Wire Lab Company

Mechanical Descaling Machinery
An Overview of Mechanical Descaling of Steel Wire Rod

Presented by Wire Lab Company – Cleveland, OHIO
Mechanical Descaling Methods

- Reverse Bend Descaling
- Shot Blasting
- Combination of Reverse Bending & Shot Blasting

Performed
- In-Line with Wire Drawing Machine
- By Batch—Taken To Wire Drawing Machine
In-Line Mechanical Descaling
Presentation Topics

• Basic Principles of Mechanical Descaling
• Brief History of the MD Process
• Current Status of the MD Process
• Equipment to Perform the MD Process
• Systems’ Approach to Mechanical Descaling
Wire Rod Elongation

![Graph showing elongation by flexing with axes for sheave diameters and rod diameters.](image)
Fine Scale

Coarse Scale
Important Points for Scale Breaking

Equipment Design

• 8-10% Total Rod Deformation
• Mostly Bending with Some Stretching
• 360-400° Rod Wrap On Sheaves
• Balance Scale Breaking With Other Side Effects

Rod Condition

• Scale Of .5% to .8% By Weight
• Minimum Secondary Scale
• Minimum Rust
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Overview of MD Development

• 1950’s Coarse Scale Breaking
  » Scale Residual Removal
  » Scale Waste Management
  » Aggressive Rod Processing

• 1990’s Rod Cleaning and Coating
Overview of MD Development

- **1950’s** Coarse Scale Breaking
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• 1990’s  Rod Cleaning and Coating
WILCO Model 1250
Automatic Brush Descaling System
for processing 5.5 to 12.7mm rod.
• Need Picture Of WBM Showing Brushes Here.
Overview of MD Development

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## From Rod To Product

### Wire Products Made From MD Rods

<table>
<thead>
<tr>
<th>Bale Tie Wire</th>
<th>Barbed Wire</th>
<th>Chain Link Fence</th>
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<tbody>
<tr>
<td>Field Fence</td>
<td>Tie Wire</td>
<td>Lawn 7 Garden Wire</td>
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<tr>
<td>Rivet Wire</td>
<td>Bulk Nail Wire</td>
<td>Stick Electrode Wire</td>
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<tr>
<td>Welded Mesh</td>
<td>Coat Hanger Wire</td>
<td>Cold Heading Quality Wire</td>
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<tr>
<td>Galvanized Wire</td>
<td>Staple Wire</td>
<td>Wire Reinforcing Forms</td>
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<tr>
<td>Tire Bead Wire</td>
<td>Stitching Wire</td>
<td>Threaded Rod Wire</td>
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<tr>
<td>Chain Wire</td>
<td>Steel Wool Wire</td>
<td>Mechanical Spring Wire</td>
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<tr>
<td>Screen Wire</td>
<td>CO2 Welding Wire</td>
<td>Bedding &amp; Seating Wire</td>
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<tr>
<td>Collated Nail Wire</td>
<td>Lacing Wire</td>
<td>Hose Reinforcing Wire</td>
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<tr>
<td>Music Wire</td>
<td>Steel Cord Wire</td>
<td>Plating Quality Wire</td>
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<tr>
<td>Rope Wire</td>
<td>Piano Wire</td>
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MD Examples

- Model 920 Air Jet Descaling System
- Model 1030 Water Jet Descaling System
- Model 1060 Descaling / Precoating System
- Model 1250 Automatic Brush Descaling System
- Model 1750 Automatic Brush Descaling System with Precoating
• Model 920 Air Jet Descaling System
• Model 1030 Water Jet Descaling System
• Model 1060 Descaling / Precoating System
• Model 1250 Automatic Brush Descaling System
• Model 1750 Automatic Brush Descaling System with Precoating
• Model 920 Air Jet Descaling System
• Model 1030 Water Jet Descaling System
• Model 1060 Descaling / Precoating System
• Model 1250 Automatic Brush Descaling System
• Model 1750 Automatic Brush Descaling System with Precoating
Model 1060 Lubricant Precoater
Wire Rod Condition

- Everything starts with the green rod condition.
- Proper scale weight.
- Degree of red rust.

Wire Lab Company
Wire Rod Rust Guide

The following are examples showing the various degrees of rust which may be present on wire rod coils. The effectiveness of a WILCO Mechanical Descaling System will be directly affected by the amount and type of coil rust present. Rod coil rust will vary from simple surface staining limited to the scale itself to base metal pitting. A misconception concerning rod rust and mechanical descaling is that wire rod needs to be “seasoned” prior to use. Intentional rusting of rod coils is definitely not recommended.

- **HIGH RUST** : 25% -
  - More base metal pitting than 25% rust above. Still acceptable for basic cleaning but occasional stains on the final wire product are not uncommon. Once again stains may draft out. Best corrected into high-quality descared rod when using a WILCO Brush Descaling System.

- **MEDIUM RUST** : 15% -
  - Material is rusted you might as well send it to the scrap pile or let someone else deal with it. Not possible to make any sort of quality wire product as much scale has converted into rust. Base metal is completely and severely pitted.

- **LOW RUST** : 5% -
  - Material still suitable for basic mechanical decaling. Wire material will convert into wire that has a normal uniform plan to the surface. Typically not a problem for industrial quality wire products. Can still be converted into quality wire by decaling with a WILCO Brush System.

- **ZERO RUST** (A1) -
  - Quality raw rod with essentially no rust present. Perfect for decaling with basic or brush type (aggressive) WILCO Descalers.

- **LIGHT RUST** (10% - 20%)
  - More typical than zero rust. The base metal will be a nice matte gray. This material is also great for processing with standard or aggressive WILCO Descalers.

- **LIGHT RUST** (10% - 20%)
  - Typical quality. Some rust areas will have penetrated the scale to the base metal. Any rust stains on the wire will be very light and typically disappear in multiple drafts. These stains are removed by a WILCO Brush System.

- **MODERATE RUST** (20% - 75%)
  - Not typical for wire rod that will need conversion into top quality wire products. Material surface is heavily pitted from rust. With basic decaling there will be a good degree of red rust remaining on the rod surface. Brush decaling will clean up the surface but deep pits hold rust.
Improvement in Rod Quality
• Model 920 Air Jet Descaling System
• Model 1030 Water Jet Descaling System
• Model 1060 Descaling / Precoating System
• Model 1250 Automatic Brush Descaling System
• Model 1750 Automatic Brush Descaling System with Precoating
Worldwide Installations

WILCO Model 1250
Automatic Brush Descaling System
- Model 920 Air Jet Descaling System
- Model 1030 Water Jet Descaling System
- Model 1060 Descaling / Precoating System
- Model 1250 Automatic Brush Descaling System
- Model 1750 Automatic Brush Descaling System with Precoating
Model 1750 Brusher with Precoating
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Systems Approach to MD & Wire Production

- Mechanical Descaling Equipment
- Hot-Rolled Rod
- Wire Drawing Lubricant
- Wire Drawing Aids
- Draw Die Geometry
- Pressure Dies
- Die Box Cooling
- Draw Block Cooling
- Drafting Schedule
- Drawing Speed
Wire Drawing Aids

- Lubrication is key to successful wire drawing.
- Without lubricant precoating extra attention to die lubrication is needed.
- Lubricant Applicators and Pressure Die Holders in each die box.
- Improve drawing performance.
- Improve wire quality.
- Easy to use.
- Economical.
Thank You For Your Attention