GENERAL CONTROLS OPERATING DESCRIPTION

This manual is provided to familiarize operating personnel with the functional design of the **HYMAC Model 100 Wet Lap Twin Wire Press, Press Technologies Model 100 HDP Heavy Duty Press, and Hymac Model 100 Cutter Layboy**. Any additional information regarding the press operation may be obtained by calling **PRESS TECHNOLOGIES LLC** at **303-456-9898**.

HYMAC MODEL 100 TWIN WIRE PRESS

The **Hymac Model 100 Twin Wire Press** description and drawings depict all main components of the press and establish the terminology used throughout this manual. At this point, the reader should familiarize himself with the basic design components of the unit.

The **Hymac Model 100 Twin Wire Press** is a dewatering unit which provides continuous dewatering of pulp/slurry solids by means of entrainment between two endless, porous synthetic belts (wires). These belts are supported by both dewatering plates and free turning rollers throughout the unit. The basic operating principle states that the pulp/slurry solids become more stable to pressure as water is removed. The **Model 100 Press** accomplishes this by means of three separate, continuous dewatering zones or sections:

(1) WEDGE ZONE: Where sheet formation occurs and dewatering generated by a forced reduction of volume between the upper and lower belts in the shape of an extended wedge;

(2) S-SECTION: Where higher pressure is applied by the belts passing through a series of S-Rolls.

(3) HIGH PRESSURE ZONE: Where high pressure is applied to the sheet by means of two opposing rollers converging into a nip configuration. In the Model 100 this consists of 3 sets of non-driven nipped (press) rolls and 1 set of nipped drive rolls. The operating nip pressure range is adjustable, with pressures ranging from 0 to 1000 PLI, and typical operating pressures from 100-900 PLI.

Units are generally equipped with auxiliary systems for upper and lower belt tensioning, upper and lower belt tracking, upper and lower belt washing, and automatic machine shutdown, if the belt tracking systems should fail. Each of the above items will be addressed in this manual.

WEDGE ZONE

The wedge zone is formed by the convergence of the upper and lower fabrics, or belts, in the shape of an extended wedge. Both upper and lower belts are supported by a series of HDPE drainage plates. The upper set of drainage plates can be adjusted to meet the dewatering needs of a given stock, making the wedge adjustable from 0-5 degrees. The exact wedge angle must be set in the field after observing the machine in operation. This adjustment is made from visual observations during performance runs. The wedge adjustment section should be set so that the dewatering function is optimized for optimal performance. The wedge is sealed by means of a side deckle arrangement, or YV Seal, so called because of the shape of the molded urethane seal. The YV Seal incorporates two parts, with the larger of the two installed closest to the headbox and the smaller installed in line moving in machine direction towards the more closed end of the wedge section. At the end of the wedge zone, care should be taken to insure the upper and lower plate systems never come any closer than 0.75" (18mm) unless instructed by a **PRESS TECHNOLOGIES LLC** representative.

NOTE: KEEP HANDS AWAY FROM THE WEDGE SECTION WHILE THE MACHINE IS IN OPERATION.

"S" SECTION

The "S" section will further enhance dewatering coming from the wedge section prior to entering the high pressure section. Initial and final adjustment of the "S" section is set at time of start-up after observation of the machine in operation and adjustment of the Wedge Section, and is accomplished by shimming of the rollers to effect a gradually increasing pressure in machine direction, maximizing dewatering in this section prior to introduction into the press nips. During machine operation, observation of the "S" section can indicate several conditions such as:

- Excessive pulp flow to the machine for the operating speed.
- Inefficient dewatering in the wedge section caused by low flow relative to the line speed.
- "S" section is improperly adjusted for the operating conditions.
- Consistency control or flow control problems.

Any of these conditions can result in a "bulging" in the "S" section fabrics due to excessive water removal in the section. If this is noted during machine operation, the stock pump should be shut down while allowing the machine to run. The machine will then purge itself of excess stock and the bulging will correct itself. If the machine is allowed to run with bulging in the "S" section, the belts could fold and be destroyed while passing through the high pressure section. Review and adjustment of operating conditions should be undertaken prior to resuming stock feed to the equipment.

