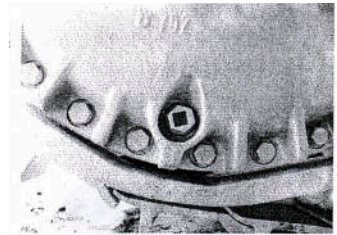
(1) 把车体两侧的放油塞打开进行排油, 排油后将油塞紧固。

(2) 从加油口加注规定的机油。

终传动箱两侧内的油量各为约 55 升。

5. Final drive case (Fig. 5-20)

图 5-20 (Fig. 5-20)

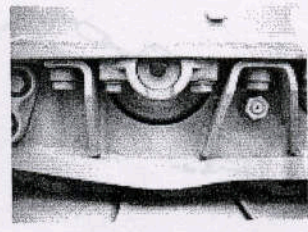
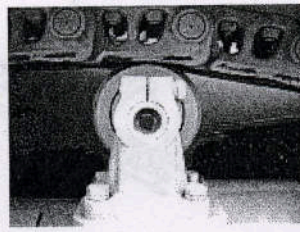
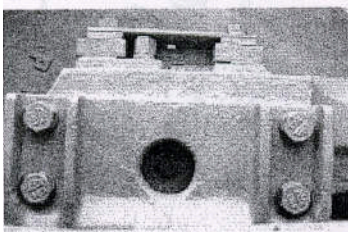


(1) Remove oil drain plug from both sides of machine to drain oil. After draining, tighten plug.

(2) Refill prescribed quantity of engine oil through fillers F. Refill capacity for each side: 55L.

6. 行走装置油的更换

把车子停在平坦的地了, 按下述方法检查支重轮、托轮、引导轮的油量是否要加注。(图 5-21)



图

5-21 (Fig. 5-21)

(1) 把各轮的密封螺栓慢慢地松开, 如果从螺纹中有油渗出, 说明可不必加注新油, 立即把螺栓紧固。

(2) 密封螺栓若松开, 甚至卸掉后, 仍没有油漏出, 说明油量不足, 须立即加注新油。

6. Undercarriage components

Stop machine on level ground and check consumption of oil in track roller, carrier roller and idler (Fig. 5-21)

(1) Slowly loosen seal bolt and see if oil oozes out of screw.

If oil oozes out, oil is still sufficient. Tighten bolt immediately.

(2) If oil does not flow even after seal bolt has been removed, oil amount is insufficient, add new oil immediately.

5.7 每 2000 小时保养 Every 2000 hours service

包括“每 250, 500, 1000 小时保养”一起进行。

Maintenance for every 250, 500 and 1000 hours should be carried out at the same time.

1. 加注润滑脂

如图所示在箭头所指方向处加注黄油。(图 5-22~5-26)

1. Lubricating

Apply grease to grease fitting shown by arrows(Fig.5-23~5-27)

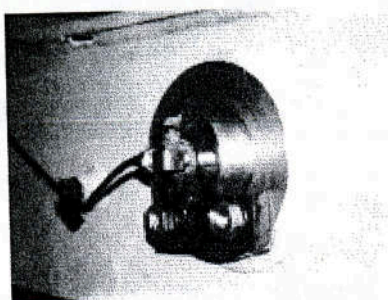


图 5-22 (Fig. 5-22)

1. 平衡梁转轴 (1 处)

1. Equalizer bar shaft (1 point)

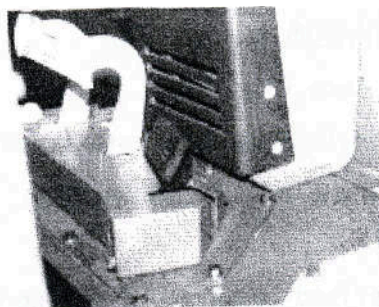


图 5-23 (Fig. 5-23)

2. 减速踏板转轴 (2 处)

2. Decelerator pedal shaft (2 points)

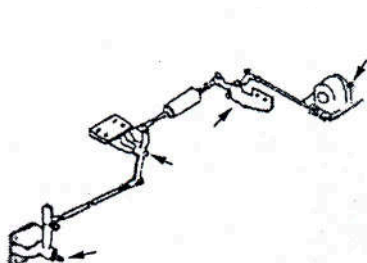


图 5-24 (Fig. 5-24)

1. 燃油控制杆机构中的转轴 (4 处)

4. 制动踏板连杆机构转轴 (6 处)

5. 推土铲操纵杆机构转轴 (7 处)

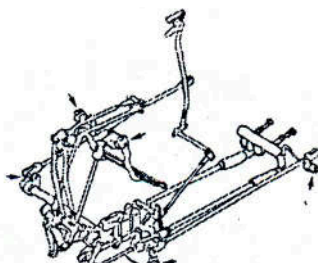


图 5-25 (Fig. 5-25)

4. Brake pedal lever shaft (6 points)

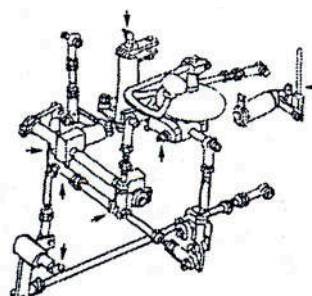


图 5-26 (Fig. 5-26)

3. Fuel control lever shaft (4 points)

4. Brake pedal lever shaft (6 points)

5. Blade control lever shaft (7 points)

5.8 不定期保养 When required

1. 冷却水更换

当冷却水里加有防冻液时的更换, 应在每年春、秋两季进行。

当冷却水里不加注防冻液时, 须每隔 1000 小时更换一次冷却水。

1. Replacing the coolant

Replace the cooling water, mixed with antifreeze, 2 time in year. When not using antifreeze in cooling water, replace the water every 1000 hours.

