

Company Name:	Equipment/Job Identification: Roller Mill Tire Change Type of Equipment: Roller Mill Make: Raymond Model: Year: Use:
Mine Name:	
Date of Analysis:	

Duty 1: Planning

Objective: The learner will explain the importance of the planning meeting in determining work to be accomplished. The learner will explain and interpret information received in the planning meeting to the trainer. The learner will explain each job step, why it is conducted, any associated risk, and how to implement appropriate controls. Planning activities include the following duties:

Job Steps	Importance Narrative (Consider Safety, Production, Maintenance)	Importance Ranking 1=Important 2=Very Important 3=Critical	Satisfactory or Needs Work	Procedures/Risk Resolution/ Notes/Comments
Planning Meeting				
Weekly Inspection				Critical to production loss
<ul style="list-style-type: none"> • Wear Measurement (Maintenance Engineer) <ul style="list-style-type: none"> a. Follow Mill lock-out procedure b. Use pin measurement template c. Check data to make sure within constraints (0-1 5/8" wear) d) Locks out hydraulic system for roller mill • Supervisor goes to 5th floor of preheat tower to locally closes off guillotine gate S-252 • Supervisor returns to first floor of preheat tower MCC, pulls breaker, and locks out S-252 				Review company lock-out procedures.
				Explain temperature hazards

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<ul style="list-style-type: none"> Supervisor then goes to second level of pre-heat tower MCC 				
<ul style="list-style-type: none"> a) Goes to mill motor switch gear <ol style="list-style-type: none"> Verify with ammeter that motor is not energized Trips mill drive motor starter Pull handle of breaker to off position Installs MCC lock 				Review company lock-out procedures
<ul style="list-style-type: none"> b) Goes to Roller Mill ID fan <ol style="list-style-type: none"> Verify that ammeter is at zero Trips ID fan motor starter Pull handle of breaker to off position Installs MCC lock 				Review company policies and procedures
<ul style="list-style-type: none"> c) Store the lock-out keys in lock-out box <ol style="list-style-type: none"> Locks out lock-out box 				Review company policies and procedures
<ul style="list-style-type: none"> d) Supervisor calls control room for a bump start <ol style="list-style-type: none"> Supervisor fills out S-230 lockout procedure form 				This is done to check that the right equipment has been locked-out.
<ul style="list-style-type: none"> Crew members install personal locks 				Review lock out procedures
<p>Crew members do pre-job safety inspection</p>				Address any potential hazards observed prior to starting work.
<ul style="list-style-type: none"> Fill out daily job site inspection form 				
<p>Open journal door</p>				
<ul style="list-style-type: none"> Properly place 8-foot ladder 				Discuss three points of contact. Show ladder safety video

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<ul style="list-style-type: none"> Workers put on fall protection 				Review company policy
<ul style="list-style-type: none"> Loosen nuts with ¾ inch impact wrench (top and sides of door) 				Once harnessed in place instruct co-worker to hand 3/4 inch impact wrench up to co-worker. Turn latches 90 degrees. Lower impact wrench to co-worker. Descend and remove ladder from working area.
<ul style="list-style-type: none"> Remove thermocouple from journal bearing 				Thermocouple should normally only be hand tightened
<ul style="list-style-type: none"> Attach safety removal tabs on door to journal yoke 				
<ul style="list-style-type: none"> Loosen nuts on lower edge of door 				
<ul style="list-style-type: none"> Use hoist to remove walkway & railing beside journals to accommodate journal yoke. 				
<ul style="list-style-type: none"> Install temporary railings 				
<ul style="list-style-type: none"> Attach clevises on 15-ton monorail hoists to picking eyes on yoke assembly 				One hoist attached approximately 20 degree from vertical. One hoist attached vertical. Monitor cables for proper tension.
<ul style="list-style-type: none"> Attach ½-inch choker and come-alongs to hydraulic cylinder connecting rods. 				Attach connecting rods to yoke assembly
<ul style="list-style-type: none"> Remove taper pin lock cap screws and insert one cap screw in threaded pusher hole to break taper lock 				
<ul style="list-style-type: none"> Insert threaded slide hammer into pin threaded center hole 				

