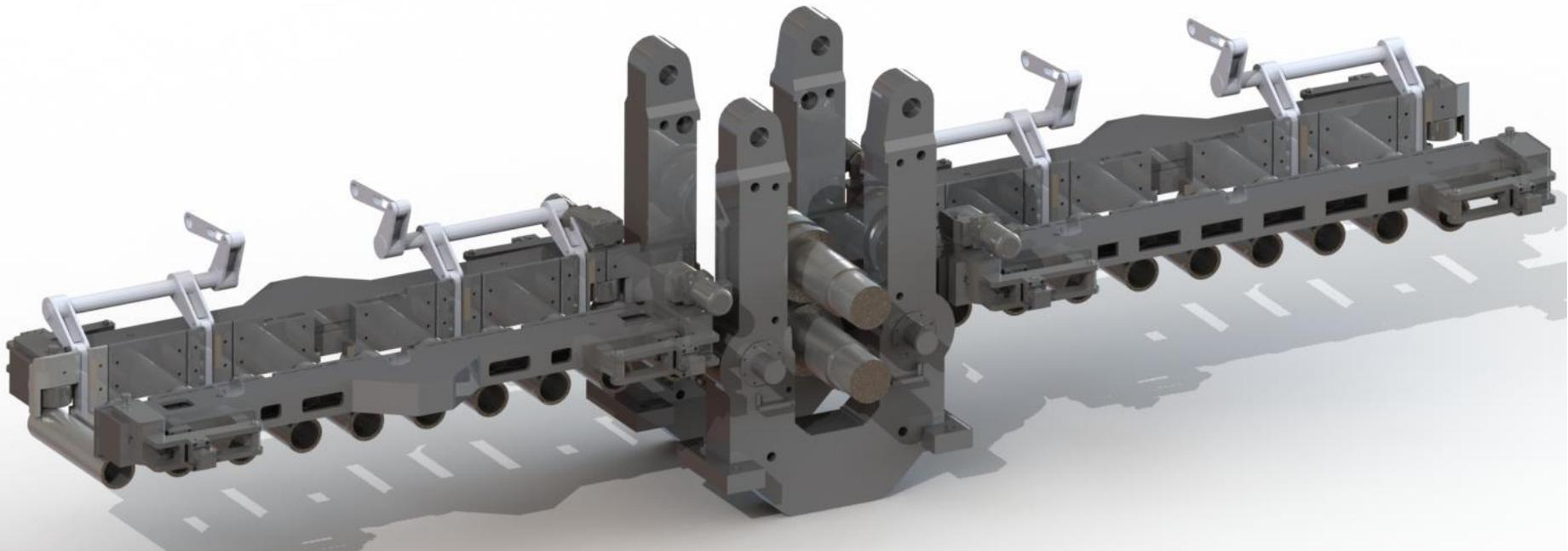


VDM Metals Improvement Projects

For Florham Park, NJ Rolling Mill



“You’re crazy!”

“That will never work!”

“We have tried that before and have proven that it can’t be done!”

Many great ideas are blocked before they are ever “born”, usually due to people who are afraid or unwilling to try something new or different. Oftentimes, one or two problems that occur when an idea is first implemented are quickly used as proof that the idea was a bad one. Persistence in the pursuit of realizing a good idea, even in the face of criticism and minor failures, can reap great benefit.



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At VDM Metals USA in Florham Park New Jersey, the Birdsboro rolling mill is used to hot roll large forged billets and small ingots into square billets, rectangular bars, and narrow plate. Work has been performed to expand the product offering of different sizes of square billet and rectangles, the standard geometry of the bars had not changed.