更换方法如下：

-  (1) 将车辆停放在平坦的地方，停止发动要，紧固防蚀通气装置，慢慢旋开散热器盖，让水中压力下降：特别是水温高时防止热气喷出烫手。
- (2) 打开3处放水阀（散热器、气缸体、油冷器）进行排水。
- (3) 排水完毕后，用清洗剂清洗，清洗方法按商标上说明的方法做。
- (4) 洗净后把水全部排净，关闭各放水阀，从加水口把清水加到要求位置。
- (5) 将发动机作怠速运转，打开各放水阀放水，并继续从加水口加水清洗，直到放水阀时流出干净的水为止，然后关闭放水阀。
- (6) 再从加水口按要求把水加满。
- (7) 更换防蚀通气装置中的防蚀剂。
- (8) 为了清除混入冷却水中的空气，将发动机怠速运转5分钟，然后再高速无载荷运转5分钟。
- (9) 发动机停止3分钟后，再从加水口按“每日保养”第四条中的图示要求加满水量，然后紧固加水口盖子。

-  (1) Stop the machine on the level ground. Stop the engine and close valve of corrosion resistor, turn radiator cap slowly to allow pressure to be relieved. If the water temperature is high, care should be taken to prevent scalding water from spurting.
- (2) Loosen drain valve at 3 points(radiator, cylinder block and oil cooler and drain off the cooling water.)
- (3) After draining off the cooling water, wash out the cooling system using commercially available detergent. Follow the instructions of detergent.
- (4) After washing the cooling system, drain off all the water, then close up drain valves and pour in clean water slowly up to the vicinity of the water filler.
- (5) Put the engine at low idling, open the drain valves, then pass water through the cooling system until clean water comes out from the drain valves and close the all drain valves.
- (6) Supply water until it overflows from water filler.
- (7) Change the DCA inhibitor in the corrosion resistor.
- (8) Run the engine 5 minutes at low idling and then for another 5 minutes at high idling to criminate air trapped in the cooling system(leave radiator cap off during the operation).
- (9) Stop the engine and wait for about 3 minutes. Supply cooling water up the specified level as shown in Fig. Tighten the cap.

2. 空气滤清器检查、清洗和更换

当空滤传感器报警时，就要立即清洗空气清器，这时发动机须停止运转。

图 5-27 (Fig. 5-27)

- (1) 卸下盖子①和外套筒滤网 F。(图 5-27)
- (2) 清洗壳体内部和盖子。
- (3) 清洗外套筒滤网。

图 5-28 (Fig. 5-28)
图 5-29 (Fig. 5-29)

法如下：
用压缩空气的清洗方法即用干燥的压缩空气（0.7MPa 以下），先从内表面沿着褶皱吹气，

然后从外表面沿着褶皱吹气，最后再次吹内表面，使内外表面不沾尘土。（图 5-28）

- (b) 用水洁洗方法，即用自来水（0.3MPa 以下）从滤网的内表面沿着褶皱冲洗，然后从外表面沿着褶皱冲洗，最后再次冲洗内表面，待干燥后检查滤网。
- (c) 对污垢严重的滤网按下列方法进行：
 - (1) 在 20 升水中混入 300 克洗涤剂；
 - (2) 把滤芯在以上溶液中浸 15 分钟；
 - (3) 在流动的清水中冲洗；
 - (4) 采用电风扇吹干（决不可加热烘干），待干燥后检查滤网。
- (d) 若用 40°C 左右的温水中冲洗，效果更佳。

2. Cheek clean and replace air cleaner element.

Whenever the red piston in dust indicator appears, clean the air cleaner outer element. Stop the engine when cleaning the element.

- (1) Remove wing nut ① and outer element ② (Fig. 5-27).
- (2) Clean the air cleaner body interior and wing nut.
- (3) Clean the outer element ②

Cleaning as following:

- (a) With compressed air (Fig. 5-28)

Direct dry compressed air (less than 0.7MPa) to element from inside along its folds, then direct it from outside along its folds and again from inside to keep the clear surface on both side, then direct it from outside along its folds and again from inside to keep the clear surface on both side.

- (b) With water

Wash city water (less than 0.3MPa) on element from inside along folds, then from outside and again from inside. Dry and check it.

(c) Clean the dirty element as follows:

(1) Put the detergent(300g) into 20L of clean water.

(2) Soak the element in the above solution for 15 minutes

(3) Swash the element in flow water.

(4) Blow it dry by fan and check it(Never attempt to heat the element).

(d) Using warm water(about 40°C) may be more effective.

