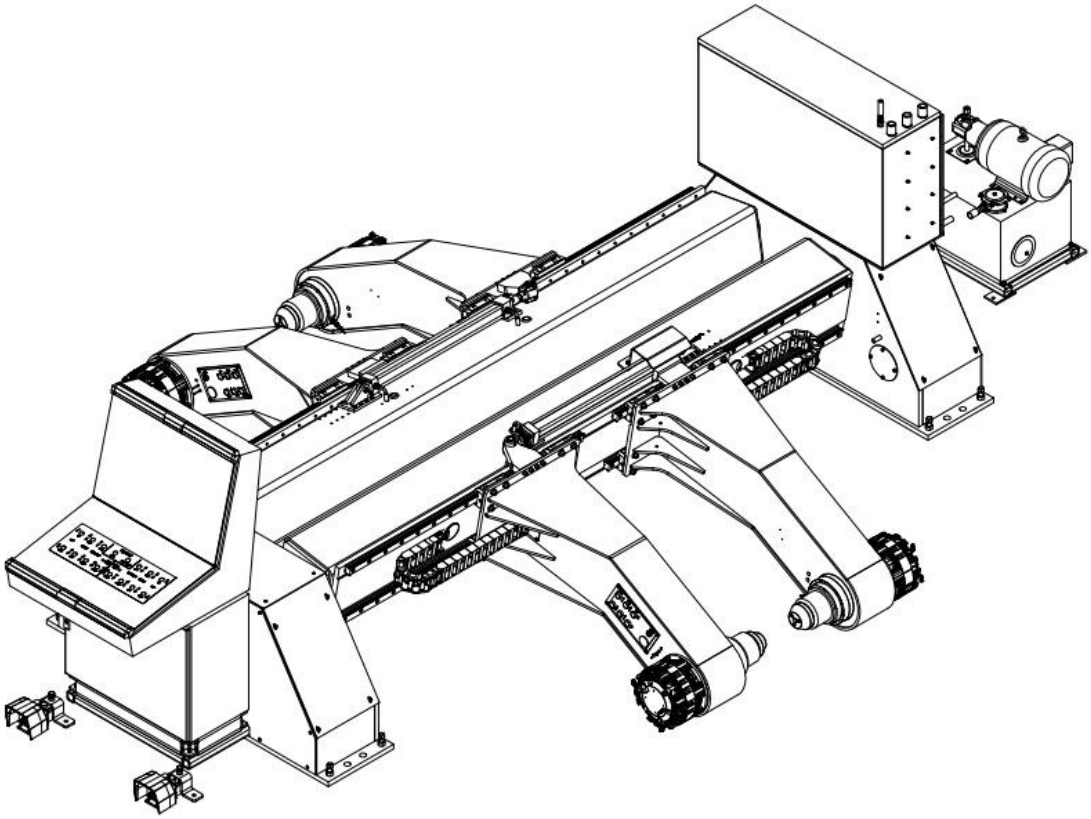
Roll Stand

Maintenance Manual



Gyptech

Proven Technology Worldwide

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Introduction

This manual contains **Original Instructions** written to provide detailed technical information to assist in the maintenance of the Roll Stand. For information regarding normal operation please refer to the Area Operator's Manual. Maintenance should only be performed by qualified, trained personnel

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1 Safety Overview

Never put yourself at risk.

Many pieces of equipment have the potential to cause serious injury or even death. Be sure to understand the safety concerns related to a piece of equipment before undertaking or performing any maintenance or clean out procedure. Work with your supervisors to address any safety concerns prior to undertaking work.

1.1 Roll Stand Disconnects

Both roll stands share a local disconnect located at the isolation console and a secondary panel disconnect on the paper handling drive panel. A manual lockable air dump valve is located on the isolation console.

Note: The local disconnects will cut the high voltage power to the roll stands. They do not disconnect the power to the PLC. However, the output module that feeds the roll stand solenoids is de-energized. The local disconnects will also exhaust all air from the system and close the pneumatic air supply line. Unless stated by end user management, the manual air dump valve must be locked out as well to deem the equipment safe.

