

## **Craffey, Ryan**

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**From:** Craig Metzger <craig.metzger@gerdau.com>  
**Sent:** Tuesday, March 26, 2019 11:52 AM  
**To:** Craffey, Ryan  
**Subject:** [External\_Sender] Information Request  
**Attachments:** MON-RP-111-55-11 CHANGING A MOLD.pdf

Good afternoon Ryan,

Please see the attached procedure for Gerdau's caster operation. If there are any further questions regarding this issue please let me know.

Thanks Ryan.

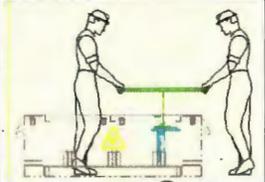
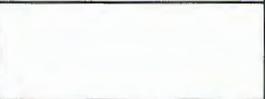
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	Dept Head/Date	Safety /Date	Environmental/Date	Dept	Melt Shop/Caster
				Title	Changing a Mold
				RP No.	MON-RP-111-55-12
	Quality /Date		Quality Systems/Date	Original Issue Date	04/09/97
				Revision Date	12/04/18
				Page	1/3

**Critical List**

<b>REQUIRED PPE</b>			<b>MEASURES AND INFORMATION</b>		
					
Hard Hat w/Chin Strap	Safety Glasses	Metatarsal Boots	Fire Resistant Clothing	100% Cotton Long Undergarment	Ear Plugs
Measures: N/A			Information: CCM Main Report, Mold level calibration (MON-RP-111-50)		
COMPLETION TIME			N/A		

N°	TASK	DETAIL WITH PICTURES		KEY POINTS	Safety/Environment/Quality/Cost/Delivery
>1	Mold changes	<b>Scheduled: Molds will be changed at approximately 300 heats or weekly as determined by supervision</b>	Non-Scheduled: billet quality concern such as off-square, bulge, wide gap on foot rolls	Mold life mold changes. NON DOWN DAYS, do not change molds unless ladle arrival time from VTD is greater than 45 minutes per mold.. Record mold changes in level 2 CCM heat report	Minimum amount of time needed to change a mold has several factors which may lengthen the event. ( Electrician availability, Crane availability etc )
>2	Notify Employees	Maintenance will assist with filling the expansion tank if needed after mold change.		<b>Millwright must be notified and present when filling expansion tank</b>	Draining the expansion tank and dumping the emergency mold water system will result in extended down time
3	Verify System Settings	The strand must be in MTCE mode to change a mold.		The dummy bar remains in the home position	
4	Check Water Valve	A visual check of the Emergency water valve in the <b>closed position</b> must be performed before closing any mold water valves.		This valve must be in the closed position before changing a mold to prevent emergency mold water from contaminating the clean mold water.	
5	Mold Water Pumps Operation	No mold water pumps are shut off if you change a single mold. Shut the pumps off if you change more than one mold.		HMI screen shows the mold water pumps in the ON position, as well as the mold water flow, liters per min (L/min).	
6	Shut off INLET Water	Shut off the mold water, cooling <b>INLET</b> water valve		The INLET valve must be closed first	
7	Shut off OUTLET Water	Shut off the mold water cooling <b>OUTLET</b> valve		Close OUTLET valve after inlet valve is closed.	<b><u>If the outlet valve is closed first, the water will be dead heading into the valve creating back pressure. High back pressure could result in damage to valves and pipes</u></b>
8	Lock Out of Equipment	Apply Locks to INLET and OUTLET valves		Use Valve locks supplied for each strand located on wall near valves	<b><u>Failure to lock out this source could result in safety hazard for person changing the mold.</u></b>
9	Relieve the Pressure in the Mold	Open the two drain valves on the south side of the oscillator for the mold/molds that are being changed. These valves must be left open for about 30 seconds. Then close them.		This will release water in the pipes to prevent entrapment when pulling the mold	<b><u>Failure to relieve the pressure will result in high pressure water release that could causing injury.</u></b> Failure to close these valves after one minute will result in draining of the expansion tank causing extended down time.

