

DECLARATION OF CONFORMITY

APPLICATION OF COUNCIL DIRECTIVE: 89/392/EEC AS AMENDED
BY 91/368/EEC and 93/44/EEC

CONFORMITY IS DECLARED TO: EN500 -1, - 6; 98/37/EC; 2000/14/EC

MANUFACTURER: Power Pavers, Inc.
5838 W. Cedar Wapsi Road
Cedar Falls, Iowa USA, 50613

AUTHORIZED REPRESENTATIVE IN THE EC: N/A

TYPE OF EQUIPMENT: PAVER - FINISHER
(WITH HIGH-COMPACTION SCREED)
DEFINITION: Annex 1, No. 41

MODEL NUMBER: SF-3000 SERIAL NUMBER: 0826114

YEAR OF MANUFACTURE: 2008

NET INSTALLED POWER: 194 KW

PER 2000/14/EC: CONFORMITY ASSESSMENT PROCEDURE - ANNEX V
Lw = 91 db (mean)
Lwa = 116 db (guaranteed)

I, the undersigned hereby declare that the equipment specified above conforms to the
above Directive (s) and Standard (s).

SF-3000

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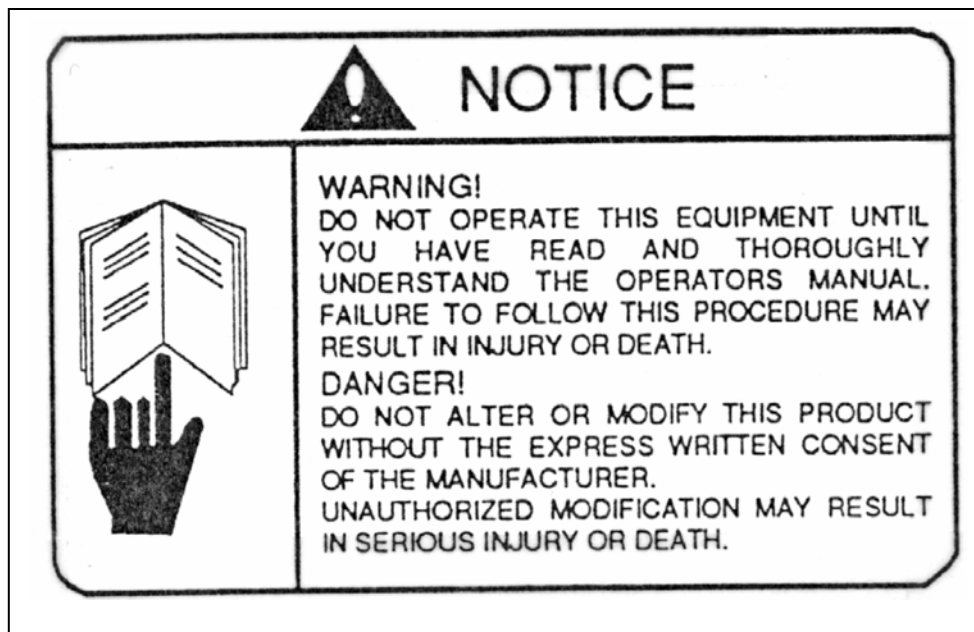
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SAFETY

SAFETY IS OF THE UTMOST IMPORTANCE. MAKE IT A HABIT TO USE SAFE PRACTICES IN ALL OPERATING, MAINTENANCE, AND SERVICE PROCEDURES. PAY PARTICULAR ATTENTION TO THESE FOLLOWING SUGGESTIONS.

1. Check to see that all personnel are clear of the machine before starting the engine.
2. Check to see that all valves are in neutral position before starting the engine.
3. Do not leave the operators console unattended at any time while the engine is running.
4. Do not allow anyone but the operator to ride on the machine during its use. (except for training purposes)
5. All personnel should stay clearly away from the machine unless directed specifically by the operator.
6. Be sure everyone is clear of moving parts before operating them.
7. Do not make adjustments or work on the machine while the engine is running.
8. If maintenance or service is taking place, be sure to remove the engine key so that it cannot be started while servicing.
9. Be careful when working near open drives or moving parts.
10. Do not wear loose fitting clothes near the machine.



SAFETY – CONTINUED

- 11. Keep safety shields in place during operation.**
- 12. Stay well clear of auger system during operation.**
- 13. DO NOT leave the augers running when they are not in use.**
- 14. Do not run any function during the cleaning of the machine. The operator must stay with the controls during the cleaning process.**
- 15. Do not run the engine in a closed or poorly ventilated area.**
- 16. Do not refuel the fuel tank while the engine is running.**
- 17. Observe all safety decals and keep them in readable condition.**
- 18. Be sure that all personnel are aware of these safety recommendations.**

**MODEL SF-3000
SLIPFORM PAVER**

OPERATOR SERVICE & PARTS MANUAL

**SECTION II
INTRODUCTION**

The SF-3000 Slipform Paver has been designed and developed by people long familiar with the requirements of this type of equipment. The SF-3000 has been proven in actual on site operations and when operated and maintained properly, will do fast and dependable work throughout its' long life.

These instructions are provided to give you the information needed to operate, adjust and service the paver effectively.

Before operation of this machine, please read this publication carefully and keep it for future reference. If more information is desired, contact Power Pavers, Inc. 1911 Lincoln Street, Cedar Falls Iowa 50613.

Phone: (319) 266-6460 Fax: (319) 266-6470

E-mail: info@powerpavers.com www.powerpavers.com

NOTE: The operator faces the direction of travel when paving throughout these instructions.... front, rear, right or left directions are made in relation to the operators' position.

SAFETY!

THE IMPORTANCE OF GOOD SAFETY HABITS CAN NOT EXPRESSED TOO STRONGLY WHEN OPERATING AND SERVICING HEAVY EQUIPMENT SUCH AS THIS. WE ASK THAT YOU PAY PARTICULAR ATTENTION TO THE SAFETY SECTION OF THIS SERVICE MANUAL AND BE SURE THAT ALL PERSONNEL WORKING AROUND THE MACHINE HAVE READ IT.

SECTION III

RECEIVING – TRANSPORTATION – STORAGE

A. RECEIVING

Your new SF-3000 will arrive on a tractor-trailer. The machine in most cases will be shipped fully assembled. Use the following procedures to unload the machine:

- 1. The machine must be unloaded on level ground.**
- 2. Before starting, check that the hydraulic valves are open to the pump. There will be three gate valves. These valves are best accessed from under the machine. Upon first receiving the machine, the exhaust extension will have been removed. Reinstall the exhaust extension using the clamps provided.**
- 3. Check the engine oil.**
- 4. The keys will be located under the console on the left side, near the fuse block; in the hydraulic tank or fuel tank fill screen.**
- 5. Make sure that the Master Switch (fig. 7.3, item 1) is in the off position. The engine will not crank with the Master Switch in the Standby or Run position.**
- 6. Make sure that the Auger Controls (fig. 7.3, items 2 & 3) are in the neutral position and that the Travel Controls (fig. 7.3, items 4 & 6) are in neutral position. The engine will not crank with the Auger Controls out of neutral position.**
- 7. To start the engine, give it about ¼ Throttle (fig. 7.1, item 6). Start the engine with the Key Switch (fig. 7.1, item 1).**
- 8. Once the engine is running, and with all controls in a neutral position, the Master Switch (fig. 7.3, item 1) may be moved to the center position labeled STANDBY, this is the stand by position. This will allow all cylinder functions to operate only.**
- 9. The controls used for the Loading Legs and the Elevation Posts are the same. They are the four handles on the lower right side of the Main Control Panel (fig. 7.3, items 12).**

SECTION III – CONTINUED

10. The Loading Legs work when the Selector Switch, located on the lower right side of the Main Control Panel (fig. 7.3, item 11) is rotated to the left position.
11. The machine will arrive with the loading legs extended to the third or forth hole (see fig. 1, items 25, 26, 27). To unload the machine, extend the cylinders till they lift the machine clear of the bed of the haul unit. When the machine is clear of the truck, drive the truck out from underneath the machine.
12. Now you can lower the machine to the ground with the loading leg cylinders. Keep in mind to lower the machine evenly.
13. The tracks will often not sit on the ground after the loading leg cylinders have been retracted. You will have to rotate the Selector Switch (fig. 7.3, item 11) to the center position and then use the four handles (fig. 7.3, items 12) to extend the Track Posts (fig. 2, item 2) till the weight of the machine is on the tracks.
14. After the tracks are sitting on the ground, rotate the Selector Switch (fig. 7.3 items 11) to the left position. Now you can reposition and re-pin the loading legs so that they are retracted out of the way during use of the machine.
15. Once the loading legs are fully retracted rotate the Selector Switch (7.3, items 11) to the “center” Elevation Post position and you will then have elevation control function for the track posts during operation.