HIGH PRESSURE ZONE

After the last "S" roll, the sheet is transferred into the high pressure section. This zone is comprised of three (3) sets of non-driven pressurized Nip Rolls and one (1) set of driven Nip Rolls, each of which is driven by its own motor and gearbox arrangement and electronically synchronized for proper speed and load share. Pressure of these press nips are independently adjustable for maximizing discharge consistency from the unit. The nip section is created by the convergence of two opposing rollers actuated via an air bellows and lever arm arrangement. After discharge from the Model 100 Press the sheet transfers to a Model 100 HDP Heavy Duty Press unit.

MODEL 100-HDP HEAVY DUTY PRESS

After discharge from the Model 100 Press the sheet transfers to a Model 100-HDP Secondary Press, which also incorporates a set of adjustable pressure Drive / Nip rolls, drive arrangement as described for the Primary Press above. The nip section in this unit is created by the convergence of two opposing rollers, the upper of which is mounted directly to the pressurizing air bag. After discharge from this press the sheet is transferred to the Model 100 Cutter Layboy.

NIP ROLL WATER DOCTORS

To insure the water being removed from one nip section does not re-enter the previous nip section, water doctor assemblies are placed behind each nip to collect the water from the top wire surface. The doctors are a rubber, floating design. The doctors must be adjusted in a manner such that minimal to no water is allowed to escape under the blade.

BELT SHOWERING

There are two belt cleaning showers located on each press: one for the upper belt and one for the lower belt. Both showers may be enclosed in stainless steel enclosures. In some installations the lower shower may be set up to allow the shower water to discharge directly into a whitewater collection pit. The shower pipes and nozzles are constructed of stainless steel. The nozzle arrangement is typically on three inch (3") centers with a fan type nozzle. The shower pipe is generally coupled to plant water by means of a flexible hose. The showers are manual clean (handwheel) type. They must be cleaned at least once per day, or per shower water quality and machine demand. They are cleaned by turning the handwheel at the end of the shower. This will allow contaminants to be flushed from the nozzle orifice. The shower contains an internal brush that is connected to the handwheel, and the handwheel should be rotated back and forth to insure proper cleaning. If white water is to be used on the machine, a maximum particle size of 0.069" can be passed through the shower orifice without plugging. Please note that the showers should be in operation whenever the machine is running.

BELT TENSION UNITS

Belt tensioning is independently controlled for both upper and lower belts. The tension unit is extended pneumatically via air bellows or air cylinders actuating stainless steel shafting directly connected to the tension roller bearing housings. When using air bellows, as the belt elongates, spacers are provided to maintain proper bellows height and tension on the belt. The spacer is inserted between the air bag hold plate and the stainless steel thrust rod. When placing the spacers in the tensioning system, be sure that a spacer is placed on both drive and wire change sides. **Never**

place a spacer so as to decrease the bellows extension under its normal operating range. Please refer to the Firestone air bellows catalog information. This information will give you the proper operating height range of the bellow. Cylinders typically do not require the use of spacers. The amount of belt tension for the lower and upper systems are controlled individually from the main pneumatic control panel.

CAUTION: OPERATING BELOW OR ABOVE THE RECOMMENDED TENSIONS CAN RESULT IN DAMAGE TO BELTS

BELT TRACKING

Belt tracking is maintained by an automatic pneumatic system, one each for both upper and lower belts. The belt alignment system has been designed to compensate for belt misalignment and is fully automatic. Each tracking unit is comprised of a pivoting tracking roller, air bellow actuated tracking unit, and three-way tracking valve/paddle unit. The tracking roll has a fixed bearing block at one end and a floating bearing arrangement at the other. The floating bearing arrangement is fixed to a stainless steel slide bar and is actuated by air bags on either side of the bearing housing. Movement of the tracking roller is actuated by pneumatic pressure controlled by the valve/paddle unit. When the machine is in operation and the belt is centered, the tracking paddle should not be in a vertical position. With the belt in a centered position the paddle should contact the wire at an intersect angle of approximately 30 degrees. In this arrangement, center the valve ports so that a neutral position is obtained. The air bag will not be actuated until the wire moves from the centered position. Please note that when the wire moves away from the tracking paddle, gravity will pull the paddle down.