1.2 Safe Entry to the Roll Stand

Although all functions of the loading arms are controlled via manual pushbuttons, hazards still exist. At no time should operators move the loading arms while other personnel are around the moving roll stand components. Operators should always be aware of their surroundings and only operate the equipment when the area is clear. During normal operation, it is safe to be in the roll stand area. The only potential hazards that may exist relates to the running roll of paper.

Proper zone lockout procedures must be followed for any maintenance purposes. As a further safeguard, always confirm that the roll stand air and hydraulics are not operational. This can be checked by attempting to operate the loading arms from the main operator console and manually spinning the chucks.

1.3 Pinch Points

The brake calipers and rotor operate automatically with production. The brake housing is designed to keep fingers out, but due to the nature of braking, the housings can become hot.

With most of the functions for loading a roll of paper being manually controlled, operators should still be cautious. The paper rolls are large and heavy and pinch points can occur if the roll is moved without attention to the surroundings or if the roll is mishandled.

Operation of the loading arms can also result in pinch points between the arms and other components or the roll of paper and floor. Hazard does not exist unless the operator is pushing a button and unaware of other personnel in the area or is distracted from the task being performed.

1.4 Hydraulic System

Danger: Hydraulic fluid is dangerous. Fluid can escape when adjusting or removing equipment. Fluid can be trapped in the hydraulic system even when the motor and hydraulic pump are stopped. Trapped fluid can be pressurized at more than 2,000 psi. Pressurized fluid can penetrate the skin, requiring prompt medical attention, as consequences may not be obvious.

Any work to be performed on the hydraulic system must be carried out by a qualified hydraulic technician.

Under no circumstances should any maintenance work be performed on any hydraulic components when the loading arms are raised. Ensure the hydraulic cylinders are fully retracted before commencing work. If control over the loading arms is lost and the arms can't be lowered automatically, support the arms by means of fork truck and hoist straps to lower them in a controlled manner.

Follow the procedure outlined in section 3.2 when energizing the hydraulic system for the first time after maintenance work has been completed.