CAUTION !

IF A CRANE IS USED TO LIFT THE MACHINE FROM THE TRAILER IT MUST BE CAPABLE OF LIFTING 70,000 lbs. FOUR CABLES OF EQUAL STRENGTH AND LENGTH MUST BE USED. WRAP THE CABLES AROUND THE MAIN FRAME EXTENSIONS NEAR THE OUTER GRADE LEGS. WHEN LIFTING THE MACHINE IT MAY TURN 90° DUE TO THE POSITIONING OF THE CABLES. BE PREPARED FOR THIS AND STAND CLEAR DURING THE LIFTING PROCESS. NEVER STAND UNDER THE MACHINE.

SECTION III - CONTINUED

B. STORAGE

- 1. When storing the machine for the winter or for long periods of time, it is best to clean the machine thoroughly and spray all areas that come in contact with concrete with light oil to prevent rusting.**
- 2. Grease all points on the machine.**
- 3. Drain the water tanks and pressure washer pump. Any excessive water left in the water pump will freeze and damage the pump.**
- 4. The tracks should be driven onto a hard surface and oiled. The battery should be removed to a place of warmth and the fuel tank filled to prevent condensation.**
- 5. The engine oil and filters should be changed at this time.**
- 6. The machine should be lowered with the machine weight on the Safety Stands (FIG. 2a, item 29).**

SECTION IV

SERVICE PRIOR TO OPERATION OF THE MACHINE

1. ENGINE:

Prior to starting the engine the fuel and oil levels should be checked for proper elevations. Number 2 diesel fuel and SAE 10-30, high grade, highly refined oil is recommended. Under normal conditions the oil should be checked every 10 hr period or daily. The oil should be changed every 250 hrs. The oil should be changed every 250 hrs. In extreme operating conditions the oil should be changed every 150 hrs. The oil filter should be changed with every oil change. SEE SECTION XI FOR FULL SERVICE SCHEDULE.

2. PUMP DRIVE:

Prior to starting check the level of gear lube in the gearbox. A “dipstick” is provided in the top of the housing for this purpose. Use SAE 80-90 gear lube of high quality. **DO NOT OVER FILL THE GEARBOX. OVER FILLING OF THE GEARBOX WILL RESULT IN OVER HEATING OF THE UNIT.**

3. HYDRAULIC RESERVOIR:

Prior to starting the engine, check to see that the hydraulic oil level is showing about $\frac{3}{4}$ in the sight gauge on the hydraulic tank (fig. 1a, item11). Use J20-C TRANSDRAULIC FLUID or equivalent. See the cross over sheet attached in Section XI.

NOTE:

IT IS HIGHLY RECOMENDED THAT THE OIL AND FUEL TANKS BE LOCKED TO PREVENT VANDALISM.

Check to see that all lines to the pumps are turned on. The shut-off valves should be rotated fully counterclockwise.

Check to see that all lines to the pumps are turned on. The shut-off valves should be rotated fully counterclockwise.

SECTION V

OPERATION AND FUNCTION OF CONTROLS

A. ENGINE CONTROLS

1. The engine Ignition Switch (fig.7.4, item 1) is located in the lower left corner of the Control Panel.
2. The engine Throttle Cable for the engine is located in the left side of the control panel (fig. 7.1, item 6). Pull the Throttle $\frac{1}{4}$ out in preparation for starting the engine.

CAUTION:

HYDRAULIC PRESSURE IS AVAILABLE AT ALL TIMES WHEN THE ENGINE IS RUNNING, EXCEPT WHEN THE MASTER SWITCH (fig. 7.3, item 1) IS IN THE OFF POSITION (FULL COUNTERCLOCKWISE).

3. When starting the engine push the key operated switch in and turn clockwise. When the engine starts release the key.
4. To kill the engine push the throttle in and allow the engine to run at idle for 60 seconds before turning the key off.

NOTE: Like all internal combustion engines, the engine should not be shut down suddenly from load running. It is better to let the engine idle for 1 or 2 minutes to allow for temperature balance.

NOTE: **AN EMERGENCY STOP BUTTON IS LOCATED ON EACH END AND AT THE CENTER REAR OF THE MACHINE . WHEN PUSHED IN THE ENGINE WILL COMPLETELY STOP. TO RESTART THE ENGINE THE BUTTON MUST BE PULLED OUT.**

SECTION V - CONTROLS CONTINUED

B. CONTROL CONSOLE FUNCTIONS

1. The Throttle (fig.7.1, item 6) controls the speed of the engine. Under normal operating conditions the engine should run at 2250 rpm under no load. Idle the engine down while waiting for concrete. This will increase the life of the pumps and reduce heat.
2. The AUTO STEERING is activated by the Selector Switch (fig. 7.3, item 5). The Auto Steering will only work in forward travel unless the optional Auto Reverse Steering has been installed. (fig. 7.3, item 8)
3. The LEFT AUGER CONTROL (fig. 7.3, item 3) controls the Left Auger and will proportionally drive the Left Auger in the direction that the knob is rotated.
4. The RIGHT AUGER CONTROL (fig. 7.3, item 2) controls the Right Auger and will proportionally drive the Right Auger in the direction that the knob is rotated.

5. TRAVEL

Neither track valve will have any power until you rotate the TRAVEL SPEED CONTROL (fig. 7.3, item 4), and turn the MASTER SWITCH (fig. 7.3, item 1) to the PAVE position. When the Selector Switch (fig. 7.3 item 5) is pushed forward the machine will steer itself automatically when the steering sensor is on and positioned against the string line.

6. MANUAL STEERING

When steering the machine manually, the Selector Switch (fig. 7.3 item 5) must be in the manual position. The Manual Steering Control (fig. 7.3 item 6) will proportionally steer the machine in the direction the knob is rotated. When the knob is rotated more than 80% in either direction the crawler tracks will counter rotate.

CAUTION:

WHEN STEERING THE MACHINE MANUALLY IN LOOSE DIRT OR GRAVEL, ONE TRACK, OR THE OTHER SHOULD BE PUT IN REVERSE AND THE TRACKS COUNTER ROTATED. THIS WILL REDUCE STRESS ON THE MACHINE.

SECTION V - CONTROLS

CONTINUED

- 7. The HIGH SPEEDTRAVEL SWITCH (fig. 7.3, item 7) controls the displacement of the track drive motors. With the High Speed Travel Switch in the “TRAVEL” position, the Track Drive Motor displacement is reduced by half, thus increasing the travel speed. NOTE THAT WHEN THE DRIVE MOTORS ARE IN HIGH SPEED MODE THEIR OUTPUT TORQUE WILL BE REDUCED BY HALF.**
- 8. The LEFT SIDEFORM CONTROL (fig. 7.3, item 13) controls the Left Side-Form. The Left Side-Form will move out when the switch is moved to the left and in when the switch is moved to the right. The Left Side-Form will rise when the switch is pulled back and lower when the switch is pushed forward.**
- 9. The RIGHT SIDEFORM SWITCH (fig. 7.3, item 14) controls the Right Side-Form. The Right Side-Form will move out when the switch is moved to the right and in when the switch is moved to the left. The Right Side-Form will rise when the switch is pulled back and lower when the switch is pushed forward.**
- 10. The SIDEFORM SELECTOR SWITCH (fig. 7.3 item 14). When the selector switch is set to CONSOLE only the sideform controls in the control panel are functional. When the selector switch is set to REMOTE both the controls located in the control console and the sideform controls located on the ends of the machine are functional.**
- 11. The PRESSURE WASHER SWITCH (fig. 7.2, item 7) turns on the Pressure Washer Pump (fig. 16). THE PUMP MUST BE SWITCHED OFF WHEN NOT IN USE.**
- 12. The LEFT SPREADER CONTROL (fig. 7.2, item 2) operates the Left Spreader Lift Cylinder. Push the switch forward to lower the left side of the Spreader/Strike-Off.**
- 13. The RIGHT SPREADER CONTROL (fig. 7.2, item 2) operates the Right Spreader Lift Cylinder. Push the switch forward to lower the right side of the Spreader/Strike-Off.**
- 14. The SPREADER CROWN CONTROL (fig. 7.2, item 2) operates the Spreader Crown. Pull the switch back to raise the Spreader Crown. Push the switch forward to lower the Spreader Crown.**