The air bag will then be actuated and the tracking roll will move into the proper position. The advantage of this system is that belt alignment is continuously monitored and corrected for the smallest amount of misalignment. The system operates smoothly, quietly and automatically to eliminate operator attention. Each system has an electrical fail safe system. This system is tied electrically to the main drive to automatically shut down the press if the pneumatic system should fail. Two limit switches, one located on each side of the machine, send the belt over-run signal. The pneumatic supply to the tracking units is provided from the pneumatic control panel by a regulator valve. Typical operating pressure for the system is 45 P.S.I.G or higher.

NOTE: THE MOST COMMON FAILURE OF THE WIRE GUIDE SYSTEM IS THE FAILURE OF THE OPERATOR TO ENGAGE THE AIR SYSTEM AT THE CONTROL PANEL. PLEASE MAKE SURE THAT THE AIR SUPPLY IS OF INSTRUMENT AIR QUALITY.

100-CLB CUTTER LAYBOY

The **Model 100 CLB Cutter Layboy** description and drawings depict all main components of the unit and establish the terminology used throughout this manual. At this point, the reader should familiarize himself with the basic design components of the unit.

The **CLB Cutter Layboy** is a sheet cutting and stacking unit which provides continuous cross cutting and stacking of a pulp sheet or web in order to produce bales. The unit is comprised of four main operating sections, the low speed transfer belt, the cutter knife assembly, the vacuum sheet transfer system, and the scissors lift stacking and conveying section.

(1) LOW SPEED TRANSFER: The purpose of the low speed transfer section is to accept the sheet from the 100-HDP Press and bring it into the knife section at a speed that is calibrated to the main press. The low speed transfer section main components are drive roll, tension roll and system, and polyester conveyor belt.

Tracking of the belt is automatic using sprockets which interact with the belt.

Tensioning is manual and is accomplished by turning adjustment bolts to move the tension roll bearing housings in an assembly located on the transfer belt frame until the proper tension is applied to the fabric. When properly tensioned, the fabric should show no sag on the carrier surface. Do not over tension. When pressing down on the fabric carrier surface it should move quite easily. Make sure that the adjusting bolts on both sides of the roll are adjusted evenly, and that the drive and tension rolls are parallel. This will insure good belt life as well as proper tracking.

(2) CUTTER KNIFE ASSEMBLY: The cutter knife assembly consists of a fly knife working in conjunction with a fixed anvil knife. The anvil knife and holder assembly is adjustable to allow for setting the proper clearance between the fly knife and anvil blade. The fly knife is driven by its own motor and gearbox arrangement, and rotation speed is adjusted to provide the desired cut length at a given line speed. At this point the drive is matched to the press drive so that an increase or decrease in line speed will automatically result in the same sheet cut length.

(3) VACUUM SHEET TRANSFER SYSTEM: The purpose of the vacuum transfer system is to receive the cut sheet from the knife section and drop it on to the stacking conveyor. Main components are drive roll, lower belt tracking roll and system, lower belt tensioning roll and system, lower belt, upper vacuum belt, and vacuum blower system. Tracking of the upper vacuum belt is via a tracking roll with discs that mesh with the grooved belt, and tensioning for the upper vacuum belt is as described for the Low Speed Belt. The upper and lower vacuum belt drives are tied to line speed, and the amount of vacuum is based on the particular characteristics of the pulp sheet being produced in order to release the sheet at the appropriate location to position the stack properly on the stacking conveyor. A pneumatically operated fork assembly located under the fork assembly frame extends and accumulates the cut sheets while a finished bale is being discharged from the stacking and conveying section.