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<ul style="list-style-type: none"> Remove pins, (north and south) 				Utilize hoist, come-a-long, and slide hammer in unison to remove pin. (Pins weight approximately sixty pounds each) Once the pin is out of the taper fit, it takes two people to lower it to ground level. Remind workers to use proper lifting techniques. Utilize hoist to ensure safe removal of pin to prevent lifting injuries.
<ul style="list-style-type: none"> Relax the connecting rods with the come-a-longs already in place. 				
<ul style="list-style-type: none"> Position one mechanic on the north hoist pendant and one on the south hoist pendant. 				Maintain eye contact to ensure consistent and safe lifting.
<ul style="list-style-type: none"> The mechanic on the 20 degrees off vertical hoist begins lifting while other mechanic maintains proper tension on other line. 				. .
<ul style="list-style-type: none"> When the 20 degree offset line becomes vertical, it maintains tension while the other hoist lowers the journal to the I-Beam stops below the removed grating 				Ensure there is tension on the line when at stops
Tire Removal (Top)				
<ul style="list-style-type: none"> Position the 8' extension ladder over journal, ascend ladder and attach to retractable fall protection 				Review company policies

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<ul style="list-style-type: none"> Co-worker hands air lance to worker in upper position 				Necessary to have face shield, goggles, dust mask, and normal PPE.
<ul style="list-style-type: none"> Clean ring retainer holes (approx. 20) 				Fellow workers should evacuate building while air lancing is taking place. (To avoid dust and projectile injury)
<ul style="list-style-type: none"> Get ¾" air impact wrench from co-worker and removes the (20) ring retainer bolts. 				
<ul style="list-style-type: none"> Attach mobile crane to retainer ring <ul style="list-style-type: none"> a) Attach I-Bolts 180 degrees apart through threaded picking holes 				Execute pre-shift inspection. Chokers must be minimum of 6' in length and matching.
<ul style="list-style-type: none"> Worker on top of journal apparatus descends ladder and removes it from area. 				
<ul style="list-style-type: none"> Swing out handrails 				
<ul style="list-style-type: none"> Designated signaler posted to communicate with the crane operator <ul style="list-style-type: none"> a) Signals crane operator to add light tension to line. 				
<ul style="list-style-type: none"> Position mechanics (2) on opposite sides of journal with 8 lb. sledge hammers. <ul style="list-style-type: none"> a) Impact retainer ring with sledge hammers to loosen rig from shoulder while maintaining tension 				Apply tether lines to eye holes prior to tapping to maintain lift control of ring. Worker should maintain tension on the tether line.

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<ul style="list-style-type: none"> Lift ring with crane and position outside on ground out of work area. 				Review company procedures Place as determine during crew meeting
<ul style="list-style-type: none"> Close handrails 				Review company procedures
<ul style="list-style-type: none"> Detach crane from ring. 				
<ul style="list-style-type: none"> Two mechanics attach spreader bar to crane. 				
<ul style="list-style-type: none"> Two mechanics obtain ring of fire a) Center ring on tire and attach propane and air hoses to proper connectors. 				Ensure the ring of fire is centered on tire to optimize heat transfer.
<ul style="list-style-type: none"> Mechanic positions ladder to ascend onto top of journal, with proper fall protection to attach spreader bar. 				Review company procedures
<ul style="list-style-type: none"> Attach spreader bar to top tire via two threaded holes on opposite sides. 				Ensure the spreader bar is level for equal pull and maintain a constant tension.
<ul style="list-style-type: none"> Mechanic descends ladder and removes from direct work area. 				
<ul style="list-style-type: none"> Ignite ring of fire. 				Mechanic opens propane valve slightly while another mechanic is igniting flame. Adjust both air and propane to obtain proper mixture of gas. Proper air/gas mixture shows a flame detached from nozzles approx. 1" (blue flame)
<ul style="list-style-type: none"> Start heat check 				Use a heat pencil or infrared meter to verify the removal temperature is 250 degrees Fahrenheit (do not exceed).

