

IRD ASSOCIATION, INC

DESIGNING THE FUTURE THROUGH INNOVATION

Spring Conference, May 2017

Advanced High Force Roll Balance Technology for Rolling Mills

Presented by:

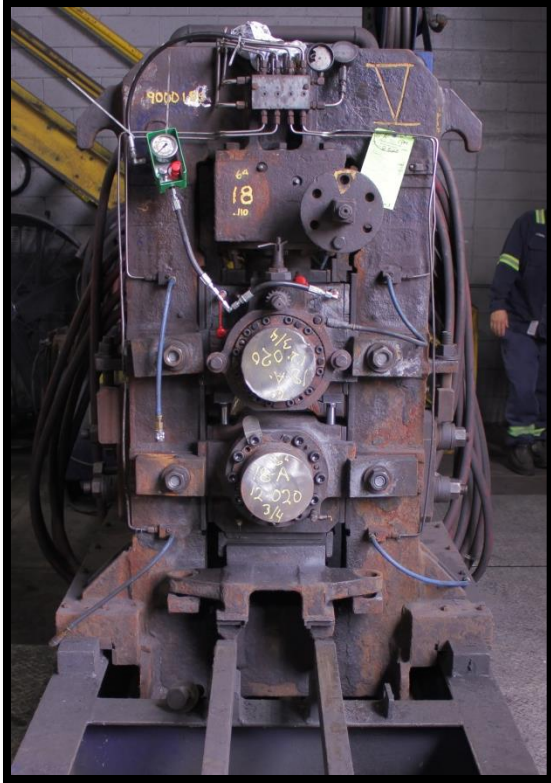
Tim Barill, HYSON Metal Forming Solutions

Bryan O' Malley, Gerdau | Rancho Cucamonga

AGENDA

- **Importance of RBC and role they play**
- **Comparison**
 - Coil / Mechanical Springs
 - Hydraulic
 - Elastomer (Liquid-filled / Silicone filled)
 - **Roll Balance Cylinders**
- **RBC Safety**
- **Pain Resolve**
- **Case Study**

INTRODUCTION



Importance of RBC and role they play

- Provide consistency
 - Roll force
 - Roll gap
- Ensure proper gauge and bar quality
- Enables quicker and safer roll change

ROLL BALANCE OPTIONS

Coil Springs



Belleville



Hydraulic



Elastomer



Nitrogen



ROLL BALANCE COMPARISON

	Safety	Fatigue Resistance	Consistent Force	Reliability	Maintenance Cost	Capital Cost
Coil / Mechanical	✓				✓	✓
Belleville Washers	✓		✓		✓	✓
Hydraulic		✓	✓	✓		
Elastomer			✓		✓	
Nitrogen	✓ +	✓	✓	✓ +	✓	

TYPICAL ROLL BALANCE CYLINDER DELAYS

- Hydraulic Leaks
- Inconsistent Roll Force
- Inconsistent quality due to roll gap issues
- Diminished force due to sealing surface damage

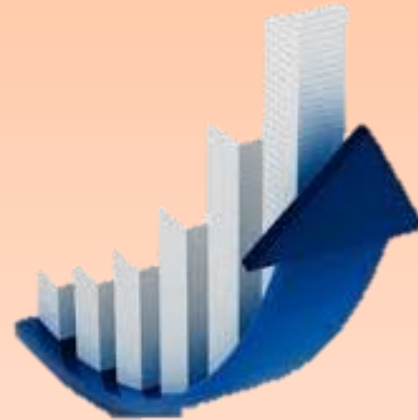
BENEFITS of MILL DUTY N2 CYLINDERS

- **Variable force** to meet the needs of the mill stand
- **High force on contact**
- **Protected sealing surface**
- Installation **time**
- Mill duty provides a robust mill duty cylinder that **resist damage**, due to side load impacts and mill shifting

BENEFITS

BENEFITS of MILL DUTY N2 CYLINDERS

- **Safely charge and discharge** the roll balance cylinder
- **Quick installation** of the mill stand into the mill
- Increases **stability** in mill stand
 - Better bar quality
 - more yield out of the billet
- **Reduces mill stand fatigue**



SAFETY

- Nitrogen is **inert, non-flammable** gas
- **Safety engineered** into cylinder
 - Multiple Charge / discharge port
 - Fail Safe Design
- **Mill Duty**
 - Large piston rod resists misalignment



CASE STUDY: Gerdau – Rancho Cucamonga

Gerdau – Rancho Cucamonga

- Rebar Mill
- 8 Mill stands in the finishing

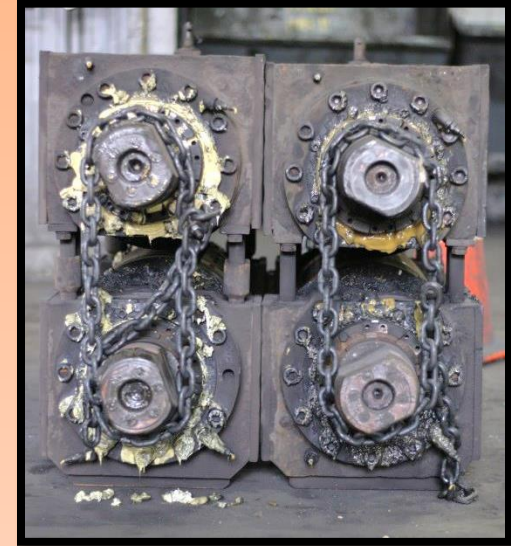


Project Goal:

Replace traditional coil springs with safer, more reliable roll force solutions.