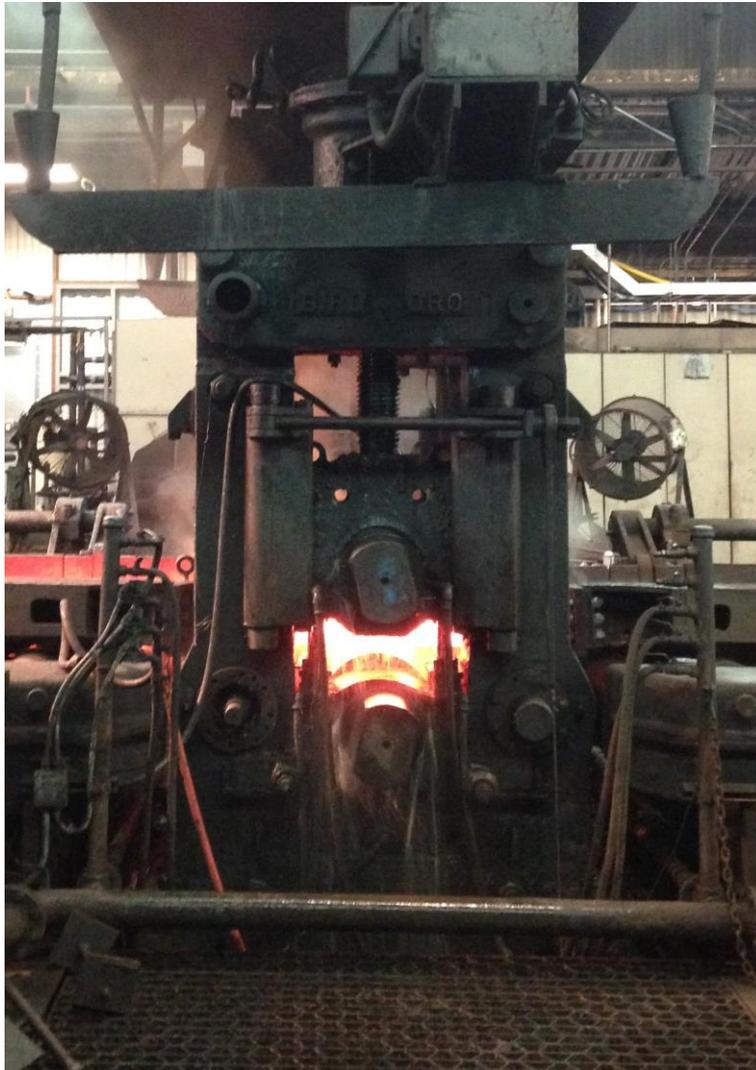
The **Reno Nevada Rolling Mills** use the output of the Florham Park Mill as pre-material. Not only does Reno roll small squares and rectangles, but Reno rolls round bars and specialty shapes as well.

Reno has two limitations...the strength of the employees and the power of the mill.

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- First, the bars in Reno are not moved by motors or robots. The metal bars are picked up by people and moved from roll stand to roll stand.
- Second, the Reno mills are limited by the power of the motor and the configuration of the bar to be rolled.





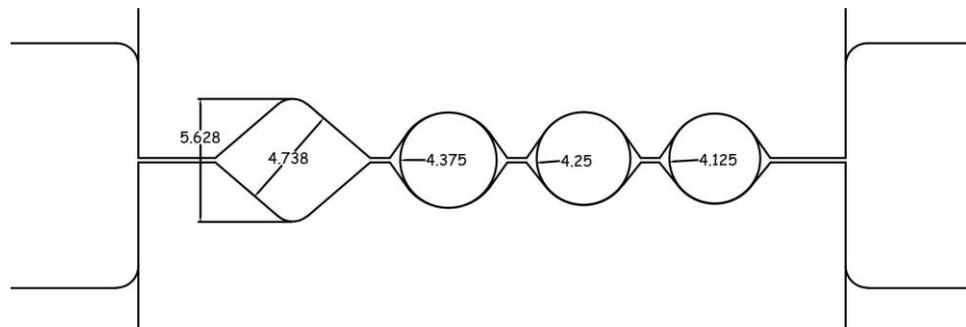
The Birdsboro in Florham Park has both the equipment for handling larger bars as well as the power for rolling large sizes of bar.

- Birdsboro was not set up for rolling round bars.
- Modifying the Birdsboro to roll round bars?
- Attempted in the past, but no one could recall when or what the results of the attempt were.



First Attempt Rolling Rounds

- Knocking the corners down to shape
- Grain Structure - Unacceptable.
- Existing Equipment not sufficient
- Need Guiding
- Re-Design of Roll Pass Required



Roll Design team in Reno and the Production Team in Florham Park

- Different approach needed.
- VDM Metals Reno - Long relationship with Ashlow Guides
- Primetals Technologies

With the Single Reversing Stand Roll barrel length of 32 inches, it was decided the first set of equipment would be set up to produce 4.125” diameter bars.