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<ul style="list-style-type: none"> • Lift tire <ul style="list-style-type: none"> a) Swing out handrails b) Signal crane operator to lift c) Shut off propane/air valves. d) Pivot arms on ring of fire and lower e) Continue lifting tire off of journal and lower to ground outside. 				<p>Execute a constant lift when separation begins to occur between tires.</p> <p>Explain hazards</p> <p>Ensure all workers are clear of the active crane radius</p> <p>If tire is to be discarded, place on pallet</p> <p>If tire is to be re-installed, place on cribbing.</p>
<ul style="list-style-type: none"> • Detach spreader bar from removed tire. 				
Tire Removal (Bottom)				
<ul style="list-style-type: none"> • Two mechanics center ring on tire. 				<p>Ensure the ring of fire is centered on tire to optimize heat transfer.</p>
<ul style="list-style-type: none"> • Attach spreader bar to bottom tire via two threaded holes on opposite sides. 				<p>Ensure the spreader bar is level for equal pull and maintain a constant tension.</p>
<ul style="list-style-type: none"> • Ignite ring of fire. 				<p>Mechanic opens propane valve slightly while another mechanic is igniting flame. Adjust both air and propane to obtain proper mixture of gas. Proper air/gas mixture shows a flame detached from nozzles approx. 1" (blue flame)</p>

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<ul style="list-style-type: none"> Start heat check 				Use a heat pencil or infrared meter to verify the removal temperature is 250 degrees Fahrenheit (do not exceed).
<ul style="list-style-type: none"> Lift tire <ol style="list-style-type: none"> Swing out handrails Signal crane operator to lift <ol style="list-style-type: none"> Shut off propane/air valves. Pivot arms on ring of fire and lower Continue lifting tire off of journal and lower to ground outside. <ol style="list-style-type: none"> Close handrails 				<p>Execute a constant lift when separation begins to occur between tires.</p> <p>Explain hazards Ensure all workers are clear of the active crane radius If tire is to be discarded, place on pallet If tire is to be re-installed, place on cribbing.</p>
<ul style="list-style-type: none"> Detach spreader bar from crane. 				
New Tire Installation				
<ul style="list-style-type: none"> Clean and de-burr the key on hub 				Use sandpaper or emery cloth. If uncleanable then replace key with one inch key stock. To be done while heating the spare tire and removing the crane block from the removed tire.
<ul style="list-style-type: none"> Put Loc-Tite on the entire circumference of the hub face. 				Loc-Tite is used to alleviate pressure from the inner split retainer ring. To be done while heating the spare tire and removing the crane block from the removed tire.

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<ul style="list-style-type: none"> Attach spreader bar to new tire via two threaded holes on opposite sides. 				Ensure the spreader bar is level for equal pull and maintain a constant tension.
<ul style="list-style-type: none"> Ignite ring of fire. 				Execute when the bottom tire being removed is being heated. Mechanic opens propane valve slightly while another mechanic is igniting flame. Adjust both air and propane to obtain proper mixture of gas. Proper air/gas mixture shows a flame detached from nozzles approx. 1" (blue flame)
<ul style="list-style-type: none"> Start heat check 				Use a heat pencil or infrared meter to verify the removal temperature is 250 degrees Fahrenheit (do not exceed).

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<ul style="list-style-type: none"> • Lift tire <ul style="list-style-type: none"> a) Shut off propane/air valves. b) Remove ring of fire c) Attach spreader bar to crane d) Swing out handrails e) Signal crane operator to lift f) Lift tire off cribbing and raise into position above journal, then lower into place. g) Close handrails 				<p>Explain hazards</p> <p>Execute a constant lift when separation begins to occur between tires</p> <p>Ensure all workers are clear of the active crane radius</p> <p>One mechanic should be guiding the tire keyway onto key.</p> <p>It is critical that tire and spreader bar is level to ensure that during installation the tire does not get stuck.</p> <p>Maintain level when lowering the tire into place over keyway. (Very Critical)</p> <p>There should not be any gap between the tire and the split retainer because the split retainer may have broken bolts or a bent boss.</p>
<ul style="list-style-type: none"> • Detach spreader bar from installed tire. 				
Re-install top tire				
<ul style="list-style-type: none"> • Determine which used tire to reinstall 				
<ul style="list-style-type: none"> • Attach spreader bar to tire to reinstall via two threaded holes on opposite sides. 				<p>Ensure the spreader bar is level for equal pull and maintain a constant tension.</p>