(4) SCISSORS LIFT STACKING AND CONVEYING SECTION: The function of this section is to facilitate stacking of the sheets in a continuous fashion to a predetermined, adjustable height and discharge the finished bales on to the material handling system. Main components are a hydraulic scissor lift with associated hydraulic power unit, and a conveyor which sits on top of the lift and provides the platform on which the bale is formed as well as the mechanism for discharging the bale when finished. Several photo eyes are also a part of this section, controlling stacking and bale removal functions. These photo eyes and their functions can be found on the system PID drawing.

BALE STACKING / DISCHARGE START-UP AND OPERATION

1. Lift table in the up position.
2. Forks in the extended position.
3. Layboy in manual mode.
4. Transfer initial sheets to forks until an appropriate stack (10-15 sheets high typical) is formed.
5. Switch to automatic mode. Forks will retract, dropping the short stack on the stacker discharge conveyor. Sheets will continue to stack, forming the first bale.
6. With the table in the upper position and the pulp sheets stacking on the table, the upper photo eye looking across the pulp stack will automatically lower the lift table as the height increases by activating a valve on the hydraulic pump. The amount of drop is controlled by adjusting the valve open time in the PLC and/or by adjusting the flow through the manual down valve located at the hydraulic pump unit.
7. As the table automatically lowers, it will eventually reach a photo eye that will override the auto photo at the top. This photo eye will tell the table to drop at a constant rate until it reaches the down position. This photo eye is adjustable up or down, and determines the stack height.
8. As the table lowers, it will quickly pass another photo eye that will tell the system that the bale is below the forks (stack clear) and that the forks should extend to their out position. This photo eye can be adjusted up or down to allow the forks to pass over the pulp sheets without hitting the pulp stack. If the forks hit the pulp sheets, the eye should be lowered. If the forks delay too long before extending, the eye

should be raised. **DO NOT ALLOW THE FORKS TO EXTEND UNTIL THE PULP STACK IS CLEAR (BELOW THE FORKS). DAMAGE TO THE FORK ASSEMBLY WILL OCCUR.**

9. The table will continue to lower until it reaches the down position. At this point, the down photo eye will be activated and the lift table and material handling conveyors will be activated. The pulp stack will travel out of the layboy and onto the material handling system.

10. As the pulp stack enters the material handling system it will activate another photo eye indicating the lift table conveyor is clear, and will begin the sequence which will stop the lift table conveyor and raise the lift table, stopping just under the extended forks.

11. At this time the forks retract, provided that the appropriate number of sheets have accumulated, dropping the accumulated short stack onto the lift table conveyor.

12. The pulp stack builds on top of the scissors lift discharge conveyor.

CONVEYOR LINE OPERATION

ACCUMULATION AND BALE WEIGH / PICK-UP CONVEYORS: The conveyor system accepts the bales discharged from the stacking conveyor consists of (2) 20 foot conveyors, each driven with its own gearmotor, and equipped with several photo eyes along the length for bale positioning along the conveyor line. These photo eyes should be adjusted for proper positioning of the bales on the conveyors to optimize accumulation on the line.

The final conveyor in the line incorporates several functions. After accepting bales from the preceding accumulation conveyor, the bales will be positioned on the conveyor, again using photo eyes, so that they are positioned over the top of a bale weighing and pick-up module. This module consists of two hydraulically actuated scissor lifts, one for each bale. On top of each lift a scale base and peg table are located. The purpose of this unit is to both weigh each bale individually and simultaneously, as well as lift the bales to facilitate side pick-up of the bales by a fork lift from the line for removal to storage or transport. In practice, once the bales have been positioned over the lift modules, the scissor lifts will be actuated and raise the bales on the lifting pegs. At this time there will be a slight delay to allow for any movement that would affect the weighing process to end, and then the scales will read the weight and send it to the system. At this time the bales can be removed from the system, the scissor lifts will lower to their resting position, and the weighing and pick-up conveyor is ready to receive the next bales. As an alternative, the conveyor is also set up for end pick-up of the bales should that be wanted. In this case weighing the bales can either be ignored or bypassed, the bales will travel to the end of the conveyor, and removal is accomplished using a forklift. Forklift guards to help prevent damage to the unit are provided for both the side and end of the conveyor.