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- Tradition rolling practices would be to reduce the material through a series of stands as shown below
- The Florham Park reversing mill would present many challenges in controlling and rotating pass progression throughout the reduction process.





Florham Park:

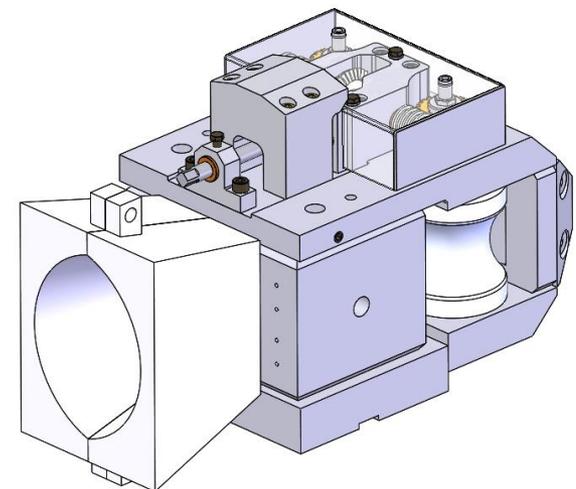
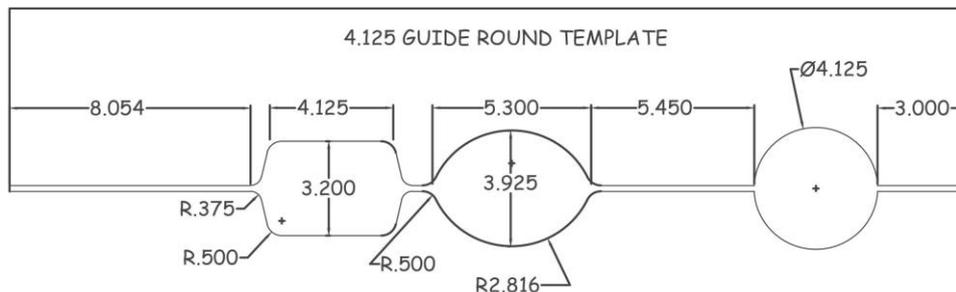
- Single Stand Reversing Mill
- Manipulators
- Driven Roll Tables



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Rolling Process: The new roll pass progression was designed using a bull head, box, oval, and round passes.

- Roll Template shown below.
- Limited space on the roll and why 4.125" diameter bars were chosen.
- Ashlow 2E150R 2 Roller Entry Guide.





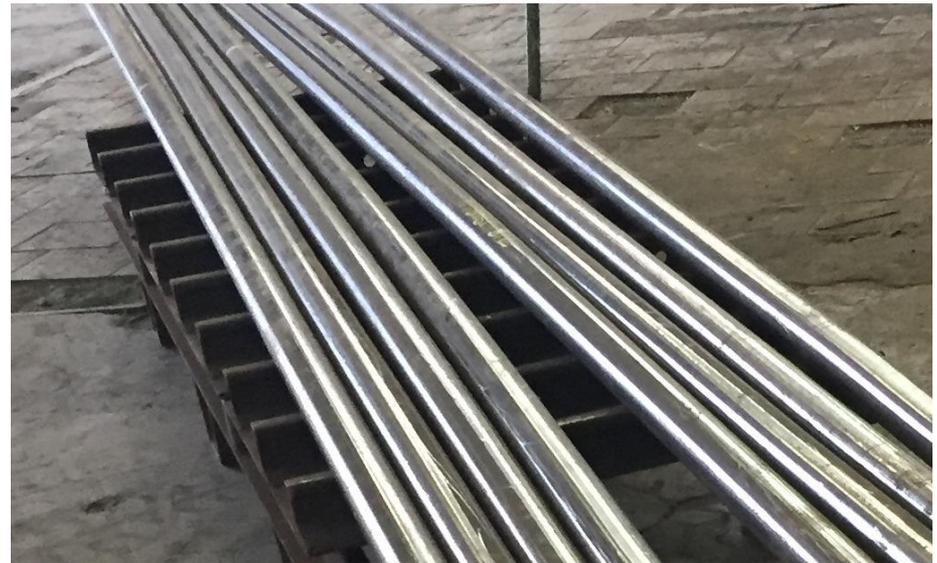
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First production - incorporating upgrades:

- New equipment was moderately successful.
- Acceptable shape and grain structure.
- Florham Park travel to Reno
- Observe rolling practices inspired ideas
- Additional process improvements required.