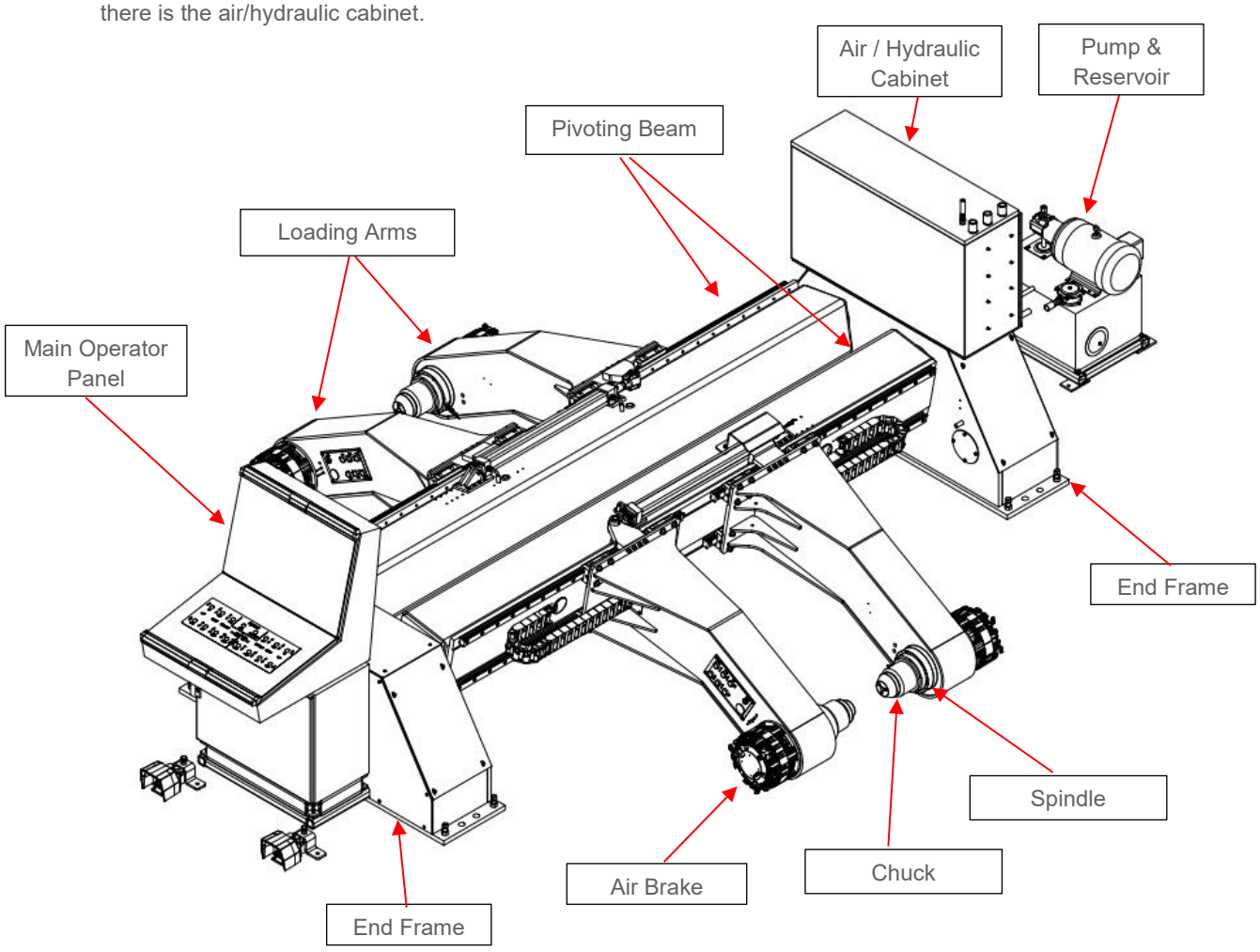
1.5 General Safety

Refer to section **1.4 General Safety** in the Safety System manual.

2 Equipment Overview

2.1 Major Components

The roll stand serves two major functions in the board making process. The first function is to hold the rolls of paper off the floor, align it with the boardline, and allow it to unwind paper for the process. The second function of the roll stand is to generate the forces required to create and maintain proper paper tension in the system. A roll stand consists of two sets of loading arms (each with spindle assemblies) that move across pivoting beams and rotate off end frames. At the front of the unit is the main operator panel and at the back there is the air/hydraulic cabinet.



2.1.1 Loading Arms

The loading arms are used to pick the roll of paper off the floor and hold it stationary at a proper position for production. The arms are raised and lowered by a pair of hydraulic cylinders rotating the pivoting beam. The arms can be opened and closed (moved away or closer to each other) as well as side shifted in either direction (moved together in unison). Movement of the arms along the pivoting beam is also controlled by hydraulic cylinders; one on each arm. Linear rails provide the strength and track system for the arms moving along the beams

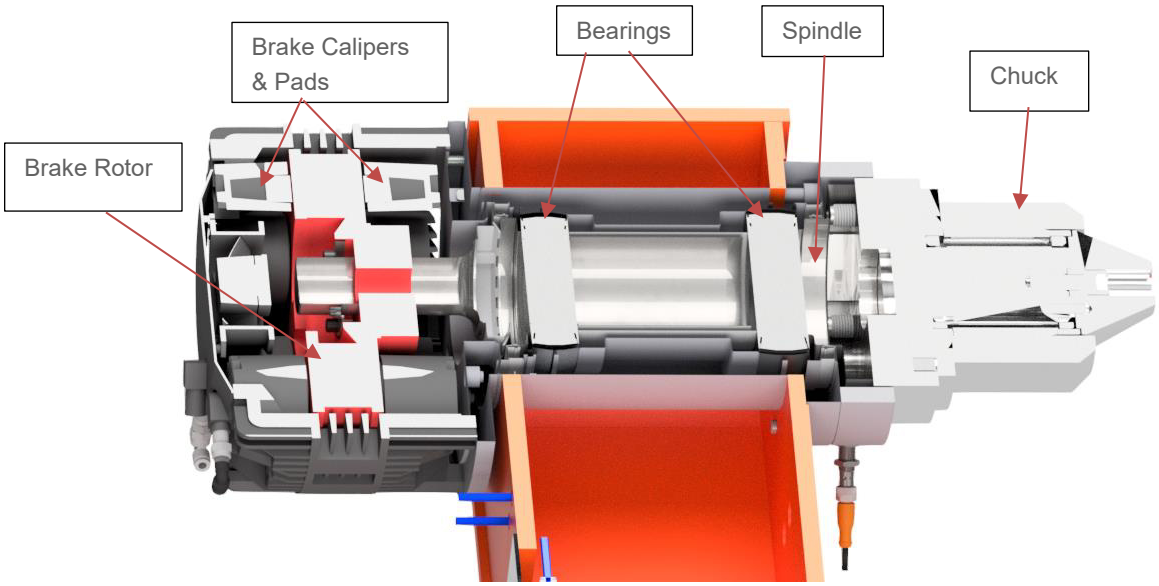
All arm movement functions are speed controlled either using flow controls or varying the speed of the pump. Along with an overall system pressure regulator, specific functions such as arms close, arms lower, arms side shift, have pressure regulators to prevent damage to the equipment and product.