(4) 滤网清洗干燥后用灯光检查，如果有小孔等损坏时，要更换新的。(图 5-29)

(5) 外套筒滤网，经六次清洗后或用过一年后，即应更换新的，不允许继续使用；若虽然清洗不到六次，但清洗后使用时，灰尘指示器仍出现红色标识，也须立即更换新的。

(6) 在更换外套筒滤网时，要同时更换内筒滤网。

(4) If small holes or damaged parts are found on element when it is checked with an electric bulb after cleaning an drying replace the element. (Fig.5-29)

(5) Replace the outer element which has been cleaned 6 time repeatedly or used throughout a year, or when the dust indicator red piston appears soon after installing the cleaned outer element even through it has not been cleaned 6times.

(6) Replace the inner element at the same time.

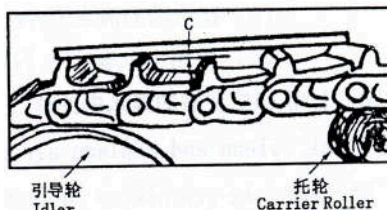


图 5-30

3.行走部分检查

(1) 检查履带涨紧度(图 5-30)

(Fig. 5-30)

把车辆停在平地上，不要刹车用直尺按图放在托轮和引导轮之间的履带上。在中是位置测量，如果直尺和履带板齿之间的最大间隙是 30~40 毫米，表明张力合适，大开此值调整。

(2) 检查引导轮导向板间隙(图 5-31)

如果间隙太大，使引导轮产生横向窜动，造成引导轮中心线与轨距不一致。间隙 A 小于 4 毫米范围内为正常。

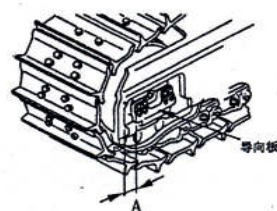
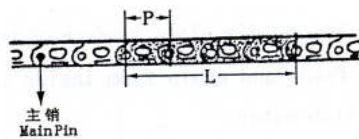


图 5-

31(Fig. 5-31)

(3) 检查链节节距(图 5-32)

在履带板与链轮之间嵌入木块，使履带不松弛；后以处于木块上的节销为基准，离开此节销二节外的位置为起点，测量其直线部分的个链节节距



然以长

图 5-32(Fig. 5-32)

度 L，其 $1/4 \times L$ ，即为链节的节距。(以主销为基准也可以)

基本链节节距：228.85 毫米

反转链节节距：较紧：231.85 毫米 标准：233.85 毫米

(4) 检查履带板齿高度(图 5-33)

当履带板拉紧后，在履带板的中间，如图 5-33 方法，测量其齿高 A。

基本尺寸：80 毫米 使用极限：25 毫米

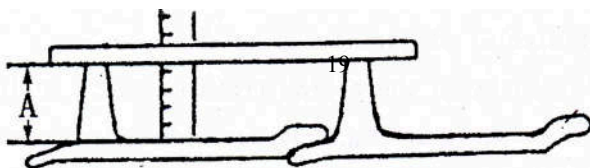


图 5-3 3 (Fig. 5-3 3)

(5) 检查支重轮外径 (图 5-34)

(a) 如图测量链节上下平面间高度尺寸 C;

(b) 当链节上平面和支重轮外圆完全接触时, 停车, 测量如图尺寸 B, 支重轮外径尺寸 A, 即 $A = (B - C) \times 2$

基本尺寸: 255 毫米` 使用极限: 229 毫米

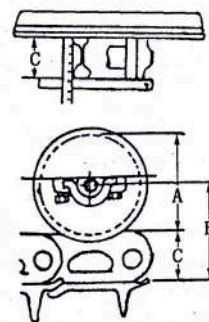
(6) 检查各种轮子是否漏油: 螺栓、螺母是否紧固, 如发现问题, 应立即修理。

3. Check undercarriage

(1) Check track tension(Fig.5-30)

Without applying brakes, stop the machine on a flat and put a straight rod on the carrier roller and the idler and the idler as shown on Fig. When the distance between the and the shoe grouser is 30to 40mm at the center, the tension is the standard one .

图 5-3 4 (Fig. 5-3 4)



(2) Check clearance between idler and guide plates(Fig.5-31)

If the clearance is too large, it will cause the vibration of idlers from side to side and idler center will run off from track gauge. It is normal that the clearance A is a number less than 4mm.

(3) check link pitch(Fig.5-32)

Insert a wooden block between link and sprocket to take up the slack in track as shown in Fig. Measure pitch length of 4 links in stretched portion at more than 2 links away from master pin. Of length obtained, 1/4 is the link pitch. See Fig.

(4) Measuring height of grouser(Fig.5-33)

After taking up slack in track, measure height A at center of shoe as on

Fig.5-34 Standard height:80mm Repair limits:25mm

(5) Measuring outside diameter of track roller(Fig.5-34)

(a)Measure height(size C)of link tread as shown

(b)Stop machine at position where link tread contacts roller tread.

Measure size B as shown in Fig.5-34. Out side diameter of track roller(size a) $A = (B - C) \times 2$

Standard size A:255mm; Repair limits:29mm

(6) Check variety of rollers for oil leakage and check tightness of bolts and nuts. If any defect is noticed, repair immediately.