SECTION V - CONTROLS

CONTINUED

- 15. The VIBRATOR SWITCH (fig. 7.2, item 5) has three positions, OFF, AUTO and RUN. When the switch is in the AUTO position the Vibrators will turn on when the MASTER SWITCH (fig. 7.3, item 1) is in the RUN position. When the Vibrator Switch is in the RUN position the Vibrators will be ON when the Master Switch is in the STANDBY or the RUN position.**
- 16. The LEFT VIBRATOR LIFT CONTROLS (fig.7.2, item 1) operates the left side of the bar that all of the Vibrators mount on. Push the handle forward to lower the bar. Pull the switch back to raise the bar.**
- 17. The RIGHT VIBRATOR LIFT VALVE (fig. 7.2, item 1) operates the right side of the bar that all of the vibrators mount on. Push the handle forward to lower the bar. Pull the switch back to raise the bar.**
- 18. The TAMPER SECECTOR SWITCH (fig.7.2, item 3) operates the Tamper Valve. When the Tamper Switch is in the RUN position the MASTER SWITCH (fig. 7.3, item 1) must also be in the RUN position to operate. When the MASTER SWITCH is in the STANDBY (center) position the Tampers will stop.**
- 19. The TAMPER SPEED CONTROL (fig. 7.2, item 4)
To increase tamper speed, rotate the knob clockwise, to decrease the speed rotate the knob counterclockwise.**
- 20. The TRAVEL SPEED CONTROL (fig. 7.2, item 4)
To increase travel speed, rotate the knob clockwise of center to increase forward travel speed. Rotate the knob counterclockwise of center to increase reverse travel speed.**
- 21. The MASTER SWITCH (fig. 7.3, item 1) is a three-position switch (OFF-STANDBY-RUN). The switch must be in the OFF position to start the engine. When the switch is in the STANDBY (center) position hydraulic oil pressure is available to manual cylinder functions only. The switch must be in the RUN position to operate the Tracks, Tamper, Vibrators and AUTO ELEVATION (elevation control) and other auxiliary functions. When the Master Switch is turned to the STANDBY position the Tracks, Tampers, Vibration and Auto ELEVATION will all be shut off at the same time.**

SECTION V - CONTROLS

CONTINUED

- 22. The MANUAL GRADE CONTROLS (fig.7.3, items 12) operate their respective Elevation Cylinders at each corner of the machine. When the Elevation Selector Switch (fig. 7.3 item 10) is in the MANUAL position.**
- 23. The AUTO ELEVATION CONTROL (fig. 7.3, item 10) when in the AUTOMATIC position activates all of the individual Elevation Sensors when the Master Switch (fig. 7.3 item 1) is on the RUN position. One Elevation Sensor is located on each Elevation Post. Each Sensor may be shut off, by closing the ball valve on that sensor. When the Master Switch is in the STANDBY (center) position oil is shut off to the Auto Elevation Valves that supply the sensors.**
- 24. The PAN CROWN SWITCH (fig. 7.2, item 6) operates the Power Crown System, which crowns the SUBFRAME ASSEMBLY (fig. 3).**
- 25. The MAIN SYSTEM PRESSURE GUAGE (fig. 7.1, item 8) reads the maximum set pressure of the Main System Hydraulic Pump.**
- 26. The VIBRATOR PRESSURE GUAGE (fig. 7.1, item 9) reads the maximum set pressure of the Vibrator Pump.**
- 27. The LEFT AUGER PRESSURE GUAGE (fig. 7.1, item 10) reads the actual working pressure of the Auger System.**
- 28. The RIGHT AUGER PRESSURE GUAGE (fig. 7.1, item 11) reads the actual working pressure of the Auger System.**
- 29. The LEFT TRAVEL SYSTEM GUAGE (fig. 7.1, item 12) reads the actual working pressure of the Left Crawler Track.**
- 30. The RIGHT TRAVEL SYSTEM GUAGE (fig. 7.1, item 13) reads the actual working pressure of the Right Crawler Track.**

SECTION VI

ADJUSTMENTS

A. PAN SYSTEM

1. When first receiving the machine the **FINISH PAN** system (fig. 4) will be set in a flat configuration.
2. The **Finish Pan** is connected at six points. Two in the center (fig. 4, items 19), where the crown is pulled into the pan if necessary and two at each end in front and back (fig. 4, items 4). The **Pan System** is properly adjusted when the front bottom surface of the Pan is the same distance, from the bottom of the frame, as the back bottom of the Pan at that respective point.

NOTE: WHEN CURBMULES ARE USED IT IS SOMETIMES HELPFULL TO PULL THE FRONT OF THE MULE UP TO HELP FILL THE MOLD.

3. If crown is pulled into the **Pan System** other than at the center crown, it is important that the same crown be put in the front of the Pan as in the back of the Pan. The way to determine this is to measure from the bottom of the **SUBFRAME ASSEMBLY** (fig. 3, item 1) in front to the Pan inside the Frame. Do the same in the back at the same location. If both are the same measurement, the Pan is set properly at that point. At any point in the Pan System where there is an adjustment, the front and back of the Pan at that point should be the same.

B. VIBRATORS

1. The **VIBRATOR MOUNT BAR** (fig. 9, items 1, 9), is hydraulically adjustable so that you may raise or lower the Vibrators at any time. The proper setting for the vibrators (fig. 9, item 18), is usually with the head of the vibrator about three inches below the Pan, when the **Vibrator Mount Bar** is completely lowered. Spacing of the vibrators will generally be determined by the specifications that you are working under. But 18 inch to 24inch maximum spacing will generally give you ample vibration.

SECTION VI - ADJUSTMENTS

CONTINUED

VIBRATORS – CONTINUED

2. The Vibrator used in the Curb area should be positioned as close to the throat of the CURB MOLD (fig. 4, item 2) as possible and in the center of the opening. There is a VIBRATOR OFFSET EXTENSION (fig. 9, item 14) which attaches to the Vibrator Bar which enables the Vibrator to be moved closer to the Curb Mold throat. The Curb Vibrators usually work best if they are pointed down and back at about a 45-degree angle.
3. Curb vibrators usually get the best results when they are set to run at about 8,000 to 9,000 vpm. The rest of the vibrators usually work well at between 5,000 to 8,000 vpm depending on the slump of the concrete and the mix design. The slump of the concrete will be a determining factor as to the proper speed. Each Vibrators speed is controlled by an individual speed control. **IT IS IMPORTANT THAT YOU DO NOT OVER VIBRATE AS WELL AS UNDER VIBRATE. WE HAVE FOUND THAT THE VIBRATORS WORK SUFFICIENTLY AT AROUND 5,000 TO 8,000 RPM . THE VIBRATORS ARE CAPABLE OF SPEEDS OVER 10,000 RPM.**
4. When paving a flat slab, the end vibrators should be positioned six inches (15 cm) from the Sideforms.

CAUTION: AT NO TIMES SHOULD THE VIBRATOR HEADS EVER TOUCH THE MACHINE. This will adversely affect the finish surface and damage the Vibrators.

C. TAMPER BAR

1. The TAMPER BAR (fig. 3, items 21, 22, 23, 24, 25) should be adjusted so that it stops even (or close to even) with the bottom of the Pan System when the Tamper is at the bottom of the “down” stroke. Make sure that all bolts on the Tamper System are tight. If the Finnish Pan has a crown in it other than at the center of the frame, the Tamper should conform to that as close as possible. **THE TAMPER SHOULD NEVER GO BELOW THE REAR OR TRAILING EDGE OF THE PAN WHILE PAVING.**
2. The BOTTOM TAMPER BAR (fig. 3, item 22) should extend to within two inches of the Side Form, when paving with no Curb Mold.

SECTION VI - ADJUSTMENTS

CONTINUED

3. When using CURB MOLD (fig. 4, item 2) NEVER extend the Tamper through the curb area.
4. Be extra certain all of the bolts and nuts are tight.

D. SENSORS

1. The SENSORS are high precision instruments and should be handled with care at all times.
2. The ELEVATION SENSORS (fig. 15.1, item 6) should be set in such a way as to position the front and the rear of the machine frame to be on the same plane as the string line. Set the front of the machine roughly $\frac{1}{4}$ inch (6mm) higher than the rear in relation to the String Line.
(See Illustration Page 34)
3. All sensors can be turned off individually during normal operation, by a ball valve located on the pressure port of each sensor. This cones in handy when trying to get by close obstructions. THE BALL VALVES MUST BE OPEN FOR PROPER OPERATION OF THE SENSORS.
5. When the machine is set to proper elevation and offset, it is advisable to have some adjustment remaining in the sensor jacks. Both in the upward and the downward directions.
6. The STEERING SENSOR, (fig. 15.2 item 6) should be set in such a way that the wand of the sensor (fig. 15.2 item 7) is contacting the string line about four inches from the end of the wand. This is done, by adjusting the sensor jack (fig. 15.2, item 2).
7. The counter weight spring on the sensor wands, should be adjusted to keep the wands against the string line, but not so mush weight as to cause deflection of the string line.