These have been factory set and should not be increased without proper knowledge of the equipment. Further details on the hydraulics can be found on the hydraulic schematics supplied with the roll stands.

The movement of the arms are only limited by the full stroke of the cylinders and a few sensors in the area. The arms can only be raised to a maximum height determined by a proximity sensor on the pivoting beam. This sensor provides an upper or raised position to indicate it is safe to move a roll of paper into position under the arms. The second limitation on the arm movement is a set of photo eyes mounted on the splicer frame above. If a roll of paper is loaded and raised too high, the photo eye is triggered and prevents the roll of paper from being pushed up into the splicer.

2.1.2 Spindle Assembly

The spindle assemblies consist of a spindle (shaft), brake rotor, brake calipers and pads, chuck and bearings. Proper maintenance of these components is important to ensure consistent and correct paper tension in the system.



Although brake function is automatically controlled by the PLC, there are two methods to manually release them. The first is through the use of a BRAKE RELEASE pushbutton on the splicer web bar pendant. When pressed, the pushbutton is illuminated and the brakes are released, but only if the roll of paper is not the running roll during operation. The second method of releasing the brakes is by using the manual override sleeves mounted directly on the brake caliper housings. Note that the override sleeves should not be used during normal plant operation but only for troubleshooting and diagnostics.

The pneumatic brakes consist of a rotor mounted on the spindle and brake housing with multiple caliper assemblies. Each caliper assembly has an air piston and two brake pads; one on each side of the rotor. When air is supplied to the caliper assembly, the piston forces the brake pads against the rotor. The torque generated by this clamping force is transferred to the roll of paper through the roll stand spindles and chucks.

One loading arm spindle on each roll of paper also includes a proximity switch. As the roll of paper turns, the roll diameter pulse sensor counts revolutions. The PLC uses this signal along with the counts from the first turn idler roller on the splicer to continuously calculate the diameter of the paper roll. Any slippage of the paper roll on the chuck will lead to an incorrect roll diameter which in turn leads to improper tension control. Note that this same calculation determines when the automatic splice occurs.

2.2 Technical Data

2.2.1 Pneumatic Settings

All pneumatic pressure regulators and flow controls are factory set. Reference the schematic air diagram drawing (SD) of the machine when checking or resetting air components.

2.2.2 Hydraulic Settings

All hydraulic pressure regulators, flow controls and fuses are factory set. Reference the schematic hydraulic diagram drawing (SD) of the machine for pre-set values.

Danger: The hydraulic system is able to induce extreme forces into the mechanical system. Different regulator and flow control settings can lead to damage on the equipment! Breakage can occur and lead to severe injury or death. Consult with Gyptech staff before attempting to adjust any hydraulic components.

2.2.3 Chuck Torque Values

Proper torqueing is required on the chuck flange bolts, as well as any internal bolts when re-assembling the chucks after cleaning or swapping chuck sizes. When removing or installing chucks, it is helpful to apply increased braking force to resist the torque applied to loosen/tighten the bolts. This can be achieved using the holding brake regulator in the rear cabinet (ensure it is returned to it's set point before returning to normal operation).