FLY KNIFE REPLACEMENT

NOTE:

NEVER WORK ON ANY SECTION OF THE MACHINE UNTIL ALL POWER HAS BEEN LOCKED OUT.

***DUE TO LACK OF COMPLETE INFORMATION FOR THE HYMAC CLB UNIT THIS WRITE UP IS PRELIMINARY AND MAY NEED MODIFICATION.**

Procedure for replacement of the knife blade is as follows:

With the knives at the top position, remove all the blade retainer bolts with the exception of one on each end of the knives. Loosen the two end bolts on each knife, but do not remove them. With a man on each end of a knife, place a 6" rubber strip over the knife at each end. Be sure that the persons removing the knife are wearing heavy protective gloves during this entire operation.

The knife can now be hand secured at each end using the rubber strips for protection. While holding the blade at each end, remove the two remaining bolts. Lift the knife retainer plate and set aside. Lift the old knife and place it into its crate. At this time the new knife may be placed on the roll using the same rubber protectors. Place the backing plate on top of the knife and replace all of the retaining bolts. At this time hand tighten only.

Setting the fly knife relative to the anvil is critical, and great care should be taken when doing so. To set the knife, rotate the knife toll until the knife is in its closest position to the anvil, with the knife parallel to the earth. The knife roll should be rotated by hand, turning the high speed coupling on the knife roll drive.

Place the appropriate dimension shim stock across the top surface of the anvil. Typical clearance is approximately .012”- .015”. A factory representative will determine the proper dimension based on application. With the shim stock in place, hand rotate the knife until it is at its closest point to the anvil, while resting on the shim stock. A visual check must be made at this point to ensure that the knife is resting evenly on the shim stock across the surface of the anvil. With the knife in place, tighten all of the retainer bolts to 175 inch pounds. Remove the shim stock. Again, perform a visual check to make sure that the knife is clear of the anvil at all points. Rotate the knife roll by hand, one complete revolution passing the anvil to ensure that the knife is not making contact with the anvil. If the anvil needs to be moved in or out, this can be accomplished by loosening the bolts that secure the anvil knife bracket and moving same. Be careful to maintain the parallel relationship between the fly knife and anvil.

DRIVE COMPONENTS

A description of drives and reducers is located at the back of this manual.

MACHINE OPERATION AND START-UP

START-UP PROCEDURE

See sample start-up on following pages.

CAUTION: THE INITIAL START-UP OF THE WET LAP LINE MUST BE CONDUCTED UNDER THE SUPERVISION OF A QUALIFIED FACTORY FIELD SERVICE REPRESENTATIVE. FAILURE TO DO SO WILL RESULT IN THE TERMINATION OF ANY FACTORY WARRANTY OR RESPONSIBILITY.

Prior to any action, the operator should inspect the machine for any objects (tools, nuts, bolts, etc.) that may have been placed in the machine during down time. Before starting, the operator should make sure that the proper maintenance procedures have been taken. **DURING OPERATION, OPERATORS AND MILL PERSONNEL ARE WARNED AGAINST REACHING INTO THE MACHINE, WEARING OF LOOSE CLOTHING OR TIES, OR OTHER FORMS OF UNSAFE CONDUCT.** As with any piece of industrial equipment, caution is strongly advised when near operating equipment.

UNSAFE USE OF THIS EQUIPMENT MAY RESULT IN PERSONAL INJURY OR DEATH.

SAMPLE START-UP SEQUENCE

ACTIVITY	ACTION	RESULTS
Main Electrical	ON	Power to Machine and Panel
Power Switch On Panel	ON	Starts Auxiliary Equipment
Check Mill Air	125 PSIG	Air to Main Panel
Pressure to Machine:		
a) Lower Belt Tension	50 PSIG	Engaged
b) Upper Belt Tension	50 PSIG	Engaged
c) Tracking System	45 PSIG	Engaged
Check Tracking Paddles	Visual	30 Degrees to Belt
Belt Showers 125 PSIG:		
a) Main Supply	OPEN	Water to Showers
Belts	Visual	Check for Foreign Objects
Line Speed Control	Set Point 25% Belts Start Rotation	

NOTE: AT THIS POINT, ALLOW THE MACHINE TO RUN FOR AT LEAST FIVE (5) MINUTES TO WET THE FABRICS AND TO CHECK THE TRACKING.