SECTION VI - ADJUSTMENTS

CONTINUED

E. TRACKS

- 1. The Track should be adjusted so that there is about $\frac{3}{4}$ inch (2cm) sag in the grousers between the top rollers.**
- 2. The Track is tightened by injecting grease into the cylinder located behind the front idler on the Track (fig. 6, item 10).**
- 3. The Track is loosened, by loosening the cap nut on the cylinder grease fitting, to let the grease out.**

SECTION VII

CHANGING WIDTHS

- A. The SF-3000 paver is adjustable in six-inch increments. Special widths can be attained, by contacting the factory for special sections.**
- B. All models of the machine widen by section with the exception of the MAIN TRACTOR FRAME (fig. 1, items 1, 2, 3) and the SPREADER BEAM (fig. 5, items 1, 2) which telescope.**
- C. When changing widths on a paver it is advisable to keep the machine balanced as much as possible, by extending both ends equally. This will ensure that the center crown is as close as possible to the center of the machine.**
- D. When installing the sections always use the larger sections first against the main frame and add the shorter sections as you go out in width. THIS IS IMPORTANT TO ENSURE THAT THE TAMPER EXTENSIONS ALL INTERCHANGE PROPERLY.**
- E. It is advisable to change one side of the machine at a time. You will find it easier, in most cases, and faster.**

NOTE: IT IS ADVISABLE TO CHANGE THE MACHINE ON A HARD, FLAT SURFACE WITH ENOUGH ROOM TO MANEUVER AROUND IT.

- F. You will find that you can use the machines' power to help you to line up parts and holes.**
- G. Determine before you start, what will need to be done for the width change.**
 - 1. How wide or narrow will the machine need to go?**
 - 2. Will you need to add Main Frame Extensions?**
 - 3. Determine where you are going to split the machine (see letter "D" this section).**

SECTION VII - CHANGING WIDTHS

CONTINUED

H. Steps involved in width changes are as follows:

- 1. Lower the loading legs so that they start to take the weight off the tracks. This will make the tracks slide out easier.**
- 2. Loosen the Frame Clamps on the end to be changed. There are clamps on the front and the back on each side.**
- 3. Set some blocks under the Strike-Off Plates (fig. 5, items 14, 15, 16) so that they will not fall to the ground as you unbolt them in preparation for the width change.**
- 4. Use a jack to support up the under side of the Spreader Beam. This should be jacked up just far enough to take the bind out of it so that it will slide easier.**
- 5. Unbolt the Strike-Off and the Augers at the outer most connection to prevent damage to the Auger Bearings, from the auger dropping to the ground and putting the gearing in a bind.**
- 7. Take the necessary vibrators off and remove Vibrator Rack Extensions (fig. 9, items 9, 10) if required.**
- 8. Remove the Tamper Sections and Shafts that will interfere with the widening or narrowing of the machine.**
- 9. Unbolt and remove the required front and rear Sub Frame sections (fig.3, items 4, 5, 6, 8, 9, 10).**
- 10. Unbolt the Finishing Pan System (fig. 4) in the same place that the Sub Frame was unbolted.**

I. With the above steps taken, and the weight of the machine on the Loading Legs, you are now ready to widen or take out enough parts to reduce the width.

- 1. Locate the selector valves inside the console (fig. 7, item 19). Pull the valve handles “up” to select the widening cylinders positions.**
- 2. By using the grade valves (fig. 7, items 15, 16, 17, 18) you can push or pull the Main Frame Extensions in or out.**

SECTION VII - CHANGING WIDTHS

CONTINUED

3. Try to keep the front and back of the frame extensions equal as you extend or retract them to prevent binding.
4. If it is necessary to add Frame Extensions (fig. 1, item 7), extend the Main Extension Tubes (fig. 1, item 2) past 48 inches (1.2m) and then unbolt one frame at a time from the End Frame (fig.2), draw it back in and install the 48 inch (1.2m) Frame Extension. **DO NOT UNBOLT BOTH FRONT AND BACK AT THE SAME TIME. THERE IS A DANGER THAT THE TRACK MAY FALL OVER.**
5. With the Extensions in place, you can continue out with the machine.

J. SPREADER BEAM:

The Inner Spreader Beam Tube (fig. 5, items 1, 2) simply slides out or in with the Main Frame after the after the Strike-Off and Augers have been disconnected.

K. STRIKE-OFF:

1. Replace the Strike-off (fig. 5, items 14, 15, 16) plate to the determined width.
2. The Outer Strike-Off Plate (fig. 5, item 15) and the Strike-Off Extension Plate (fig. 5, item 16), when used, will always overlap the Main Center Strike-Off Plate (fig. 5, item 14).

L. AUGERS:

1. The Augers come in left-hand and right-hand flighting. This must be kept in mind when installing the Auger sections.
2. To determine the difference between the left and right hand flighting look at the end of the auger section. If the flighting turns clockwise, it is a right hand auger.
3. Insert or remove auger sections as needed keeping the longer auger sections toward the center of the machine.

SECTION VII - CHANGING WIDTHS

CONTINUED

M. SUB FRAME: (PAVING KIT)

- 1. The Sub-Frame Assembly or “PAVING KIT” (fig. 3, item 1, 2), Will always consist of the Main Center Section (fig. 3, item 1), and two End Frames (fig. 3, item 2), one each side.**
- 2. The widening sections (fig. 3, items 3 thru 10), are added between the Main or center section and the End Frames.**
- 3. Always use the wider frame sections against the Main or Center Section and work down to the smaller sections as you go out to the End Frames.**
- 4. The left and right Frame sections are identified by the Tamper mounts and the Finishing Pan match up assemblies on the sections.**
- 5. The front sections are taller and have a longer plate on them, which extends below the front lip of the Pan sections.**

N. FINISHING PAN ASSEMBLY:

- 1. The Main Sub-Frame Assembly is equipped with a Finishing Pan Assembly (fig. 4). When the Frame is extended, the Pan must be extended also.**
- 2. When extending Pan Sections always keep the longer sections toward the middle.**
- 3. There are left and right pan sections, and they can be identified by a joint “lip” on the front of the Pan. This “lip” is always positioned towards the center of the machine.**
- 4. There is an adjustment screw/truss system between each Pan Section (fig. 4, items 9 thru 12), front and back. This allows you to adjust the Pan at each of these points.**

SECTION VII - CHANGING WIDTHS

CONTINUED

O. TAMPER SYSTEM:

- 1. When using 48 or 24 inch Frame Sections, Tamper shafts of the same length must be used. The bottom Tamper Bar should extend to within 2 inches of the Side Form or the Curb Mold, if installed. NEVER EXTEND THE TAMPER BAR THROUGH THE CURBMULE AREA. BE SURE ALL BOLTS ARE TIGHT.**

P. VIBRATOR RACK:

- 1. The Vibrator Rack, (fig.9) is extended by Sections (fig.9, items 9 thru 12).**

SECTION VIII

PLACING THE PAVER INTO OPERATING POSITION

METHOLD USED TO PAVE WITH THE POWR PAVER SF-3000 SLIPFORM

1. STRINGLINE

Stringline is used for guidance of the paver. This includes both grade (elevation) and line (steering). The stringline is set in relationship to preset hubs that are determined by the project engineer and are set by the surveyor.

- A. Elevation of the string is generally set at 12" (300mm) above the slab. This can vary with a particular job situation.**
- B. Line or off-set is generally set 5 feet (1.5M) to the back of slab. This can vary with a particular job situation.**
- C. With the stringline set at 5 feet (1.5M) to the slab the grade at this point must be to the edge of slab.**
- D. Distance between each stringline stake must be no more than 20' (6M) center to center.**

2. SUBGRADE

After the stringline has been set, the subgrade can be prepared to proper grade and density. This is done in relationship to the stringline. Subgrade preparation must be complete to a minimum of 48" (1.2M) beyond the edge of slab on both sides. This assures that the pavers tracks are traveling on properly prepared grade. This minimizes the amount of adjustment that the machine must make which assures a smooth slab.

SECTION VIII

PLACING THE PAVER INTO OPERATING POSITION

CONTINUED

3. MACHINE SET UP

After the subgrade is prepared the paver is moved into position on the subgrade.

- A. The elevation (thickness of the slab) is then set with the four grade sensors located on each corner of the machine. These four sensors read off the stringline set on each side of the paver. It is very important that all personnel are instructed not to disturb the stringline. If the stringline is accidentally hit the sensors will signal the paver to adjust the elevation which will reflect in the slab. These areas will require hand finishing.
- B. The steering sensor is adjusted in the same manner as the grade sensors.

4. PAVING

When the grade and steering have been properly set, concrete is then introduced to the machine directly on the augers allowing the vibration chamber to fill. Ideal slump is approximately .5 inches (1.27cm) to 1.5 inches (3.8cm). This will vary with the slab thickness and mix design.

5. AUGERS

The operator controls the augers and distributes the concrete evenly across the front of the paver.