Caution: The values below are only valid for the original chucks and hardware supplied.

Flange bolts: 243 lbs-ft / 329 Nm

Centre bolt: 140 lbs-ft / 190 Nm

3 Maintenance Procedures

3.1 Lockout Procedures

As equipment may start automatically, always lock out any source of motive power (electric, hydraulic, steam, compressed air, etc.) before performing maintenance or cleaning functions. Note that potential energy may also be stored in some equipment such as those held in a raised position by hydraulic or air pressure and that such equipment may move or fall suddenly if pressure is removed.

Depending on the equipment layout, electrical lockout may be performed at the electrical panel or locally with a safety switch or disconnect. Air pressure is removed and locked out at the manual dump valve. As a further safeguard, you must confirm that any equipment in the system being worked on is not operational after being locked out. Test for this by using the normal means of starting, i.e. the operator controls on the HMI station or the manual HOA switch.

The above procedure is a general recommendation. Operating and maintenance staff must follow lockout procedures and operate in compliance with their company policy and local regulations.

3.2 Hydraulic System Start-Up Procedure

Caution: All hydraulic regulators and flow controls have been factory set. Contact Gyptech when replacing any of these components for proper calibration procedures.

When performing maintenance work on hydraulic system components follow the procedure below. Failure to do so can cause serious injury or death.

1. Lower the loading arms and follow required lockout procedures.

2. Take note of port locations, hose and fitting sizes before commencing maintenance work. It is recommended to colour mark hose ends if previous markings are no longer visible, as incorrect hose connections can lead to unintended, unsafe machine behaviour.

3. Perform maintenance work as required. Be aware that some hydraulic lines may carry pressure in excess of 2000psi.

4. Before energizing the equipment, compare connections and hose runs to the hydraulic schematic diagram drawing (SD) and ensure all fittings have been properly tightened and crimped on (if required).

5. Ensure the reservoir contains enough oil that the gauge on the side of the tank is indicating a level greater than zero. Additional oil might have to be added during the bleeding process as the cylinders extend. However, be aware that the tank can overflow when all cylinders retract if too much oil had been added to the tank.

6. Energize the system.

7. Using the pushbuttons on the main operator panel, attempt to raise the arms about 5” off the ground. Release the button and observe if the arms stay steady.

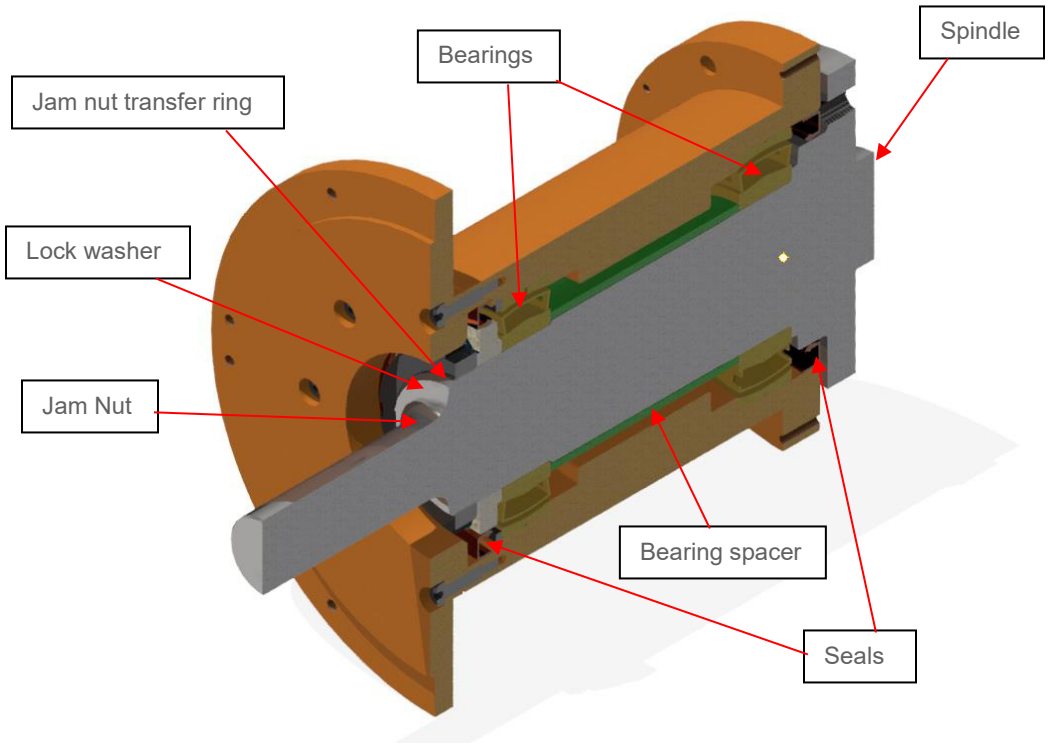
   Caution: If the “raise” function is not working, lock out the equipment and check all hose connections for correct routing. Contact Gyptech if proper functionality of the “raise” function cannot be restored.