The next two rolling campaigns for round bar on the Birdsboro:
Shape surface essentially equal to those produced in Reno.

- First campaign consisted of alloy 718.
- Second campaign produced bars of 625.
- Properties were acceptable.
- Smaller size equipment delivered.



The vision for this project is to have the capability of rolling round bar, on the Birdsboro, in the range of two inches to four inches by the end of 2017.

Rolling Process: Video

Product is much longer, and obviously heavier, than the pictures shown earlier from the Reno Plant.

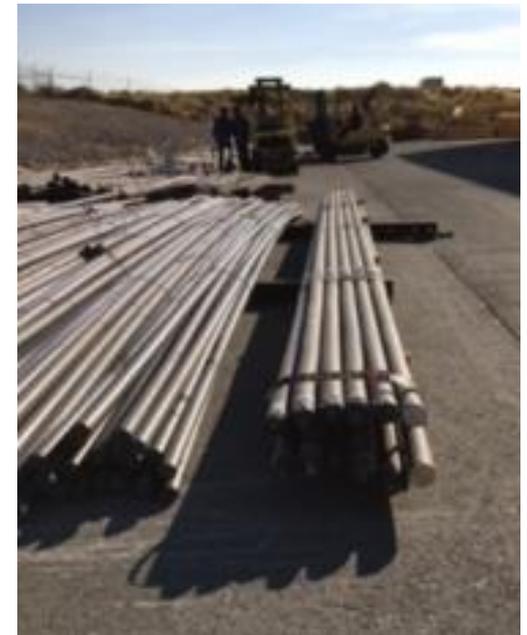
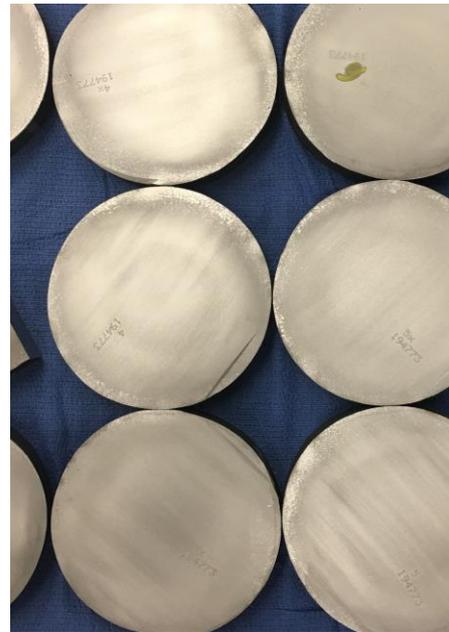


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Quality of Rounds:

- Rounds tested for grain structure and size.
- Sent to Reno for a straightening and peeling process
- Supplied to the end user.



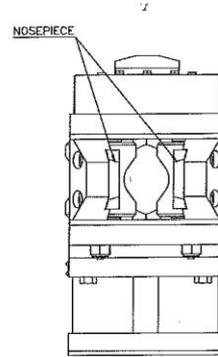
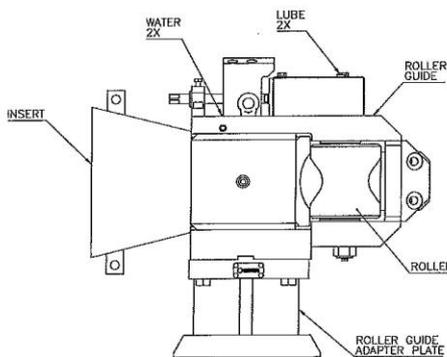
TABULATION OF GUIDES							
FINISH PRODUCT	ROLLER GUIDE	ROLLER GUIDE ADAPTER PLATE	ROLLER	INSERT	NOSEPIECE	GANG GUIDE ENTRY SIDE	GANG GUIDE EXIT SIDE
1.50	2E127R 10559322	10655545	10655555A	10655552A	10655576A	-----	-----
2.125	2E127R 10559322	10655545	10655555B	10655552B	10655576B	-----	-----
2.25	2E127R 10559322	10655545	10655555B	10655552B	10655576B	-----	-----
2.50	2E127R 10559322	10655545	10655555B	10655552C	10655576C	-----	-----
2.75	2E150R 10633955	10633834	10656470A	10656474A	10656440A	-----	-----
2.94	2E150R 10633955	10633834	10656470B	10656474A	10656440A	-----	-----
3.00	2E150R 10633955	10633834	10656470B	10656474B	10656440B	-----	-----
3.25	2E150R 10633955	10633834	10656470B	10656474B	10656440B	-----	-----
3.50	2E150R 10633955	10633834	10656470B	10656474C	10656440C	-----	-----
3.75	2E150R 10633955	10633834	10656470B	10656474C	10656440C	-----	-----
4.125	2E150R 10633955	10633834	10656470C	10634583	B2852-05	10634198	10634238