- A. 2" (5cm) of the outer edges of the augers are hardsurfaced to prevent wear. The flighting is 3/8" (1cm) thick.
- B. The auger is split in the center and reversible, thus allowing the operator to distribute the concrete equally in front of the paver. Each half is individually controlled in either direction by the operator.
- C. Containment shields in front on each side of the paver allow extra concrete to be placed in front of the augers. This prevents concrete from spilling over into the track line.

SECTION VIII

PLACING THE PAVER INTO OPERATING POSITION

CONTINUED

6. STRIKE-OFF

- A. Hydraulically adjustable in each end by the operator. This allows the operator to maintain a consistent quantity (head) of concrete in the vibration chamber. This is an important factor in achieving a smooth finished product.**
- B. The strike-off is crownable allowing it to be set equal to the extrusion meter, when the final product calls for a crown.**

7. VIBRATION

As the machine moves forward the vibrators are automatically turned on. When the forward motion of the paver stops the vibrators automatically shut off.

- A. The vibrators are located directly behind the strike-off.**
- B. 2 1/4" (5.72cm) angled internal vibrators variable from 0 to 12,000 vibrations per minute. Each vibrator is individually controlled. Suggested vibrations per minute is 7,500 to 8,500. This will vary with the slump and mix of the concrete.**
- C. Vibrators are spaced 18" to 24" (45 to 60cm) apart. Consolidation is 16" (40cm) radius around the vibrator. Vibrators are located so top of the vibrator is even with the bottom of the pan (or top of slab).**
- D. Vibrator height is controlled hydraulically. They can be raised to pass over expansion joints, baskets, or headers.**
- E. The amount of concrete in the vibration area is controlled by the strike-off. The height of the concrete is approximately 6" (16cm) higher than the finished slab and should be maintained consistent through the entire pour.**
- F. Vibrators should never be run unless submerged in the concrete.**

SECTION VIII

PLACING THE PAVER INTO OPERATING POSITION

CONTINUED

8. TAMPER

- A. The tamper is located directly behind the vibrators and in front of the extrusion meter.**
- B. The tamper is speed adjustable and has a stroke of 2 inches (5cm).**
- C. Double tamper bars. The lower bar helps consolidate the concrete, pushing the aggregate below the extrusion meter. The upper bar keeps the head of the concrete in the vibration area turned over preventing the concrete from crusting.**
- D. The right and left tampers are staggered so that when one half of the tamper is moving up the other half is moving down. This eliminates a surging effect out the back of the extrusion meter.**

9. EXTRUSION METER

- A. 3/8" (10mm) thick material**
- B. Rear of the meter is reinforced providing a clean straight edge.**
- C. The meter sections are adjustable at each joint.**
- D. Meter is crownable hydraulically.**
- E. The altitude of the pan should be one-eighth to one-quarter of an inch (3.2mm to 6.3mm) higher in the front than rear. This produces sufficient compression to seal the slab. Insufficient altitude will produce an open surface. Too much altitude will produce a surging effect behind the meter. An excessive amount of altitude will produce a lifting (ski) effect which will cause the tracks of the paver to lose traction.**
- F. It is normal for the edge of the slab to slump a little. This is controlled by overbuilding the edge approximately a quarter inch (6mm). This will vary with the slump of the concrete and the thickness of the slab being poured. The paver is equipped with a manual adjustment in the last 12 inches (300mm) of the meter. This is one of the reasons it is of utmost importance to have a uniform and continuous supply of concrete.**

SECTION VIII

PLACING THE PAVER INTO OPERATING POSITION

CONTINUED

- G. The extrusion meter must be kept clean. It is important not to allow concrete to build up on the bottom of the pan.**

10. BELT FINISHER

- A. The belt is directly behind the extrusion meter. This helps finish and close the concrete by oscillating the belt approximately 10" (25.4cm) over the top of the slab. The belt is 20" (50.8cm) wide and has variable speed control. The belt stops and starts simultaneous with the travel of the paver.**

11. TRAILING FLOAT PAN

- A. The float pan is located directly behind the belt finisher. It is a longitudinal float. It has no downward pressure except for weight of the float. The float helps the finish and is used in conjunction with the introduction of the bars in the side of the wet slab, correcting any displacement of concrete caused by the bar.**

12. TIE BARS

- A. Tie bars are inserted directly into the side of the wet slab. The insertion is made by means of a hydraulic tool which will push the bar one half of its length into the slab.**
- B. Spacing between the bars will be determined by the circumference of a metering wheel mounted over the track. The circumference of the wheel will be determined by the specifications of the job.**

13. BURLAP

- A. Burlap is pulled behind the machine to provide a finish to the slab. It is important to keep the burlap wet. This can be done by periodically wetting it by means of the pressure wash system on the paver.**
- B. Only clean acceptable water can be used.**

SECTION VIII

PLACING THE PAVER INTO OPERATING POSITION

CONTINUED

14. SENSORS

- A. The paver is equipped with hydraulic sensors. The hydramation system is maintenance free compared to electrical systems. Electrical systems are susceptible to moisture and contamination is harder to trouble shoot. The hydramation system is much simpler and easier to work on. Hydraulic sensors may be left on the machine as they are not affected by the weather.**

15. TRACK SYSTEM

- A. Hydrostatic drive**
- B. 14' (4.27m) long track**
- C. Grouser pads are 14 inches (35.6cm) wide**
- D. Two speed track drive motors. Low speed for smooth paving speeds. This gives you uninterrupted paving when concrete delivery is slow. High speed for moving the machine around on the job site.**

SECTION VIII

PLACING THE PAVER INTO OPERATING POSITION

CONTINUED

PLACING THE PAVER INTO OPERATING POSITION

1. After checking the engine oil and making sure that all of the valves and switches are in the neutral or off positions and with the Master Switch in the full OFF position, start the engine. After the engine has warmed up, switch the Master Switch to the Center position to activate the pumps.
2. Raise the Strike-Off up to assure that it will clear any obstacles in the way.
3. After checking to make sure there are no obstacles around the machine, switch the MASTER SWITCH to the RUN position and start to move the machine into position. Manually maneuver the machine into a position, so that the STEERING SENSOR WAND can be placed against the String Line. Select AUTOMATIC with the Steering Selector Switch (fig.7.3 item 5). Rotate the TRAVEL SPEEDCONTRL to forward, and the machine will align itself with the String Line. This will usually take about 30 feet or so. You will have to adjust the Steering Sensor toward the String Line or away from it depending on how the machine aligns itself. **BEAR IN MIND THAT THE SIDE FORMS MUST BE IN THE “IN” POSITION WHEN YOU MEASURE TO THE STRING LINE.** When you are sure that the machine is steering properly, back the machine into position.
4. With the machine setting at the correct distance from the String Line, stop the travel and prepare to adjust the machine for proper elevation.
 - A. When setting the Sensors up for elevation, be sure that they are pulled out far enough so that they will not be in danger of damage by the track when you lower the machine all of the way down. If you pull the Sensors out far enough to just miss the track motor guard, you will be about the right distance away from the String Line if it is set 48 inches from the proposed slab.
 - B. Use the MANUAL ELEVATION CONTROL VALVES, to raise or lower the machine until the Finnish Pan is at the approximate elevation of the proposed slab.

SECTION VIII

PLACING THE PAVER INTO OPERATING POSITION

CONTINUED

- C. Once the machine is adjusted to the approximate elevation, put the Sensor Wands under the String Lines. Adjust the Sensors up or down with the screw jack until the wands on the Sensors are roughly level. Now turn each sensor OFF with the Ball Valve that is located at the pressure port of each sensor. Once the individual sensor valves have been turned OFF, turn the MASTER SWITCH to the RUN position and move the ELEVATION SELECTOR (fig.7.3 item 10) by pushing it forward. Now go back to ONE SENSOR AT A TIME and turn each individual sensor on watching closely to see if the machine moves. If the machine moves readjust the sensor with screw jacks until you have the desired height.**

SECTION IX

PRE-PAVING CHECK LIST

- 1. Proper fuel level**
- 2. Proper engine and pump drive oil levels**
- 3. Has the machine been greased?**
- 4. Are the water tanks full?**
- 5. Walk the string line before each pour and check for:**
 - A. Line tightness**
 - B. Clearance over manholes, box outs or any other obstructions in the grade.**
- 6. Start the engine to see if the following functions are operable:**
 - A. Augers**
 - B. Tamper**
 - C. Vibrators**
 - D. Travel**
 - E. Auto Elevation (each corner)**
- 7. Are the side form containment extensions installed?**
- 8. Has the machine been oiled down?**
- 9. Is the tamper system set right?**
- 10. Are the sensors in the correct position with the arrow on the end of the shaft “up” and the wands parallel to the ground?**
- 11. Is the machine in the right relationship to the string line?**
- 12. Is the curb mold vibrator adjusted properly?**
- 13. Is the pan system adjusted properly?**
- 14. Does the tamper bar extend to within 2 inches of the side form?
(An exception to this would be when a curb mold is installed.)**
- 15. Are all bolts on the tamper system tight with lock washers?**

SECTION X

SERVICE & MAINTENANCE

The SF-3000 slipform paver requires a minimum of service to keep it operating efficiently. However, attention to these regular maintenance procedures is important to have long trouble free operation. Follow these recommendations carefully.

