CASE STUDY - DEGRADATION
Contents

Introduction ................................................................................................................. 1
Problems associated with typical transfer systems .................................................. 2
WEBA Chute advantages ............................................................................................ 3
Latest technology and incorporation of: ................................................................. 4
SM-1 Previous Transfer chute ................................................................................. 5
SM-1 Transfer chute comparison .............................................................................. 7
SM-1 New WEBA Transfer Chute .......................................................................... 8
191 Previous Transfer Chute .................................................................................. 13
191 New WEBA Transfer Chute ............................................................................. 15
Company information .............................................................................................. 20
Introduction

The installation of WEBA Chute Systems at the Isdemir Steel Plant in Turkey has significantly reduced noise levels as well as material degradation and dust levels.

When the plant was assessed by WEBA Chute Systems’ engineers it was confirmed that the existing transfer points were old and there was an urgent need to reduce the degradation of the material as the high levels of fines were impeding the performance of the furnaces. In addition to this, the unacceptable levels of dust and noise pollution had to be addressed.

WEBA Chute Systems are custom engineered to meet the specific criteria of each transfer point, and factors such as belt speed, belt width, material size, shape and throughput are taken into account. Use of a custom design allows for the control of direction, flow and velocity of a calculated volume and type of material. This minimises the impact of the material, including belt presentation. This absolute control produces a significant reduction in material degradation as well as dust and noise.
PROBLEMS ASSOCIATED WITH TYPICAL TRANSFER SYSTEMS

Problems associated with typical transfer systems

- Uncontrolled material flow
- Degradation
- Segregation
- Dust
- Noise
- Build-up from scraper fines
- Chute blockages
- High wear and maintenance
- Skew belt loading
- Direct belt impact
- Uneven belt loading
- Excessive material spillage
WEBA Chute advantages

- Controlled material flow
- Reduce tendency for unwanted material build-up
- Reduce belt wear
- Up to 80% improvement in degradation
- Up to 80% improvement in segregation
- Reduce dust
- Reduce noise
- Reduce liner wear and tear
- Low maintenance
- Improved maintenance access
- Reduce material spillage
- Reduce chute blockages
- Controlled belt loading
- Accommodate scraper fines
Latest technology and incorporation of:

- Plant reliability, Availability, Operability & Maintainability and Modelling
- Value Engineering Assurance
- Constructability Assurance
- Plant 3D Modelling
- Discrete Element Modelling
- Structural Engineer to ensure structural integrity
SM-1 Previous Transfer chute

- Location: Furnace feed chute
- Incoming conveyor: BEC-02
- Outgoing conveyor: BEC-01
- Materials conveyed: Sinter, Coke, Pellet, Ore and other materials

- Problems experienced with existing chute:
  - Material Spillage and skew belt loading
  - Degradation
  - High noise level
  - Excessive dust
  - Excessive wear and high maintenance

**SM-1 Below results was obtained during material testing done by Isdemir**
(22 March 2013)

<table>
<thead>
<tr>
<th>SINTER</th>
<th>COKE</th>
<th>PELLET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumps Size (mm)</td>
<td>BEC-02 (%)</td>
<td>BEC-01 (%)</td>
</tr>
<tr>
<td>(+)50</td>
<td>0,31</td>
<td>0,23</td>
</tr>
<tr>
<td>(+)10 (-)50</td>
<td>37,13</td>
<td>39,10</td>
</tr>
<tr>
<td>(+)5 (-)10</td>
<td>54,78</td>
<td>51,50</td>
</tr>
<tr>
<td>(-)5</td>
<td>7,78</td>
<td>9,71</td>
</tr>
</tbody>
</table>

(Note that the -5mm Sinter particles has increased by 25% after flowing through the existing transfer chute)
Results obtained during material testing on the 22 Mart 2013:

- Sinter (-5 mm) BEC-02 Input: 7.78%
- Sinter (-5 mm) BEC-01 Output: 9.71%
- Breakage rate: 25%

- Coke (-25 mm) BEC-02 Input: 10.04%
- Coke (-25 mm) BEC-01 Output: 16.96%
- Breakage rate: 69%

- Pelet (-5 mm) BEC-02 Input: 0.81%
- Pelet (-5 mm) BEC-01 Output: 1.16%
- Breakage rate: 43%

Results obtained after the installation of the new WEBA Transfer Chute:

- Testing was done on the degradation of the Sinter after installation of the New WEBA Transfer Chute.
- Sinter (-5 mm) breakage rate: 12.40%

**50% Improvement on -5mm Sinter particles**
SM-1 Transfer chute comparison

**Noise level comparison**

- **Previous Transfer Chute:** 95 dB
- **New WEBA Transfer Chute:** 83 dB
SM-1 New WEBA Transfer Chute

WEBA Transfer chute improvements noted after commissioning:

- Significantly reduced dust and noise levels,
- Less maintenance required,
- Lip liners have been monitored for 15 months and are still in good condition,
- Degradation improved by 50%,
- Belt loading and other aspects has been successfully addressed.