Success of rolling 4.125” Rounds...

- Increase the production portfolio
- 2.00” through 4.125 – every 0.25” increments.
- Primetals engineer and manufacture guides, inserts, rollers, and nose pieces to support this new product size range.
- VDM added a 1.50” round size to the mix to alleviate the Reno facility from having to produce in the future.

Several studies:

- Group families of rollers and inserts.
- Used for a variety of sizes.
- Reduce Guides and Spares



Obstacles:

No Shear Cut during rolling process

- Head or Tail
- Deformation of the product's nose.

Last pass – Oval to Round:

- Florham Park introduces a fork truck with a large boom to “nudge” the product from the back side to “encourage” the oval to enter to round pass.

Temperature of the Product on the roller tables.

- Delays cause the temperature to drop and increase the difficulty of rolling.
- Automation – Temperature Recording

Fork Truck: Reduction of product sizes from 4.125” to 2.00”

- “Nudging” process – attempt to eliminate
- 30+ foot long bar, column strength of the rod
- Smaller products in future?

Solution: Manipulator Pinch Roll mechanism.

- Primetals designing Pinch Rolls to the Florham Park facility.
- Several factors:

Add design to existing Mill without major changes...be cost effective.

Add Pinch Rolls to both sides of the Mill – never know when needed.

Design Pinch Roll to work with a variety of products/sizes.

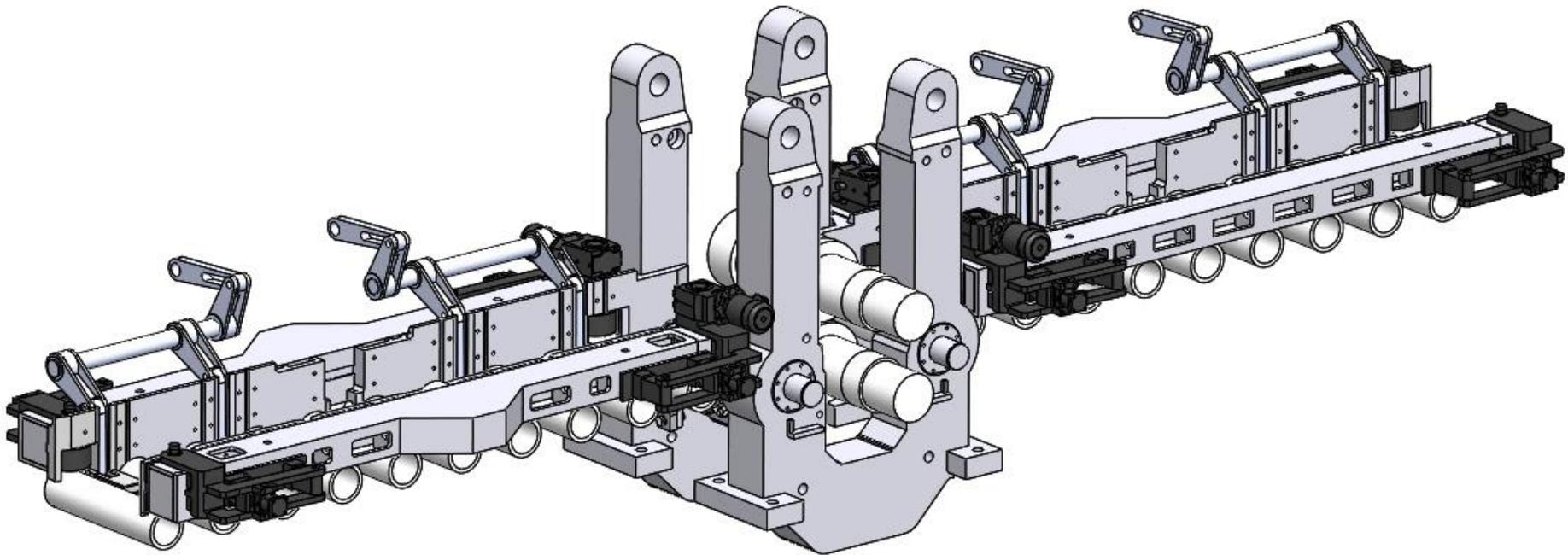
Add design without compromising the other products that have been rolled for several years.