- A. OF UTMOSTED IMPORTANCE TO THE OPERATION OF THIS MACHINE IS THAT IT BE WASHED, CLEANED AND GREASED AT THE END OF EACH USE. THE PAN SYSTEM AND CURBMULE MUST BE KEPT PARTICULARLY FREE OF ALL BUILDUP AND FILM.**
- B. BEARINGS, SHAFTS AND MOVING PARTS**
 - 1. Using high quality gun grease, lubricate grease fittings as recommended below.**
 - a. Tamper bearings and bushings.....daily**
 - b. Outer auger bearings.....daily**
 - c. Center auger shafts.....daily**
 - d. Grade tubes.....weekly**
 - e. Grade tube pin that mounts to the tracks.....weekly**
 - f. Spreader crown system.....weekly**
 - g. Sub-frame (paving kit) crown system.....weekly**
- C. The hydraulic pump drive gearbox should be checked weekly and changed every six months. DO NOT OVERFILL. A “dip stick” is provided in the top of the casing. Excessive oil in the gear casing will result in heat buildup in the gearbox.**
- D. The track drive torque hubs should be checked weekly and changed every six months.**
- E. The power crown chains should be oiled monthly.**
- F. The track pins should be oiled monthly.**

SECTION X
SERVICE & MAINTENANCE
CONTINUED

G. HYDRAULIC

1. **The hydraulic oil level should be visually checked. The oil should show half way in the sight gauge.
USE ONLY TRAN-DRAULIC J-20-C FLUID OR EQUIVALENT. A hydraulic fluid reference sheet is provided at the end of this section.**
2. **The hydraulic filters should be changed every 250 hours.**
3. **The hydraulic hoses should be checked periodically for wear and leakage.**

H. PAN SYSTEM

1. **It is important to wash any seepage of concrete into the interior of the pan away every day.**
2. **The pan system MUST be cleaned at the end of each pour.**

I. VIBRATORS

1. **The vibrators should be checked weekly to assure all bolts are tight and the rubber isolators are in good shape.**

SECTION X
SERVICE & MAINTENANCE
CONTINUED
HYDRAULIC FLUID REFERENCE SHEET

DESCRIPTION:

Northland's specially formulated hydraulic transmission fluid is truly a multi-function tractor fluid for use in transmissions, final drives, differentials, wet brakes and hydraulic systems of tractors employing a common fluid reservoir. This fluid is manufactured from carefully selected base stocks and additives to provide; lubrication of spur and bevel differential gears, lubrication of transmissions, control brake chatter and serve as a power steering and hydraulic fluid. This fluid contains selected additives for high oxidation resistance and low pour points. It is compatible with commonly used seal materials, will resist water, and provides excellent load-carrying capacity and wear protection. In addition, this fluid is rust and foam inhibited for a complete universal lubricant.

TYPICAL PROPERTIES UNIVERSAL TRAN-DRAULIC TRACTOR FLUID

Gravity, API	29.8
Flash Point, F.....	415
Pour Point, F.....	- 40
Viscosity at 100 C CST.....	9.6
Viscosity after 30 min. Sonic Shear.....	8.0
Viscosity Index.....	135
Viscosity at - 34 C cP.....	61,400

APPLICATION:

Northland Universal Tran-Draulic fluid is recommended for service refill of: transmissions, final drives, differentials, hydraulic systems, and power steering systems on most domestic and foreign tractors. It may also be used for hydraulic applications where wide operating temperature performance and good anti-wear characteristics are required.

Tractor manufacturers have not been able to agree on a single specification for a fluid suitable in all tractors, and therefore, this fluid cannot be offered as meeting all manufacturers' specification requirements. It has, however, demonstrated excellent field and bench test performance and can be recommended for use in the following manufacturer specified products.

SECTION X
SERVICE & MAINTENANCE
CONTINUED

HYDRAULIC FLUID REFERENCE SHEET

MANUFACTURER	FLUID SPEC.	COMMERCIAL BRAND
Allison	C – 3	
Caterpillar	TO – 2	
J I Case	MS 1207	Powerguard PTF
	MS 1206	Powerguard PTF
	MS 1205	TFD – IT
	MS 1204	TFD
	MS 1210	TCH
Deutz Allis	272843	Power Fluid 821
JOHN DEERE	JDM J20C	HY-GUARD
	JDM J20A	Hy-Guard
	JDM J14B	303 Fluid
Ford	ESN M2C 134B	
	ESN M2C 86B	
	ESN M2C 53B	
	ESN M2C 48B	
	ESN M2C 41B	
Ford New Holland	ESN M2C 134C	
	ESN M2C 86C	
International Harvester	B – 6	Hy-Tran, Tran Plus
Massey Freguson	M – 1135	Perma-Tran
	M – 1129 – A	
	M – 1127 – B	
	M – 1110	
	M – 1141	
Kubota	M – 80	
	UDT	
Oliver		Type 55
Stieger		Hydraulic Trans. Fluid
White Farm	Q1826	
	Q1766 B	
	Q1766	
	Q1726	

SECTION XI

PROBLEMS & SOLUTIONS

- | | | |
|-----------|-----------------|--|
| A. | PROBLEM | Concrete is rippling or surging out the back of the paver, leaving an excess of concrete. |
| | SOLUTION | <ol style="list-style-type: none">1. The front of the machine is too high, lower the front end by adjusting the sensors.2. If the ripple or surge effect is occurring only in one area, it is a sign that the front of the Pan is too high in that respective area. Readjust that area of the Pan downward. |
| B. | PROBLEM | Tracks on the paver keep losing traction. |
| | SOLUTION | <ol style="list-style-type: none">1. The front of the machine is too high, causing a “ski effect”, lower the front of the paver by adjusting the front sensors. |
| C. | PROBLEM | The concrete is not touching the back of the Pan as it passes through the machine. |
| | SOLUTION | <ol style="list-style-type: none">1. Raise the front of the machine by adjusting the front sensors. |
| D. | PROBLEM | The slab has holes in the top finish. |
| | SOLUTION | <ol style="list-style-type: none">1. Decrease the vibration except on the ends.2. Increase tamper speed.3. Increase the slump of the concrete.4. The concrete sat too long in the front of the machine.5. Drag a double layer of burlap and keep it very wet. |

SECTION XI

PROBLEMS & SOLUTIONS

- | | | |
|-----------|-----------------|--|
| E. | PROBLEM | The Curb is slumping or falling over behind the machine. |
| | SOLUTION | <ol style="list-style-type: none">1. Lower the slump of the concrete.2. Decrease the curb vibrator speed.3. Make sure that the curb vibrator is not touching the mold or side of the machine.4. Increase the height of the concrete you are pushing on the curb side of the machine.5. Check the mix design. |
| F. | PROBLEM | The curb is tearing. |
| | SOLUTION | <ol style="list-style-type: none">1. Increase the slump of the concrete.2. Lower the front of the curb mold.3. Keep the machine moving more. The concrete will start to set up if waiting in one place too long.4. Slow the travel speed down.5. Check the air content of the concrete, it may need to be increased |
| G. | PROBLEM | The curb mold is not filling all the way. |
| | SOLUTION | <ol style="list-style-type: none">1. Carry a larger head of concrete in the vibration area on the curb side.2. Raise the mule in front.3. Back the vibrator out of the curb mold throat a bit. The vibrator may be too close causing a blockage.4. Increase the vibration. |