SITUATION

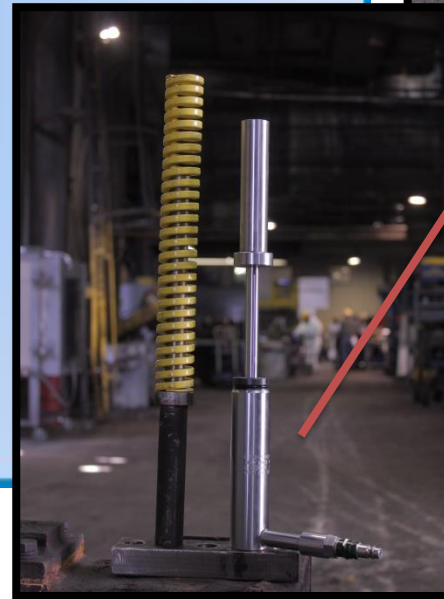
- **Current State: 8 mill stands utilizing coil springs**
 - Issue with installation and removal of rolls
 - Required compressing the rolls using banding or chains
- **Safety Concerns**
 - Unpredictable band release
 - **Transportation** of rolls
 - Once installed bands were removed which created a potentially unsafe situation including **pinch points** and **sharp edges**.



SOLUTION:

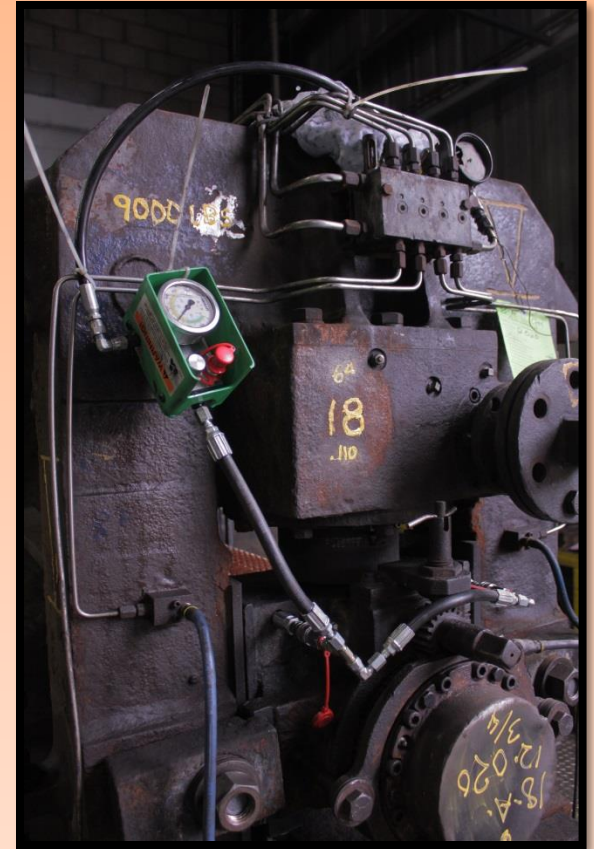
HYSON Roll Balance Cylinders | Hosed nitrogen

- Consistent and equal separation force
- Safe installation
- Roll force that could be degassed at roll change
- Higher force than coil spring
- Easy monitoring of pressure
- Easy conversion from springs to N2 cylinders



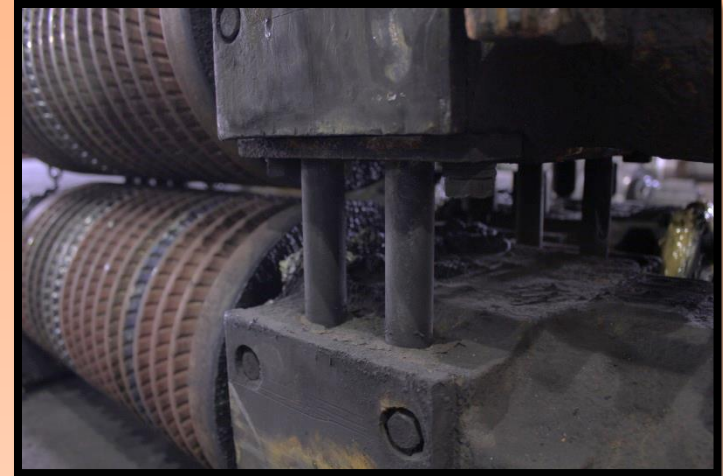
IMPACT

- Banding and Chains eliminated creating safer work environment
- Easier and **faster build up and tear down** of mill stands
- **Reduced roll transport time**
- Better control of the **bar size inside the mill**



IMPACT

- **Reduced inventory** - separation points from 8 to 4
- **Safely charge and discharge** chocks in mill through nitrogen quick connect and disconnect
- Better rolling **stability**



CONCLUSION

Collaboration between HYSON and Gerdau resulted in:

- **Safer** work environment **for employees**
- **Enhanced performance** of mill stands
- **Reduced** maintenance and inventory **costs**
- **Consistent performance:**
 - Roll force
 - Bar quality
 - Mill stand Stability