Stock Pump	On Minimum Setting	Pulp to Machine
Check Machine	Look at Sheet Discharge	Stock to Broke Pit
Stock Pump	Fill Wedge	Check Sheet for Proper Basis Weight
Nip 1	Engage 10-15 PSIG	Check Sheet Dryness*
Nip 2	Engage 15-25 PSIG	Check Sheet Dryness*

Nip 3	Engage 30 PSIG	Check Sheet Dryness*
Nip 4 (Drive Nip)	Engage 30 PSIG	Check Sheet Dryness*

* AFTER STABILIZING THE SHEET ADJUST PRESSURES FOR BEST PERFORMANCE

NOTE:

AT THIS TIME THE SHEET TRANSFER MAY BE MADE TO THE CUTTER LAYBOY. AFTER TRANSFER HAS BEEN MADE, ADJUSTMENTS MAY BE MADE TO THE NIP SECTION TO OPTIMIZE SHEET DRYNESS. MAKE SURE THAT MAXIMUM PRESSURES ARE NOT EXCEEDED.

WHEN PROPER SHEET DRYNESS HAS BEEN OBTAINED:

Machine Check	Visual	Walk around machine. Check deckles, water doctor settings and tracking. Check draw between press, secondary press, and cutter layboy for good control.
Profile Check	Visual	Check stacking at the cutter layboy for good throw and even stacking
Drive Amperage	Visual	Make sure that the drive is operating within set limits

OPERATIONAL CHECKS

After attaining stable operation by optimization of pulp flow rate, maximum productivity will be maintained by periodically checking the following items:

1. Amperage draw of drive system
2. Belt tracking, tensioning, cleaning
3. Proper functioning of nip roll doctors
4. Sheet profile, inlet consistency
5. General machine operation
6. Broke pit level
7. Draw between press and low speed transfer belt of the cutter layboy
8. Look for stock build up on roll covers

NOTE: FAILURE TO ADEQUATELY WASH THE MACHINE DOWN AND REMOVE THE EXCESS PULP FROM THE ROLLER FACE CAN RESULT IN EXCESSIVE WEAR ON BOTH THE FABRIC AND THE ROLLER COATING.

NORMAL SHUTDOWN PROCEDURE

Shutdown procedure is almost the reverse steps taken to start the machine:

1. Break sheet between Primary Press and Secondary Press (HDP)
2. Remove pressure from Nips 1,2, 3 and 4 and HDP Drive Nip
3. Turn off stock pump

NOTE: RUNNING MACHINE WITHOUT STOCK AND NIPS ENGAGED MAY RESULT IN FABRIC AND ROLL COVER DAMAGE.

4. Allow machines to rotate for 10-15 minutes
5. Allow showers to operate during this period
6. Wash machines down during this period
7. Inspect all rollers for pulp build-up; wash as necessary
8. Turn machines power off
9. Release press upper wire tension
10. Release press lower wire tension
11. Release tracking system
12. Turn off main control power
13. Turn off main air supply
14. Turn off main water supply

EMERGENCY SHUTDOWN PROCEDURE

Emergency stops are normally (installation, type, and location by mill) located around the machine within reach of the operator. An emergency stop immediately shuts down the machine and all the related equipment. In the event of an emergency shutdown remove pressure from the nips, then locate and correct the cause of the shutdown. The operator may then start the machine up at 25% line speed, after which the press should be allowed to purge itself of any stock remaining within the unit. It is best to run the machine five (5) minutes with the showers on before adding pulp to the machine. After adding pulp to the machine, normal start-up procedures will apply.