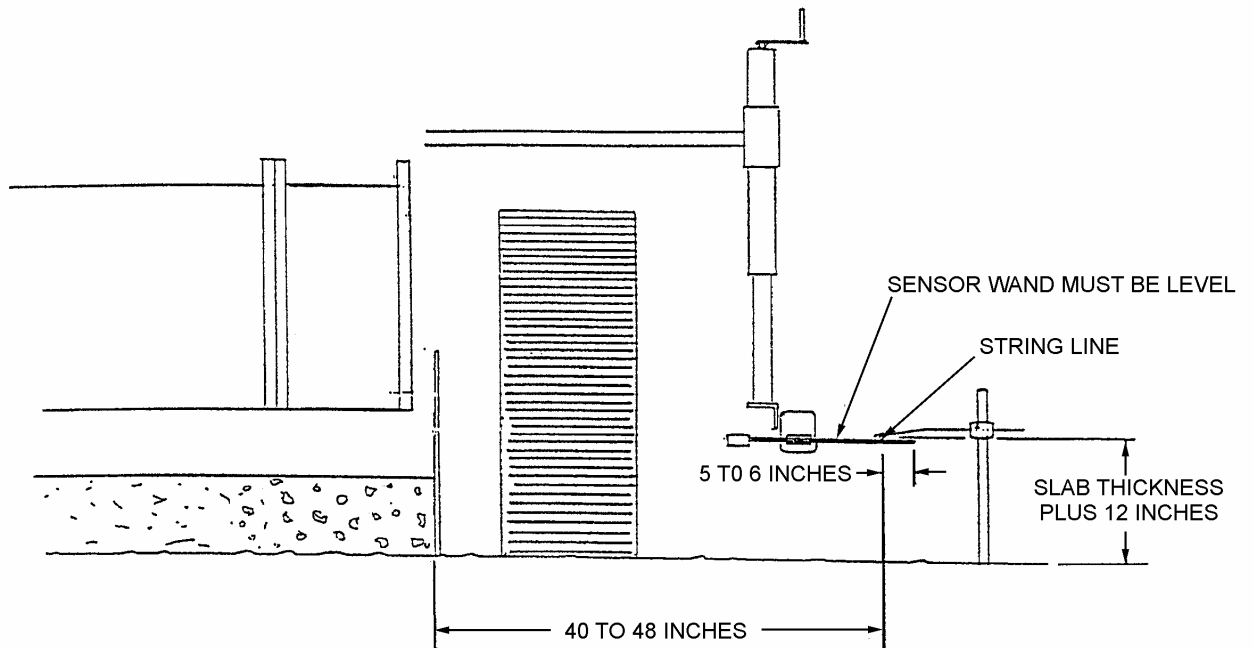
SECTION XI
PROBLEMS & SOLUTIONS
CONTINUED

- | | | |
|-----------|-----------------|--|
| H. | PROBLEM | The machine quits steering. |
| | SOLUTION | <ol style="list-style-type: none">1. Check to make sure that the selector switch is in the AUTOMATIC position.2. Check all of the steering sensor cords to ensure none are pinched and that all connections clean dry and secure. |
| I. | PROBLEM | An elevation sensor quit working. |
| | SOLUTION | <ol style="list-style-type: none">1. Is the elevation switch in the AUTOMATIC position?2. Are the individual sensor valves on?3. The solenoid wires may be loose.4. Check to see if manual grade works. |
| J. | PROBLEM | Auger quits working. |
| | SOLUTION | <ol style="list-style-type: none">1. Charge pump pressure too low. Check the gauge on the suction filter, the filter may need changing.2. Broken hose, look for oil.3. Check keys in auger motor shaft and auger drive shaft.4. Is the relief set too low?5. Faulty motor.6. Faulty pump. |

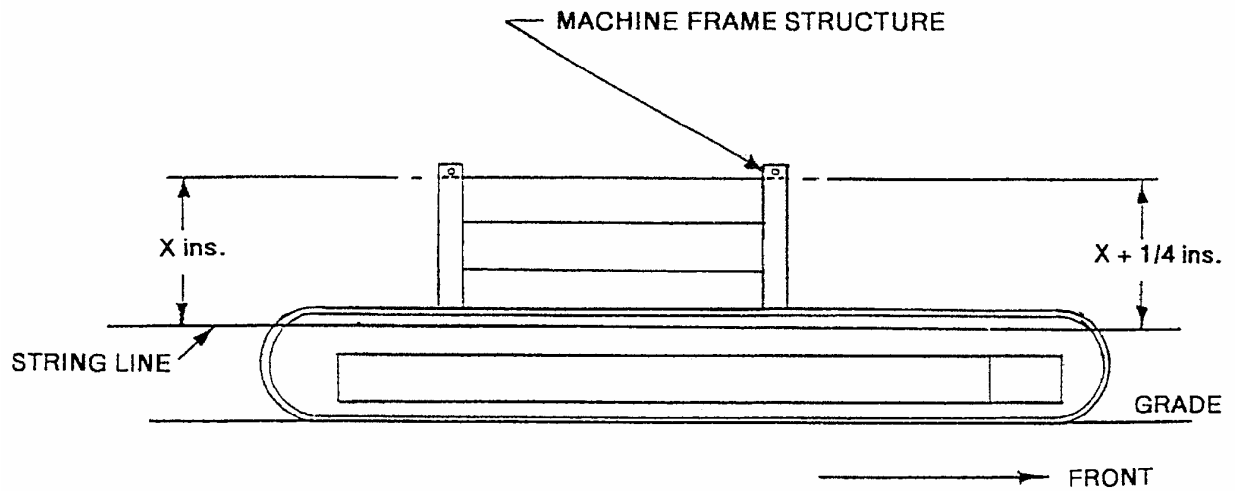
SECTION XI
PROBLEMS & SOLUTIONS
CONTINUED

- | | | |
|-----------|-----------------|---|
| K. | PROBLEM | Tamper quits working. |
| | SOLUTION | <ol style="list-style-type: none">1. Lost key in motor sprocket.2. Broken chain.3. Bottom of tamper is lodged on something.4. Concrete is set up due to waiting too long. |
| | | |
| I. | PROBLEM | Vibrators will not run fast enough. |
| | SOLUTION | <ol style="list-style-type: none">1. Volume controls are closed.2. Vibrators plugged in backwards.3. Too many vibrators for the pump.4. Increase the pressure setting on the vibrator pump. (1400psi max.)5. Engine RPM too slow.6. Oil too cold.7. Faulty pump. |

PROPER RELATIONSHIP BETWEEN THE ELEVATION SENSOR AND THE STRINGLINE



ELEVATION SENSOR SET UP FOR PAVING



ELEVATION SET UP FOR PAVING

Sensors should be set in such a way as to position the front and rear of the machine frame to be on the same plane as the string line. Set the front of the machine roughly 1/4" higher than the rear in relation to the string line.

HYDRAULIC FLUID REFERENCE SHEET

DESCRIPTION:

Northland's specially formulated hydraulic transmission fluid is truly a multi-functional tractor fluid for use in transmissions, final drives, differentials, wet brakes and hydraulic systems of tractors employing a common fluid reservoir. This fluid is manufactured from carefully selected base stocks and additives to provide: lubrication of spur and bevel differential gears, lubrication of the transmission, control brake chatter and serve as a power steering and hydraulic fluid. This fluid contains selected additives for high oxidation resistance and low pour points. It is compatible with commonly used seal materials, will resist water, and provides excellent load-carrying capacity and wear protection. In addition, this fluid is rust and foam inhibited for a complete universal lubricant.

TYPICAL PROPERTIES UNIVERSAL TRAN DRUALIC TRACTOR FLUID

Gravity, API	29.8
Flash Point, F	415
Pour Point, F	-40
Viscosity at 100 C CST	9.6
Viscosity after 30 Min. Sonic Shear	8.0
Viscosity Index	135
Viscosity at -34 C cP	61,400

APPLICATION:

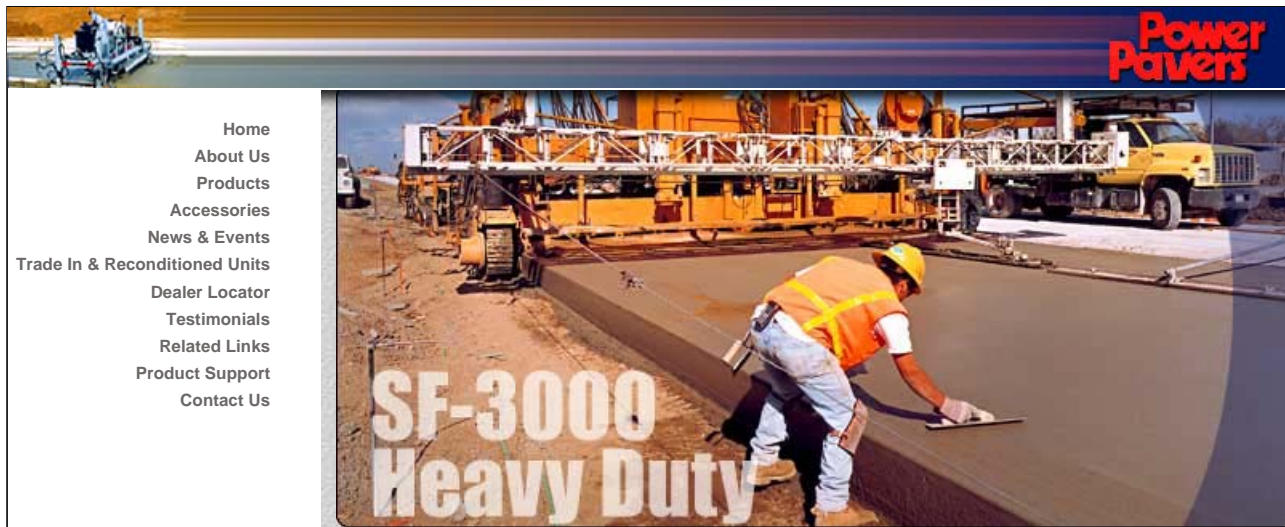
Northland Universal Tran-Draulic fluid is recommended for service refill of: transmission, final drives, differentials, hydraulic systems, and power steering systems on most domestic and foreign tractors. It may also be used for hydraulic applications where wide operating temperature performance and good anti-wear characteristics are required.