Ease of use, integrate into existing controls.

Reduce down time during installation.

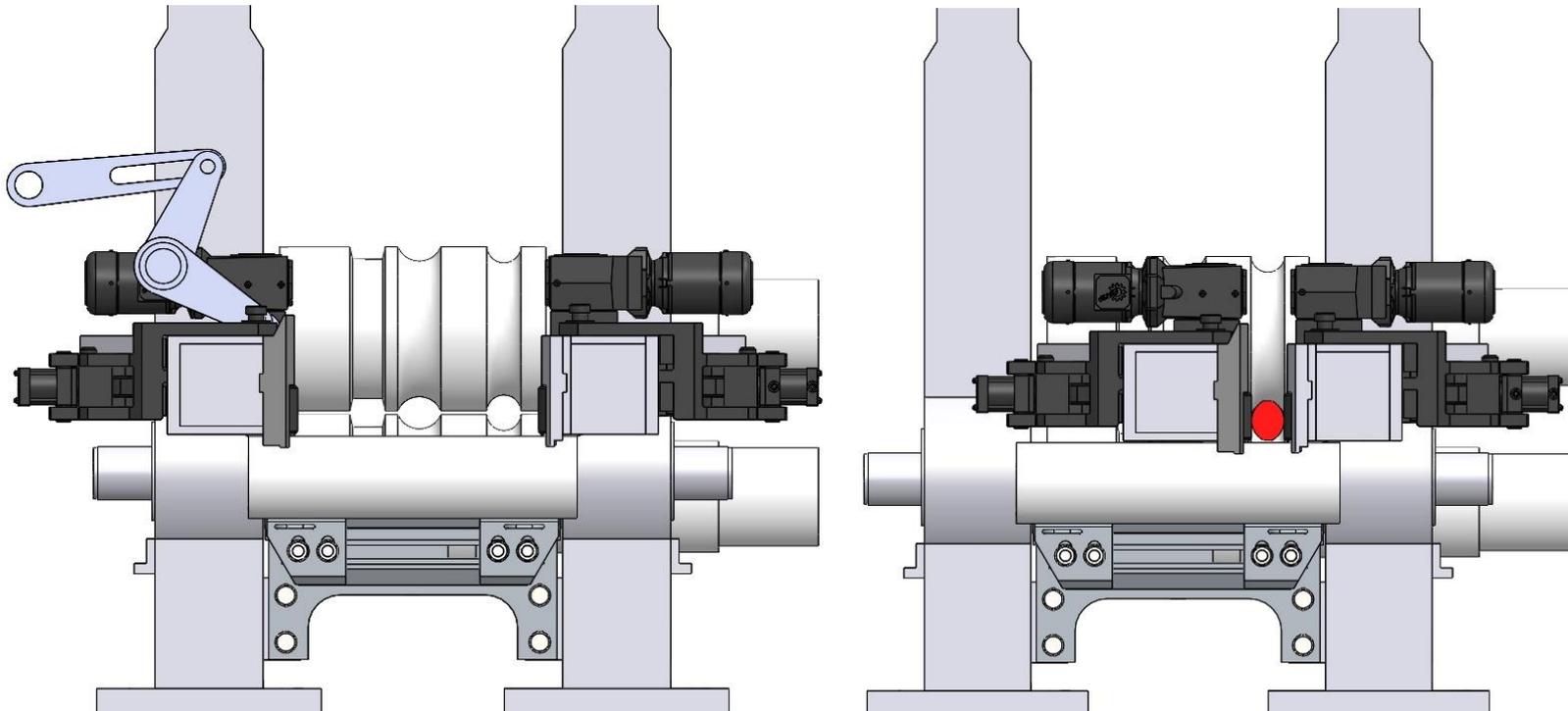
VDM Metals – Manipulator Pinch Rolls

Florham Park – Pinch Roll Layout



Manipulators: Side to side movement within the Mill window.