8. If the loading arms do not show any sign of pressure losses and no leaks can be observed, proceed raising the loading arms to full stroke. This will purge all air out of the lifting system.

9. Check the “open”, “close” and “side shift” functions. The shift cylinders located on the pivoting beam require bleeding to remove any air trapped in the system. Side shift cylinders can be bled from the main hydraulic ports, or bleed ports if present. The system is setup correctly when the loading arms do not have any side-to-side play when pushed manually and the automatic functions work smoothly.

3.3 Setting Correct Spindle Torque

The correct torque setting is required to ensure optimal tension control.



1. Fully pack both bearings prior to assembly

2. Assemble and tighten the locknut until bearings, bearing spacer, and jam nut transfer ring, are all in contact.

3. Rotate the spindle for several minutes to ensure bearings are seated properly, attempt to tighten the locknut again.

4. Fold down 1 lock washer tab to keep nut from backing up.

Note: It is important that the spindle assembly is tightened correctly. If it is too loose, the brake rotor can shift along its axis and rub against the brake pads. Over-tightening can damage components or prevent the spindles from spinning freely.

4 Maintenance Schedule

The following table summarizes the optimal maintenance intervals.

4.1 Daily Tasks

Task	Notes
Visually inspect machine for air leaks and hydraulic oil on the floor.	Lock equipment out immediately if hydraulic leaks are present and investigate. Air leaks will affect tension control and should be corrected as soon as possible.

4.2 Weekly Tasks

Task	Notes
Clean all accumulated dust and debris from the machine.	Remove dust and debris only when safe to do so. Lockout required in many instances.
Check the condition of the roll diameter pulse sensor on the chucks.	Replace if it doesn't consistently detect chuck rotation.
Inspect the brake I to P transducer. Verify signal sent to unit matches actual air pressure output.	Replace/clean/repair unit if it sounds abnormal.

4.3 Monthly Tasks

Task	Notes
Drain air filters.	This equipment requires clean, dry air. If filters are excessively dirty or lots of condensate is present, equipment performance may be affected.
Clean and lubricate linear rails	Rails may accumulate paper fuzz during normal operation. Proper lubrication is important to maintain surface integrity
Check oil level in hydraulic tank	Level varies with position of arms (up/down, in/out). Check level with arms in same position every time

4.4 Semi-annual Tasks

Task	Notes
Clean paper fuzz and contaminants from inside chuck.	Ensure bolts are torqued as required when re-installing (see section 2.2.3). Gyptech recommends replacing chucks with a spare pair one side at a time as cleaning process can be lengthy.
Check the pressure settings on all the air regulators.	Re-adjust settings to original values as per air schematic diagram drawing (SD).
Inspect the brake pads for wear.	Replace pads as required and always replace pairs together. It is important to replace with same brand and style as the original supply. Varying pad materials can result in poor paper tension control.
Check the condition of the brake rotor.	Replace if warped, worn or pitted
Inspect both linear rails and bearings for wear.	Replace rails if corroded or worn. Replace bearings if excessive play is present or operating noise is abnormal.
Lubricate linear rail bearings.	Follow manufacturer's lubrication recommendations.