Nº	TASK	DETAIL WITH PICTURES	KEY POINTS	Safety/Environmental/Quality/Cost/Delivery
10	Close Stair Case	Chain the upper and lower entrance to stair case 	Attention to surroundings	<u>Prevents pedestrian traffic on stair case while moving mold housing with crane.</u>
>11	Remove Top Plate and Closing Radioactive Source	Position employees on the north side of the mold. Remove the top plate for access to the mold level source. Position the source rod shutter to the closed position. 	Source must be closed before removing from mold housing.	<u>Failure to close source may expose operators to radiation.</u>
>12	Perform Radiation Sweep of Sources	2nd Operator to use hand held radiation monitor to sweep area around molds and source containers 	If monitor is reading 2 mRem/hr or higher, source container shutter is still open, Check container and attempt to close shutter.  Re-sweep with monitor If shutter cannot be closed - DO NOT REMOVE - Contact GTF to Inform RSO	<u>Failure to close source may expose operators to radiation</u>
13	Attach Source Lifting Device and Lock Source Closed	Once container has been verified as closed - Place plugs through lifting points on top of source tube insert cotter pins and affix a small padlock through holes in cotter pins to lock the source in the CLOSED position 	Lifting plugs must be secured with both cotter pins and LOCKED before source is to be removed from the housing. Care must be taken when removing mold level source to prevent possible damage to the housing.	<u>Failure to use proper lifting device may cause strain injuries.</u> <u>Failure to close source may expose operators to radiation</u>
14	Removal of Source Device	Using no touch tool, connect to the loop on the Source Lifting Device and raise the source container out of the mold housing. Store the source container in marked cabinet 	Care must be taken to limit exposure to source container. Maintain distance and utilize no touch tools	<u>Failure to use proper lifting device may cause strain injuries.</u> <u>Failure to close source may expose operators to radiation</u>
15	Storage of Source	Cabinet is marked with caution signs. Cabinet is only to be used for sources. 	During the mold change or any time the source is out of the mold, the source remains in cabinet with the cabinet locked.	<u>Failure to place radioactive equipment in the appropriate storage area will violate NRC requirements.</u>
16	Radiation sign placement	Place the radiation sign next to the source when removed. 	Signs must be visible to those on the casting floor.	<u>Failure to place the sign will violate NRC requirements.</u>
17	Inspect lifting device	Check the lifting cable spreader assembly for defects prior to use. 	Inspect for fraying cable damage and bent bull ring.	<u>Inspection of lifting device will help prevent the lifting device from failing which could lead to injury.</u>
18	Remove mold cover	Attach cables from lifting device to mold cover with shackles. 	Avoid pinch points and stay clear of cover for removal. Direct crane for cover removal.	<u>Failure to move out of the way while removing cover could result in pinch point injury.</u>
19	Remove mold tie-down bolts	Remove the tie-down bolts by using the T-bar. 	An impact wrench will cause thread damage to the oscillator table. This damage will lead to extended caster down time	<u>An impact wrench will cause thread damage to the oscillator table. This damage will lead to extend caster down time.</u>
20	Disconnect Source Detector	Using a small screw driver, disconnect and remove the Source detector from the south side of the mold housing 		
21	Change mold	Use lifting device and Ladle Crane to remove old mold. Clean the surface and bolt connection points where mold housing sits. Use Crane to install new mold housing 	Record information for new mold being inserted and update level 2.	<u>Failure to safely perform lifts with the ladle crane can result in serious injury and/or equipment damage</u>

Nº	TASK	DETAIL WITH PICTURES	KEY POINTS	Safety/Environmental/Quality/Cost/Delivery
22	Insert tie-down bolts	Use T-bar to hand tighten tie-down bolts. Re-install Source Detector 	Start threading the bolt slowly by hand then use the T-bar to tighten the bolts to the table.	<b>Failure to thread the bolt properly will cause damage to the mold table. This damage will result in extended caster down time.</b>
23	Reinstall mold cover and source	Install source in mold, install mold cover. When source container is installed back into the machine - CCM Pulpit Operator to unlock source and open shutter 	Put back equipment in proper place CCM Pulpit Operator is in charge of source lock out key while sources are removed from machine	<b>Failure to use proper lifting device may cause strain injuries.</b> <b>Failure to close source may expose operators to radiation</b>
>24	Perform Radiation Sweep of Sources	2nd Operator to use hand held radiation monitor to sweep area around molds and source containers 	Ensure that sources are secured in mold housing and radiation contamination readings are not found on the casting deck If monitor is reading 2 mRem/hr or higher from 1' or more away from the mold, call the RSO or GTF.	<b>Radiation Contamination is a health concern for operations on the caster</b>
25	Turn water back on	Remove locks and turn water on Ensure bleeder valves are open on the mold housings 	Open outlet valve first and then open the inlet valve.	
26	Calibration	For Mold Level Calibration refer to MON-JA-111-50.	When calibration is complete, the electricians will notify you which strand to calibrate next. If for any reason you lose the water in the expansion tank, all 4 molds must be recalibrated.	Poor mold level control may cause entrainment of mold powder and / or slag
27	Record	Document on the CCM Main Report the mold housing number(s) installed		

Revision Number	Date	Comments
3	11/5/1999	Revised paragraph 1.0, added paragraph 1.1, added Prod/Cost Concern to paragraph 1.1 and added paragraph 1.2.
4	4/10/2000	Added paragraph 2.4 and Prod/Cost/Quality Concerns, revised paragraph 4.0 and Quality Concern
5	5/30/2001	Added Environmental Rating. Added MS/CC-23.00A (CC01) to Information, deleted caster sheet from Assoc Docs
6	11/1/2004	Changed to MACSTEEL, revised format, approvals
7	6/1/2008	Changed to Gerdau, corrected title in 1.2
8	6/10/2009	Changed SOP to RP, added Safety, EV Eng, and Prod Supt approvals and added ratings to header – all to comply with the standardization structure, moved Master list to Assoc docs from critical list, changed IR/S to HR/S
9	11/8/2013	Reformatted CC-04.08 into this new RP to comply with Gerdau Standardization Structure. Went from 300 heats 350 heats on mold liner.– scheduled and non scheduled mold changes You removed MEMS, LB300 IRL source holder, plug, counter, added photo's, T-bar, etc.)
10	5/13/2015	Added #9 source lock and #10 safety item S Sova, Edited Step 1 key points, Added steps 10, 11, and 13.Added Environmental concern to step 13
11	10/31/2018	Changed wording of steps 1 & 2, changed steps 11-15 to detail how to securly lock source during maintenance to molds. Added a new step 20, edited step 21-25 to better detail safe method of source container.
12	12/4/2018	Step 11 - Add Employee positioning Step12 - Add reference readings for employees Step 24 - Add reference readings for employees