Tractor manufacturers have not been able to agree on a single specification for a fluid suitable in all tractors, and therefore, this fluid cannot be offered as meeting all manufacturers specification requirements. It has, however, demonstrated excellent field and bench test performance and can be recommended for use in the following manufacturer specified products.

HYDRAULIC FLUID REFERENCE SHEET

PERFORMANCE & SPECIFICATIONS:

Equipment Manufacturer	Fluid Spec.	Commercial Brand
Allison	C-3	
Caterpillar	TO-2	
JI Case	MS 1207	Powerguard PTF
	MS 1206	Powerguard PTF
	MS 1205	TFD-II
	MS 1204	TFD
	MS 1210	TCH
Deutz Allis	272843	Power Fluid 821
John Deere	JDM J20C	Hy-Guard
	JDM J14B	303 Fluid
Ford	ESN M2C 134B	
	ESN M2C 86B (A)	
	ESN M2C 53B (A)	
	ESN M2C 48B	
	ESN M2C 41B (C)	
Ford New Holland	ESN M2C 134C	
	ESN M2C 86C	
International Harvester	B-6	Hy-Tran, Hy Tran Plus
Massey Ferguson	M-1135	Perma-Tran
	M-1129-A	
	M-1127-B (A)	
	M-1110	
	M-1141	
Kubota	M-80	
	UDT	
Oliver		Type 55
Stieger		Hydraulic Trans. Fluid
Sundstrand		Hydrostatic Trans.
Versatile		Gear & Hydraulic Transmission Fluid
White Farm	Q1826	
	Q1766 B	
	Q1766	
	Q1726	



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Power Pavers SF-3000 Series Self-Loading Concrete Slipform Paver

A New Standard of Excellence

Our long-lasting, high performance products are made with exacting specifications and a healthy respect for the environment.

DIESEL ENGINE

Cummins 6CTAA8.3 water cooled turbocharged after-cooled, 8.27 liter (504.5 cu in.) in-line 6 cylinder diesel engine. 250hp (186kw) @ 2200 rpm, 12-volt electrical system with 105 amp alternator.

TRACK DRIVE SYSTEM

Two heavy duty 14' (4.27m) track systems, with 14" (35.6cm) wide, triple grouser street shoes. Track components with sealed links, lifetime lubricated rollers, grease gun type hydraulic track tension adjustment

Paving speeds....0-30 fpm (6 mpm)

Travel speeds.....0-60 fpm (12 mpm)

Side clearance (distance from edge of slab to outer most portion of track) 30" (76.20cm) with standard two speed motors.

MAINFRAME

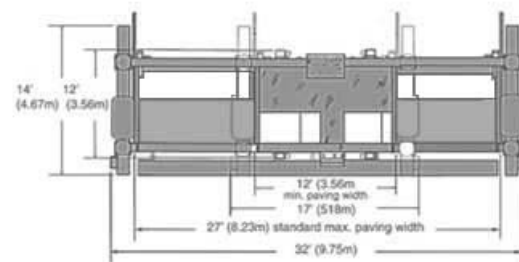
Telescoping 20" (50.8cm) deep mainframe is hydraulically adjustable up to 9' (2.74m). Extensions expand the paving width to 27'(8.23m). Optional extensions expand the paving kit to 32'(9.75m).

Hydraulic controlled loading legs are standard

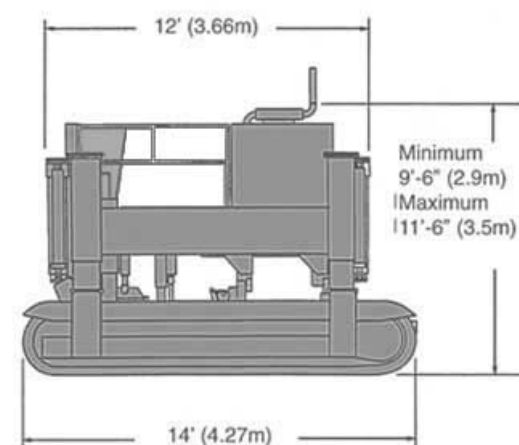
Quick release of sub-paving package for easier width changes

HYDRAULIC OIL AND FILTRATION

200 Gallon (757 liters) main hydraulic reservoir with visual fluid indicator



FRONT VIEW



SIDE VIEW

PAVING DIMENSIONS

Standard Paving Depth	20" (50cm)
Standard Paving Width	12' (3.65m) to 27' (8.23m)

Three sump filters, and four 10 micron spin-on filters

Inline filters on sensors

WATER SYSTEM

Hydraulically driven 4 gpm (15.14-lpm) pump delivers 2000 psi (138bar) water for cleanup and utility use

On-board water storage capacity is 220 gallons (833 liters)

GRADE CONTROL

Automatic machine elevation is maintained by the hydraulically powered leg columns on each track assembly. Control is through the hydraulic sensor system and is referenced through four sensor units.

ELEVATION CONTROL

Manual or automatic mode is operator selected.

STEERING

Operator selection of manual or automatic control

Counter rotation of crawler tracks possible in manual mode

Fully proportional sensing system for automatic steering control from grade reference

Plumbing is provided for right hand or left hand steering reference

Optional auto reverse available

SPREADER AUGER

18" (45.7cm) Diameter split, reversible auger with hard-surfaced flighting

Each side individually speed controlled driven and driven separately

Heavy-duty 29.9 cu. in. (490cc) hydraulic motors with 3.27 to 1 reduction for power to move low slump concrete at widths over 32'(9.75)

Augers strike-off beam are tied to auto-grade; but can be manually over-riden at any time for metering concrete flow to the enclosed vibrator and tamper section in front of the profile pan

Augers and strike-off beam all power-crown together

Quick disconnect on auger system for changing widths. Auger widens by section.

HYDRAULIC VIBRATORS

2.25" (5.7cm) Diameter head hydraulic "L" shaped paving vibrators with individual pressure compensated controls (up to 24 controls)

Standard machine features 16 hydraulic internal vibrators with individual pressure compensated flow control valves located at the console (up to 24 vibrators)

Vertical adjustment is operator controlled through hydraulic

Optional Paving Width	To 32' (9.75m)
Height	10'-6" (3.2m)
Overall Width	54" (137cm) wider than paving width
Length	16'-6" (5.02m)
Weight	65,000 lbs. (29,484 kg) to 75,000 lbs. (34,020 kg) Weight will vary depending on paving width

TRANSPORTATION DIMENSIONS

Height (with muffler)	11' (3.35m)
Height (without muffler)	10' (3.04m)
Length	54" (137cm) longer than paving width
Width (with tracks)	14' (4.25m)
Width (without tracks)	12' (3.65m)

SERVICE REFILL CAPACITIES

	Liters	Gallons
Fuel Tank	360	95
Hydraulic Oil Tank	757	200
Engine Oil	30	8
Engine Coolant	23	6
Auxiliary Water Supply	833	220

OPTIONAL EQUIPMENT

Extension kit to 32'(9.75m)

Four bank vibrator control manifolds

Curb molds

Continuous keyway inserter (per side)

Male sideform key (per side)

Center bar inserter

Manual side bar inserter (per side)

Hydraulic belt finisher

10' (30.4m) Oscillating final finisher

power lift system

Removable baffle plates between vibrators for use on supers

TAMPER BAR

Hydraulic powered tamper bar. Speed is controlled by operator

Tamper bars are staggered for smoother paving

Tamper bars crown automatically with the profile pan

Double tamper bar to prevent "crusting" in vibration chamber

PROFILE PAN

46" (1.17m) Profile pan with power crown for straight (roof top) crown configurations

Profile pan automatically adjusts for grade variations up to 36" (91.4cm) during the paving process

Adjustable End pan over-build to compensate for edge slump

Profile pan, tracks, and sideforms automatically adjust from running with both tracks on the ground to one or both tracks running on adjacent slab without modification

SIDE FORMS

30" (76cm) high sideforms for containing enough concrete during deep pours

Sideforms hydraulically widen out to back over previous day's pour for less handwork at start of next pour

Sideforms hydraulically lift up 3" (7.62cm) for travel over rough terrain

Controls for sideforms are at ground level as well as on control console



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