5.9 各部分的调整 (Adjustment)

1. 履带涨紧度调整

如图 5-35 所示, 若要增加履带涨紧度时, 可从加油口 1 注入黄油。其其调整极限行程为 S。当调整到 S=0 时, 若此时履带还是松弛, 说明销子和销套的磨损已到极限, 则必须更换全部销子和销套的安装位置, 其方法是以它们原安装位置为基准, 全部反转同一角度 (改变原安装位置), 然后再重新装配, 或者更换一条新的履带。若要使涨紧度松弛, 可

把塞子 2 松约一圈，挤出黄油。在旋松塞子 2 时，不得超过一圈以上，但要注意决不能松动塞子以外的零件，防止内部的高压油喷射出来，造成事故。当黄油从塞子处出来如不正常时，可将车辆前后运动一下。

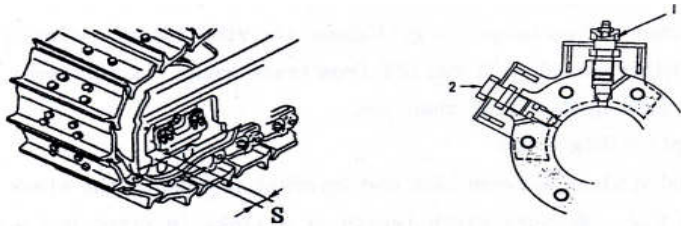


图 5-

3 5 (Fig. 5-3 5)

1 . As shown in Fig.5-35, for tightening the tension, pressure grease through lubricator 1. The limit of adjustment is S. Grease may be pressurized till S will be 0mm. In case the tension is yet loose after applying injection of grease, it indicates that the pin and bush are reduced by too much abrasion. So it is necessary to turn its installing position of all pin and bushing by changing a same angle with original position, or replaced the track with a new one.

For loosening the tension, extract grease by reversely rotating plug 2 for “rotation” slowly. Do not loosen plug 2 over once complete rotation. Also , be careful not to loose any part other than plug to prevent grease from flying out under high pressure. If grease does not ooze smoothly, try moving the machine back and forth for a short distance.(Fing.5-35)

2 . 引导轮间隙调整

如图 5-36 所示，当引导轮在外力作用下，支架 2 可以在台车架上沿导向板 3 前后移动，引起导向板磨损，造成引导轮横向窜动、侧向倾斜以及引导轮与轨距不一致，以至使支重轮、托轮的法兰边及链轮的侧面等和履带发生干涉而造成过快的磨损，因此必须进行各间隙调整。

由于引导轮在台车架上的移动造成有关连接件的磨损，若这些部位的间隙过大，会使引导轮横向偏摆，导致履带啃轨，重则脱轨。因此，应经常按下列方法调整。

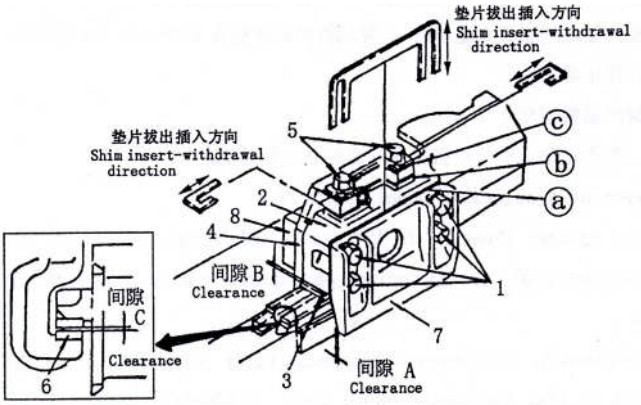


图 5-3 6 (Fig. 5-3

6)

(1) 左右调整

推土机在平地上行走 1~2 米后，若测量得左右外侧（共四处）间隙 A > 4 毫米时，应调整。调整方法如下：把螺栓 1 松开三圈以下，取出调整片 a，使单侧间隙 A = 0.5 ~ 1 毫米，然后

紧定螺栓即可。调整垫片的厚度为 1mm。

(2) 上下调整

当间隙 $(B+C) \geq 5$ 毫米时，应予以调整。

调整方法如下：

松开螺栓，将 c 调整片抽出，然后将其插入 b 内，使 $(B+C) = 2$ 毫米；正常状态 $C=0$

例：当 $B=5\text{mm}$ ，调整量为 $5-2=3\text{mm}$ 。

注意：在调整前后，调整片 b 与 c 之和保持不变，否则会造成各橡胶弹簧支承力的不均匀；调整片厚度有 1mm 与 2mm 两种。

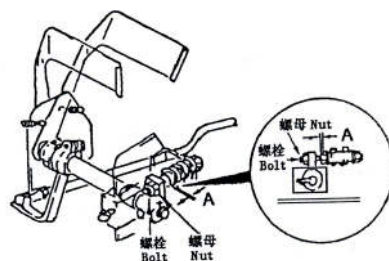
调整完后，紧定螺栓。螺栓 1 与螺栓 5 的紧固力矩为 $645 \sim 845\text{N}\cdot\text{m}$ 。