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<ul style="list-style-type: none"> Install ring of fire 				Make certain that ring of fire is centered over tire.
<ul style="list-style-type: none"> Clean key way prior to heating tire 				Be aware of temperature of fire.
<ul style="list-style-type: none"> Ignite ring of fire. 				Mechanic opens propane valve slightly while another mechanic is igniting flame. Adjust both air and propane to obtain proper mixture of gas. Proper air/gas mixture shows a flame detached from nozzles approx. 1" (blue flame)
<ul style="list-style-type: none"> Start heat check 				Use a heat pencil or infrared meter to verify the removal temperature is 250 degrees Fahrenheit (do not exceed).

Job Steps	Importance Narrative (Consider Safety, Production, Maintenance)	Importance Ranking 1=Important 2=Very Important 3=Critical	Satisfactory or Needs Work	Procedures/Risk Resolution/ Notes/Comments
<ul style="list-style-type: none"> • Lift tire <ul style="list-style-type: none"> a) Shut off propane/air valves. b) Remove ring of fire c) Attach spreader bar to crane d) Swing out handrails e) Signal crane operator to lift f) Lift tire off cribbing and raise into position above journal, then lower into place. g) Close handrails 				<p>Explain hazards</p> <p>Ensure all workers are clear of the active crane radius One mechanic should be guiding the tire keyway onto key. It is critical that tire and spreader bar is level to ensure that during installation the tire does not get stuck. Maintain level when lowering the tire into place over keyway. (Very Critical)</p>
<ul style="list-style-type: none"> • Detach spreader bar from installed tire. 				
<ul style="list-style-type: none"> • Swing spreader bar out of work area and place outside on pallet 				Explain hazards
<ul style="list-style-type: none"> • Attach crane to retainer ring chokers 				
<ul style="list-style-type: none"> • Swing out handrails 				
<ul style="list-style-type: none"> • Lift retaining ring in place on hub 				Align bolt holes with hub
<ul style="list-style-type: none"> • Close handrails 				Explain hazards

Job Steps	Importance Narrative (Consider Safety, Production, Maintenance)	Importance Ranking 1=Important 2=Very Important 3=Critical	Satisfactory or Needs Work	Procedures/Risk Resolution/ Notes/Comments
<ul style="list-style-type: none"> • Tighten Retainer bolts <ul style="list-style-type: none"> a) Position ladder and ascend to top of journal b) Attach harness to retractable fall protection c) Obtain ¾" impact wrench from co-worker d) Tighten bolts in a 90 degree spread pattern e) Lower impact wrench to co-worker f) Descend from journal and remove ladder 				<p>Explain hazards</p> <p>Ensure the ring is being tightened down evenly Do not lower using air line</p>
Close Journal Door				
<ul style="list-style-type: none"> • One mechanic positioned on N and one on S at crane pendants 				
<ul style="list-style-type: none"> • Maintain tension on the vertical line while lifting with the 20 degree offset until vertical. 				
<ul style="list-style-type: none"> • Lift with the vertical and maintain tension on 20 degree offset <ul style="list-style-type: none"> a) Position the hydraulic connecting rods with attached come-a-longs until eyelet alignment is met. 				
<ul style="list-style-type: none"> • Lift North pin into place 				<p>Remind workers to use proper lifting techniques.</p> <p>Utilize hoist to ensure safe insertion of pin to prevent lifting injuries.</p> <p>Use of slide hammer may be necessary to get the pin into position.</p>