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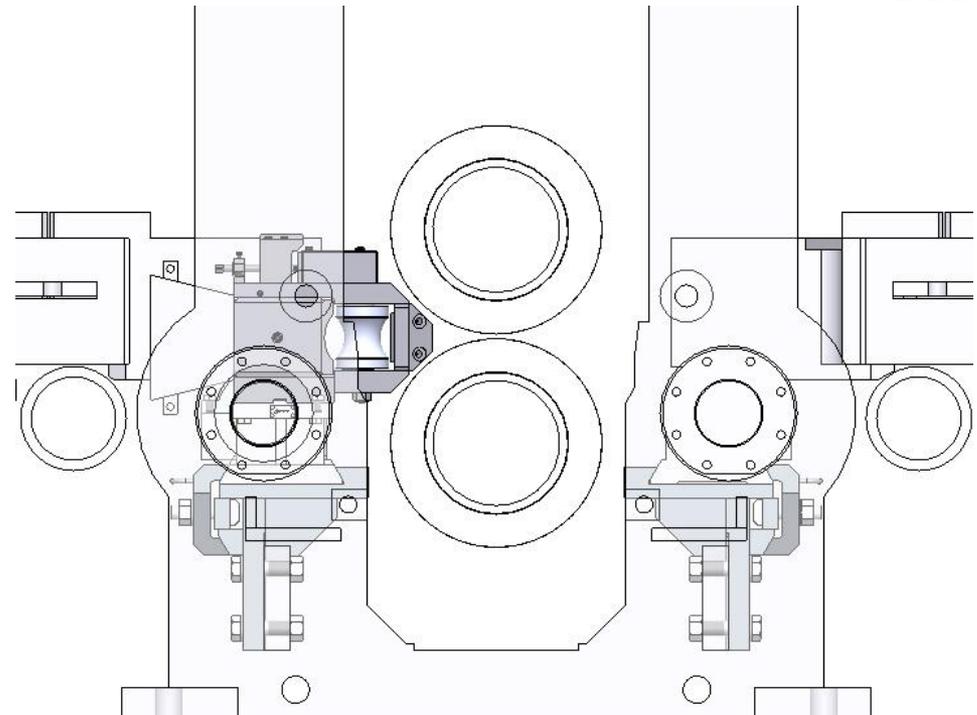
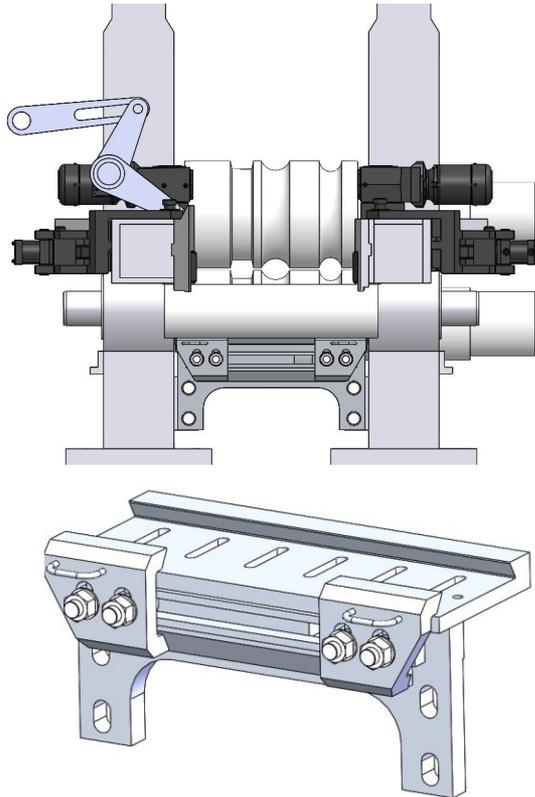
Pinch Roll: Oval must be held upright to enter the final round pass.

- Small contact area on the driven roller table
- Friction from the side walls of the manipulator.