3. 减速踏板行程的调整

如图 5-37 所示：

若把燃油控制杆，置在总行程的 $1/2$ 处，踏下减速踏板，使间隙 $A=0$ 毫米，此时发动机的转速应在 $800 \sim 850$ 转/分范围以内，不在此范围以内，应按下列步骤调整：

图 5-3 7 (Fig. 5-3 7)



1. 松开锁紧螺母 1，然后调节调整螺栓 2，一直调整到出现以下状态时为止，即：当踏下减速踏板到使之间隙 $A=0$ 毫米时，发动机的转速能在 $800 \sim 850$ 转/分范围内运转，说明踏板行程正常了。

2. 调整后紧固锁紧螺母 1

在调整时，为了正确调整发动机转速，必须使用转速表。

3. Adjustment of decelerator pedal (Fig.5-37)

Set the fuel control lever to the $1/2$ stroke and depress the decelerator pedal fully (clearance $A=0$). If the engine speed does not drop to $800\text{--}850\text{rpm}$, adjust as follow.

1. Loosen locknut 1, then depress the pedal fully (clearance $A=0$). Turn screw 2 to adjust so that the engine speed drops to $800\text{--}850\text{ rpm}$.

2. After adjusting, tighten locknut 1. To set the engine speed accurately, a tachometer is necessary.

4. 制动踏板行程的调整

因为制动器结构是外带式，因此当制动带衬片磨损后，转向操纵杆及制动踏板的行程就增大，使制动作用减弱，为此必须调整。

其调整方法如下：（如图 5-38 ~ 图 5-39）

(1) 卸下后部盖子，再卸下制动器检查盖 1；

(2) 将拉紧制动带的调整螺栓 2 拧到底（感觉有阻止为止），此时制动鼓和制动带相互贴合；

(3) 然后将调整螺栓 2 往回退约 $7/6$ 转；

(4) 发动机以怠速运转，在此状态下测理制动踏板的行程；

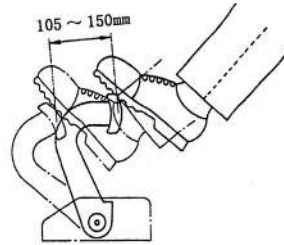
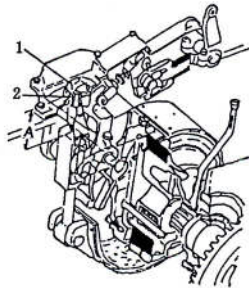
标准行程： $150 \sim 170$ 毫米

(5) 测量后如不在以上标准范围内，再次调节调整螺栓 2。螺栓顺时针方向旋转其踏板行程减小，逆时针方向旋转其踏板行程增大；

(6) 若调整螺栓 2 如图 5-38 的尺寸在 127 毫米以下时，即要调换制动带衬片；

(7) 左右两块踏板的行程，应调整的一致，即两块踏板高低差只允许在 5 毫米以内。

图
图



5-3 8 (Fig. 5-
5-3 9 (Fig. 5-

3 8)
3 9)

4 . Adjustment

of brake pedal

When the brake lining wears, since its outer band structure the brake pedal travel will increase, making braking difficult. To adjust, proceed as follows⊗See Fig.5-38 ~ 5-39)

(1)Remove rear fender

Cover and remove inspection cover(1)

(2)Turn adjustment bolt(2) to end (until feel the resistance), so that the lining comes into tight contact with drum.

(3)Then, turn adjustment bolt(2) in reverse direction for 7/6 rotation.

(4)Measure pedal travel with engine idling: Standard travel:150-170 mm

(5)If the travel after measuring is not within the above range, adjust the bolt (2) again. To reduce the pedal travel by turning bolt clockwise, and to increase the Pedal travel by turning bolt counterclockwise.

(6)w hen the S dimension of the brake adjusting bolt becomes smaller 127 mm, replace the lining with new one.

(7)Adjust so that both left and right pedals will have same travel. A difference in travel between the pedals is allowed only by 5 mm.

第六章 故障及排除

CHAPTER 6 TROUBLE SHOOTING GUIDE

1. 底盘部分 Chassis

故障现象 Diagnosis	主要原因 Cause	对策 Remedy
液力变矩器过热 Torque converter is overheats	·风扇皮带松弛 ·发动机水温过高 ·油冷器阻塞 ·齿轮泵磨损，导致油循环不足 Loosen fan belt water; Engine water temperature is high; Oil cooler core clogged; Gear pump defective, so that have not enough to circulation flow	·更换皮带 ·参照“发动机部分” ·清洗或更换 ·更换齿轮泵 Replace belt Refer to “Engine” Clean or replace core Replace gear pump

变速杆变速后，车辆不前进或没有车速 Machine doesn't start by engaging the gear shift lever	·液力变矩器与变速箱无油压上升 ·阀、管路接缝处紧固不好，混入气体或漏油 ·齿轮泵磨损、卡住 ·变速箱油量不足 ·变速箱滤油器元件阻塞 Oil pressure in torque converter and transmission case fails to rise; Air is leaking into valve and pipe joint; Gear pump is worn and clamped down; Shortage of oil in transmission case; The filter element in transmission is clogged.	·检查 ·检查、修理 ·检查、修理、更换 ·补充油量 ·清洗 Check Check, repair Check, repair and replace Replenish Clean
拉单侧转向杆，机车不转弯而直行 When steering lever on one side is pulled machine continues to travel straight forward instead of turning	转向杆失效 Steering lever fails to control	调整 Adjust
转向杆操纵重 Steering lever operating force is heavy	·转向离合器与转向制动调整不良 Steering clutch and steering brake connection defectives	调整 Adjust