Job Steps	Importance Narrative (Consider Safety, Production, Maintenance)	Importance Ranking 1=Important 2=Very Important 3=Critical	Satisfactory or Needs Work	Procedures/Risk Resolution/ Notes/Comments
<ul style="list-style-type: none"> Install taper lock bushing by tightening bolts in a 90 degree spread pattern. 				
<ul style="list-style-type: none"> Remove come-a-longs off arms 				
<ul style="list-style-type: none"> Remove hoists from yoke and secure out of the way 				
<ul style="list-style-type: none"> Replace grated walkways and handrails 				Explain hazards
<ul style="list-style-type: none"> Mechanic position ladder to ascend to top of yoke with proper fall protection in place. 				Explain hazards
<ul style="list-style-type: none"> Obtain ¾ ton come-a-long from coworker. <ul style="list-style-type: none"> a) Attach to eyelet approx. 3' above door opening on mill body and load chain attached to door eyelet. b) Put a strain on the come-a-long to support the door. 				
<ul style="list-style-type: none"> Co-worker removes bolts from the safety tabs. 				
<ul style="list-style-type: none"> Position door with come-a-long for height and to secure for tightening 				When positioning door, replace gasket if needed.
<ul style="list-style-type: none"> Harnessed mechanic is handed ¾" impact wrench <ul style="list-style-type: none"> a) Tighten all bolts within reach 				
<ul style="list-style-type: none"> Mechanic descends and removes ladder 				
<ul style="list-style-type: none"> Mechanic below tightens remaining bolts on door 				
<ul style="list-style-type: none"> Call for Oiler to check journal oil and add as needed 				

Job Steps	Importance Narrative (Consider Safety, Production, Maintenance)	Importance Ranking 1=Important 2=Very Important 3=Critical	Satisfactory or Needs Work	Procedures/Risk Resolution/ Notes/Comments
<ul style="list-style-type: none"> • Mechanic shall re-install thermocouple on journal. 				
<ul style="list-style-type: none"> • Close mill access door and tighten all bolts 				Make sure safety chains are removed prior to closing.
<ul style="list-style-type: none"> • Open 2 hydraulic valves per cylinder at the cylinders. 				

Duty 4: Startup

Objective: The Learner will demonstrate how to safely startup the roller mill circuit. The learner will demonstrate the proper procedure for a startup. The learner will also explain and demonstrate other job steps listed, and explain why they are conducted, any associated risk, and how to implement appropriate controls. The proper startup procedure will include the following job steps and activities:

Job Steps	Importance Narrative (Consider Safety, Production, and Maintenance)	Importance Narrative 1=Important 2=Very Important 3=Critical	Satisfactor y or Needs Work	Procedures/Risk Resolution/ Notes/Comments
Notify appropriate supervisor upon job completion if not at site				
<ul style="list-style-type: none"> Supervisor instructs for personal locks to be removed. 				
<ul style="list-style-type: none"> Supervisor completes a post-job site inspection 				
<ul style="list-style-type: none"> Supervisor removes MCC lock from roller mill lock box 				
<ul style="list-style-type: none"> Supervisor notifies control room that he/she will be closing out breakers 				
<ul style="list-style-type: none"> Supervisor removes all locks and energizes the breakers that were locked out. 				
<ul style="list-style-type: none"> Supervisor to 5th floor of preheat tower to S-252 Guillotine Gate and opens. 				Explain production hazards
<ul style="list-style-type: none"> Supervisor goes to 2nd floor preheat tower to S-251 Guillotine Gate and opens. <ol style="list-style-type: none"> Notify control room that he/she is going to open S-251 Guillotine Gate and it may affect airflow Open S-251 Guillotine Gate 				Explain production hazards

<ul style="list-style-type: none"> Supervisor returns to MCC and returns locks to their respective positions in the Roller Mill Lock-Out Box 				
<ul style="list-style-type: none"> Supervisor calls control room to inquire about any possible abnormal in the Roller Mill Circuit <ul style="list-style-type: none"> a) If none, mill is released to production to start 				
<ul style="list-style-type: none"> Supervisor is positioned in Roller Mill area to ensure everything starts up properly 				Production hazards