VDM Metals – Manipulator Pinch Roll

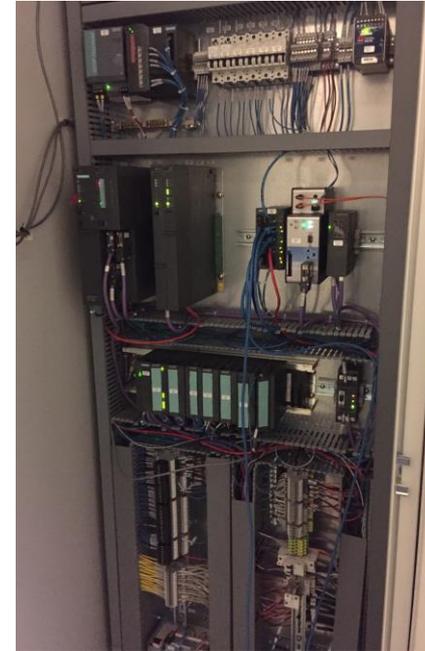
Mill Stand: Stainless Steel Restbars

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- Both sides of the Mill (entry and exit).
- Positioned below the stand drive rolls. No interference.
- Future opportunities requiring any product guiding (flats, angles, squares, etc.).

Automation Upgrade: (2012)



New Control System was installed using Siemens Sinamics Drives and S7-400 PLC's. This Control System upgrade simplified the Pinch Roll project integration at the Florham Park facility.

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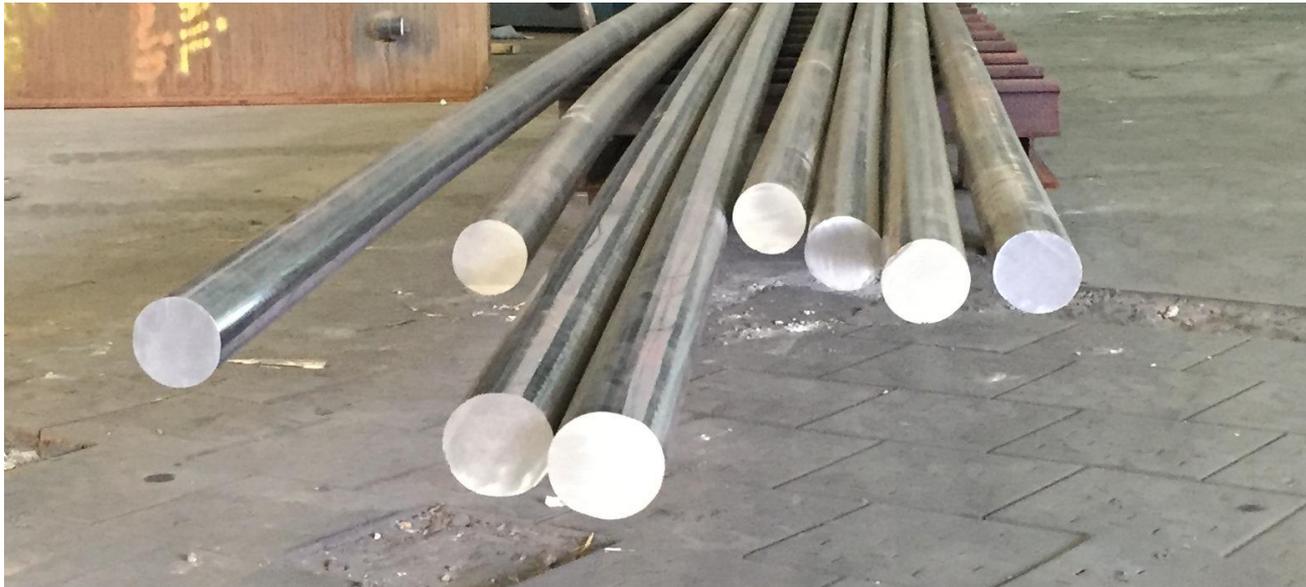


Products now being supplied at the Florham Park facility.

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Through collaboration of employees in multiple departments and different plants, as well as persistence to achieve a goal not thought possible at the start, VDM USA will cost-effectively increase the capabilities of an old piece of equipment. What was considered a billet generator for the Reno facility is now an end user Production Facility for large rounds.



Looking forward...

To improve on the ability of creating rounds at the Florham Park facility, Primetals was given the challenge to add equipment to an existing Single Stand Reversing Mill to increase a customer's product portfolio. The future looks bright for VDM.

What's the next challenge **Primetals Technologies** can solve for you?

VDM Metals Improvement Projects



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