踩下制动踏板，而车仍不停止 Machine doesn't stop when brake pedal are depressed	·制动踏板调整不良 Brake pedal travel defective	调整 Adjust
履带脱轨 Track comes off	履带张力过松 Track tension is loosened	调整其张力 Adjust track tension
链轮异常磨损 Sprocket develops abnormal wear	·履带过松或过紧 Track tension is loosened or tighten	调整其张力 Adjust track tension
推力上升较慢或完全不得升 Blade rises too slowly or does not rise at all	液压油汪足 Shortage of hydraulic oil	补充加入规定油量 Add oil to hydraulic tank

2. 发动机部分 Engine

故障现象 Diagnosis	主要原因 Cause	对策 Remedy
散热器压力阀喷出蒸汽 Steam is emitted from the pressure valve of the radiator 水温表批示水温高 The water temperature gauge indicates high	·冷却水不足或有渗漏 ·风扇皮带松弛 ·在冷却系统中沉积水垢和尘土 ·水温表不良 ·散热器中散热片阻塞 ·恒温器密封不良 Shortage of cooling water or leakage of water; Loosened fan belt; Sank dirt or sediment in cooling system;	·检查补充冷却水 ·调整张力或更换皮带 ·更换冷却水、冷却系统清洗 ·更换水温表 Cheek and add water; Adjust tension or replace belt; Change cooling water, clean cooling system; Replace water temperature gauge;

	Defective water temperature gauge; Clogged fin of radiator; Defective seal of thermostat	Clean or repair; Replace seal.
起动机虽转动，但发动机不转 The engine does not start when the starting motor is turned over	·燃油不足、燃油系统混入空气 ·起动机运转太慢 ·燃油系统有水 Shortage of fuel or mixed air in fuel system; Starting motor runs slowly; The water is in fuel system.	·补充燃油，排除空气 ·参考电器部分修理 ·进行排水 Add fuel; Bleed air; Repair with reference to electrical circuit diagram and drain water
燃油经常停止 Always stop supply fuel	燃油箱出油管路阻塞 Outlet piping of fuel tank is clogged	清洁管路 Clean pipe line
发动机排气色为白色或蓝色 Exhaust gas is white or blue	·油底壳油量过多 ·燃油不良 ·齿轮增压器油管漏油 The oil is overfull in the oil pan; Bad quality of fuel; The pipe on turbocharger is leaky.	·按规定油量，更换指定用油 ·检查、修理 Drain oil to specified capacity; Replace fuel with specified model; Check and repair;
发动机排气为黑色 Exhaust gas is black	·空滤器阻塞 ·排气压力过人 Air cleaner element is clogged; Exhaust pressure is too high;	·给以清洁或更换 ·检查、修理 Clean or replace; Check and repair.
发动机起动运转无规律、不稳定 The engine starting running is irregular and unsteady	·燃油系统中混入空气 Mixed air in fuel system	·排除系统中的空气 Bleed air from fuel system
发动机发生爆震（燃烧或机械性的） There appears the shock explosion in engine(combustion or mechanical)	·使用质量差的燃油 ·过热 ·消音器内部磨损 Use inferior fuel; Overheat; The muffler inside is worn.	·更换规定燃油 ·更换消音器 Replace with specified fuel; Replace muffler.

最后希望驾驶员作好原始记录，如车辆运转，保养时间及故障发生排除等，以便告诉我公司，让我们能为您提供更好的令您更满意的服务和产品。

We hope that the operator's initial record such as running time, maintenance interval and trouble shooting etc. should be well kept, it will help the manufacture to improve machine design and product quality.

燃油、冷却水和润滑油附表：

部 位	环境温度及适用油品														规定 油量 (升)	更换 油量 (升)	
	-15	-10	-5	0	5	10	15	20	25	30	35	40	45℃				
发动机 燃油箱	-10~-35* 柴油														600	—	
				0* 轻柴油													
发动机 油底壳	SAE10W-30														47	27	
	※ SAE15W-40																
变矩器 变速箱 后桥箱	SAE10W-30														185	—	
	※ SAE15W-40																
									SAE30								
液 压 油 箱	SAE10W-30														164	103	
	※ SAE15W-40																
终 传 动 箱	SAE30														左右 各 55	左右 各 55	
									SAE40								
支重轮 托 轮 引导轮	SAE85W-140														0.39~0.45		
															0.63~0.72		
															0.39~0.45		
其余润 滑部位	2 号、3 号 锂基润滑脂														适 量	—	
发动机 冷却液	软 水 + 防 冻 剂														121	—	
					软 水												