4.5 Annual Tasks

Task	Notes
Swap brake calipers and pads based on pad wear	This will promote even pad wear and extend the working life of the calipers.
Visually check all bolts for tightness	Torque as per grade and size.
Check all brake valves for corrosion, leaks and reliability.	Replace if required.

Inspect cleanliness of hydraulic oil	Clean/replace filter and oil if required
Examine roll stand spindle assembles for ease of rotation and play. If they are stiff, or if there is play, clean out old grease and repack or replace spherical roller bearings located in spindle assemblies.	Depending on plant operations, frequency of greasing could be increased or decreased. Reseat spindle bearings as per section 3.3

5 Troubleshooting

Due to the intricate nature of the tensioning process and the complexity of the hydraulic system, this section will only outline basic mechanical causes and solutions. Should the maintenance steps outlined below fail to fix the issues, we recommend contacting a Gyptech representative.

5.1 Chucks

Problem	Possible Cause(s)	Possible Solutions
Spindles Not spinning freely	Brakes are not releasing.	Release air manually on brake. If resistance decreases, check the brake release solenoids, run select solenoids and I to P transducer for normal operation and replace if required. Otherwise check brakes for seized pads.
	Spindle bearings do not turn freely.	Loosen the jam nut slightly, but ensure they are still tight enough to function properly. Replace with a new spindle assembly and observe the change in tension. Repair the old assembly in the shop (see section 3.3).
Paper roll core is slipping	Poor core quality.	Observe core quality and intentionally load some less damaged cores. If the problem subsides, aim to improve the quality of the paper cores supplied and reduce damage through handling.
	Roll too light.	The chucks are torque activated. When loading very light rolls (a few hundred pounds and less), the chucks may not fully engage. Observe if the problem is consistent with larger roll sizes.
	Internal rollers worn.	Replace a pair of chucks with spares. Disassemble questionable chucks in the shop and inspect internal rollers. If worn and the chuck pads do not expand as usual, replace permanently.

5.2 Brakes

Problem	Possible Cause(s)	Possible Solutions
Brakes Not releasing or not gripping.	Faulty solenoid.	Check the brake release solenoids, run select solenoids and I to P transducer for normal operation and replace if required.
	Warped rotor.	Replace the rotor if it shows any sign of warping or pitting, as the brake pads might not grip evenly any more.

	Seized brake pad.	The brakes contain spring-return brake pads. Broken springs or debris from worn pads can cause the pads to seize. Open the brakes and check each pad for function.

5.3 Hydraulic System

As a first step when trouble-shooting any hydraulic malfunction check the equipment and surrounding areas for hydraulic oil leaks. When any leaks are fixed, proceeds with the steps below.

Problem	Possible Cause(s)	Possible Solutions
No response on any function.	Pump motor/drive problem.	Check the pump drive for errors and verify motor response.
	Pump not functional.	Replace the pump if motor and drive functional.
	Not enough oil.	Add oil and bleed system.
	Extensive oil leak.	Check the connection between reservoir and loading valve for major leaks.
	Faulty loading valve or system regulator	Make sure the loading valve is turning on. Inspect the loading valve and system regulators (one in the rear cabinet and one on the pump) for functionality, replace if required (see schematic drawing for set points).
One function not responding	Pushbuttons not responding.	The machine is equipped with two control panels for each pair of arms (main operator panel and second panel on the arms). If one pushbutton does not respond, check the pushbutton on the other panel. If the second button works, check the wiring on the faulty button and/or replace button.

	Solenoid malfunction.	Reference the schematic hydraulic diagram drawing of the equipment to identify all solenoids that are required to turn on for the lift or lower function. Ensure the LEDs on the solenoid connectors light up when pushing the pushbutton. If the wiring is ok and the connector is functional, replace the non-responsive valves one by one. If error persists, contact a Gyptech representative.
Arms not opening.	Enable pushbutton not pressed.	To avoid opening the arms unintentionally, this function is two hand operated. Push the ENABLE button as well as OPEN.
	Enable pushbutton not responding.	Check the second ENABLE button. If responding correctly, check the wiring on the faulty button and/or replace the button as required.
Equipment takes a long time to respond to commands	Air in the system.	Cycle the arms up and down a few times and bleed the side shift cylinders.

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