注：

1. 标※的油品为其栏内油品的代用品，没有上一格的油品，可用带※的油品代用。
2. 润滑油品牌号均为 CD 级，若使用 CC 级，换油时间应按规定的二分之一时间执行。
3. 当环境温度低于 -20℃ 时，发动机油底壳的油换成 SAE5W-30。
4. 加油时应先从加油口抽出过滤网，用干净柴油清洗干净后，放回加油口，才可以加油。
5. 油、油脂的加入量要符合要求，不可过多或过少。
6. 加油、水的用具一定要干净，用后存放在盖严的箱子或柜子中。
7. 排油时要使油温预热至 30-40℃ 为宜。SAE 油品为国际通用油品号。

Table of Fuel, Coolant and Lubricants:

※

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE								CAPACITY (L)		
		-22 -30	-4 -20	14 -10	32 0	50 10	68 20	86 30	104F 40℃	Specified	Refill	
Fuel Tank	Diesel Fuel			ASTM D975 NO.2						600	---	
		※										
Engine oil pan	Engine oil			SAE10W-30						47	27	
			SAE15W-40									
Steering case (Incl. Torque converter and transmission case)					SAE30						185	136
				SAE10W								
Hydraulic tank					SAE10W						164	103
				SAE10W-30								
				SAE15W-40								
Final drive Case (each)				SAE30						55		
Idler (each)												
Track roller (each)	Gear oil			SAE85w-140						0.39~0.45		
Carrier roller (each)												
Other Lubricating locations	Grease			Lithium - Base NLGI NO.2						Just the right amount		
Cooling system	Coolant	Add antifreeze								121	---	

ASTM D975 No. 1

NOTE :

ASTM : American Society of Testing and Material

SAE : Society of Automotive Engineers

API : American Petroleum Institute

Specified capacity : Total amount of oil including oil for components and oil in piping

Refill capacity : Amount of oil needed to refill system during normal inspection and maintenance .

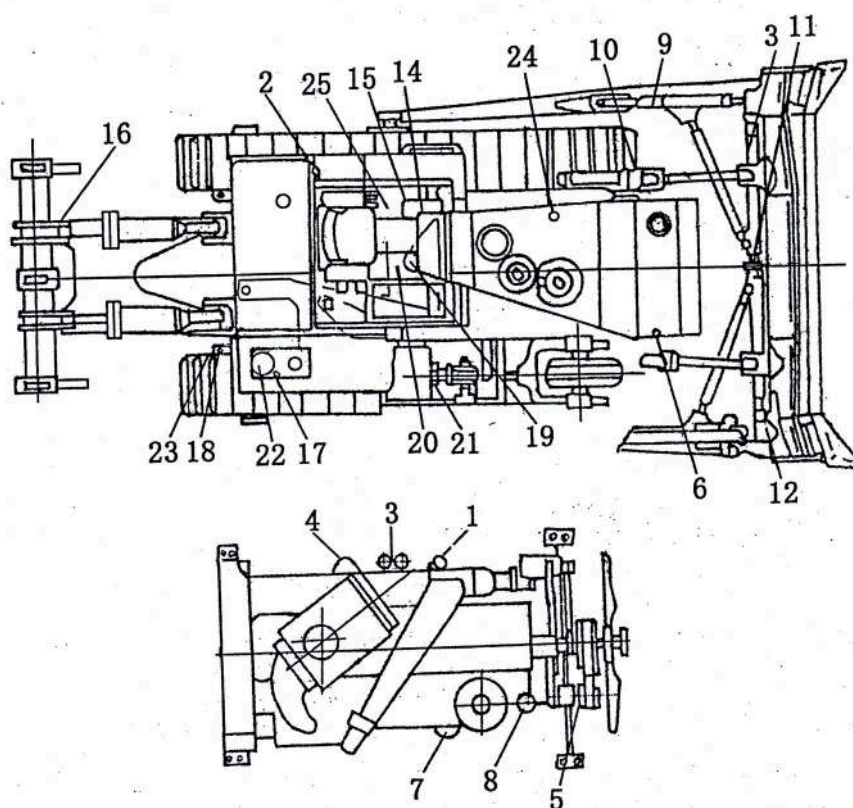
- 1 . Use API classification CD as engine oil and if Aft classification CC, reduce the engine oil change interval to half.
- 2 . When the atmospheric temperature is lower than -200C , be sure to change engine oil with SAE30 .
- 3 . When refilling fuel , oil or coolant, use the clean utensils, and put them in

covered box or case after using.

4 . Add the right amount of oil , grease or fuel , do not fill overfull or too less .

5 . The proper temperature of draining oil is $30^{\circ}\text{--}400^{\circ}\text{C}$.

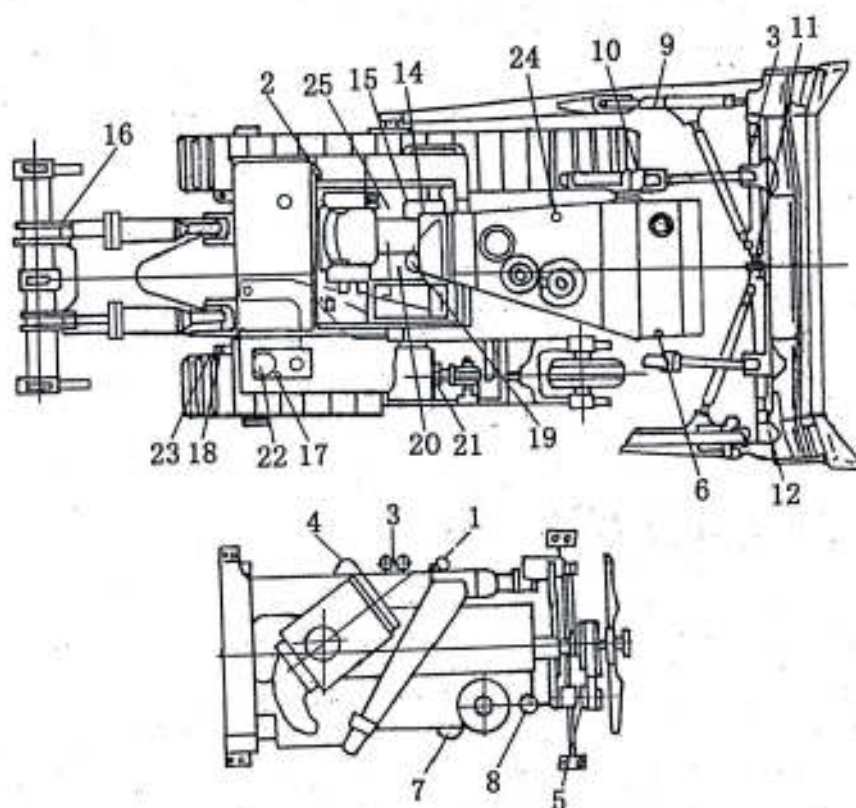
MD 3 2推土机润滑图



润 滑 表

序号	润滑部位	润滑点	润滑剂	润滑周期（小时）
1	油底壳	1	润滑油	10 小时加油，250 小时更换 23 升
2	后桥箱变速箱壳体	1	润滑油	10 小时加油，1000 小时更换 136 升
3	燃油过滤器	2		250 小时更换
4	旁通过滤器	1		250 小时更换
5	发动机皮带轮轴	2	润滑脂	250 小时补充油
6	冷却风扇轴	1	润滑脂	250 小时补充油
7	机油过滤器	1		250 小时更换
8	防腐蚀器滤芯	1		250 小时更换
9	螺杆	2	润滑脂	250 小时补充油
10	油缸支撑轴	8	润滑脂	250 小时补充油
11	球接头	5	润滑脂	250 小时补充油
12	倾斜油缸球接头	1	润滑脂	250 小时补充油
13	推土铲油缸球接头	2	润滑脂	250 小时补充油
14	变速滤油器滤芯	1		250 小时更换
15	转向滤油器滤芯	1		250 小时更换
16	松土器油缸销	12	润滑脂	250 小时补充油
17	工作油箱	1	润滑油	250 小时补充，1000 小时更换 103 升
18	终传动箱	2	润滑油	250 小时补充，1000 小时更换 55 升
19	液力变矩器主轴	1	润滑脂	1000 小时补充油
20	万向节	2	润滑脂	1000 小时补充油
21	引导轮涨紧油缸衬套	2	润滑脂	1000 小时补充油
22	工作油箱滤油器滤芯	1		1000 小时更换
23	斜支撑	2	润滑脂	1000 小时补充油
24	平衡梁销	1	润滑脂	1000 小时补充油
25	制动踏板轴	6	润滑脂	

MD32 bulldozer lubrication drawing



Lubrication table

No	Lubrication position	Places	Lubricant	Service interval (Hour)
1	Engine oil pan	1	Oil	Fill oil at 10 hours and replace oil 23L at 250 hours
2	Body of steering case and transmission case	1	Oil	Fill oil at 10 hours and replace oil 136L at 1000 hours
3	Fuel filter	2		replace at 250 hours
4	Oil filter bypass	1		replace at 250 hours
5	Engine belt wheel shaft	2	Grease	Fill oil at 250 hours
6	Fan shaft	1	Grease	Fill oil at 250 hours
7	Oil filter	1		replace at 250 hours
8	corrosion remover container element	1		replace at 250 hours
9	Screw	2	Grease	Fill oil at 250 hours
10	Cylinder support shaft	8	Grease	Fill oil at 250 hours
11	Ball joint	5	Grease	Fill oil at 250 hours
12	Tilt cylinder ball joint	1	Grease	Fill oil at 250 hours
13	Blade cylinder ball joint	2	Grease	Fill oil at 250 hours
14	Transmission filter element	1		replace at 250 hours
15	Steering filter element	1		replace at 250 hours
16	Ripper cylinder pin	12	Grease	Fill oil at 250 hours
17	Hydraulic tank	1	Oil	Fill oil at 250 hours and replace oil 103L at 1000 hours
18	Final drive case	2	Oil	Fill oil at 250 hours and replace oil 55L at 1000 hours
19	Torque converter main shaft	1	Grease	Fill oil at 1000 hours
20	Universal joint	2	Grease	Fill oil at 1000 hours
21	Recoil cylinder bushing	2	Grease	Fill oil at 1000 hours
22	Hydraulic tank filter element	1		replace at 250 hours
23	Skew brace	2	34 Grease	Fill oil at 1000 hours
24	Equalizer pin	1	Grease	Fill oil at 1000 hours
25	Brake pedal shaft	6	Grease	