Technical data:

- The chute is split into a total of seven sections for the ease of installation.
- Each section has a series of lip liners to form the internal material build-up.
- The lip liners consist of 16mm thick Hardox 500 liners.
SM-1 NEW WEBA TRANSFER CHUTE
SIMULATION SPECIFICATIONS
Belt Speed Incoming = 2.1 m/s
Belt Speed Outgoing = 2 m/s
Material Type = Sinter
Bulk density = 1.8 t/m³
Max tonnages = 2016 t/h
Max lump size = 50mm
SM-1 NEW WEBA TRANSFER CHUTE
Previous Transfer Chute

WEBA Transfer Chute
191 Previous Transfer Chute

- Location: Sinter plant
- Incoming conveyor: PU-1
- Outgoing conveyors: 27-1 and 27-2
- Material conveyed: Sinter
- Problems experienced with existing chute:
  - Degradation below -5mm particles
  - Excessive Dust
  - High wear and maintenance
  - Skew belt loading and spillage

191 - Below results was obtained during material testing done by Isdemir
(22 March 2013)

<table>
<thead>
<tr>
<th>Lump Size (mm)</th>
<th>1. Sinter plant Trommel: 73</th>
<th>2. Sinter plant Trommel: 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+) 50</td>
<td>17,40%</td>
<td>10,08%</td>
</tr>
<tr>
<td>(+) 10</td>
<td>42,60%</td>
<td>38,00%</td>
</tr>
<tr>
<td>(+) 5</td>
<td>34,74%</td>
<td>41,19%</td>
</tr>
<tr>
<td>(-) 5</td>
<td>5,26%</td>
<td>10,73%</td>
</tr>
</tbody>
</table>

(Note that the -5mm Sinter particles has increased by 102% after flowing through the existing transfer chute)
Results obtained during material testing on the 22 Mart 2013:

- 1. Sinter Plant (-5 mm) PU-1 / PU-2 Input: 5.26%
- 1. Sinter Plant (-5 mm) 27-1 / 27-2 Output: 10.73%
  - Breakage rate: 102%
- 2. Sinter Plant (-5 mm) PU-1 / PU-2 Input: 6.72%
- 2. Sinter Plant (-5 mm) 27-1 / 27-2 Output: 7.11%
  - Breakage rate: 6%

Results obtained after the installation of the new WEBA Transfer Chute at PU-1:

<table>
<thead>
<tr>
<th></th>
<th>PU-1</th>
<th>27-1 &amp; 27-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOCK</td>
<td>323,760</td>
<td>323,760</td>
</tr>
<tr>
<td>(-) 5 mm</td>
<td>50,040</td>
<td>54,963</td>
</tr>
<tr>
<td>(-) 5 mm (%)</td>
<td>15,484</td>
<td>17,000</td>
</tr>
<tr>
<td>SINTER FRACTION RATE (%)</td>
<td></td>
<td>9,998</td>
</tr>
</tbody>
</table>

Results obtained after the installation of the new WEBA Transfer Chute at PU-2:

<table>
<thead>
<tr>
<th></th>
<th>PU-2</th>
<th>27-1 &amp; 27-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOCK</td>
<td>341,970</td>
<td>341,970</td>
</tr>
<tr>
<td>(-) 5 mm</td>
<td>39,522</td>
<td>42,996</td>
</tr>
<tr>
<td>(-) 5 mm (%)</td>
<td>11,625</td>
<td>12,638</td>
</tr>
<tr>
<td>SINTER FRACTION RATE (%)</td>
<td></td>
<td>8,888</td>
</tr>
</tbody>
</table>
191 New WEBA Transfer Chute

**General Information**

- Trolley section installed to achieve a split to either conveyor.
- Trolley section is supported by 4 wheels.
- These wheels move up and down rails.
- The trolley is moved by making use of an electro hydraulic actuator.
- The trolleys move from one position to the other in 11.6 seconds.
- Local and remote control options are available.
- The trolley section can be moved over during production.
PU-1 Electro Hydraulic actuator

PU-2 Electro Hydraulic actuator
WEBA Transfer chute improvements noted after commissioning:

- Significantly reduced dust and noise levels,
- Less maintenance required,
- Lip liners has been monitored for 9 months and are still in good condition,
- Degradation has been improved by 90%,
- Belt loading and other aspects has been successfully addressed
## Company information

<table>
<thead>
<tr>
<th>ALWIN NIENABER</th>
<th>TED CRUICKSHANK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TECHNICAL DIRECTOR</strong></td>
<td><strong>PROJECT MANAGER</strong></td>
</tr>
<tr>
<td><strong>Tel</strong> +27 11 827 9372</td>
<td><strong>Tel</strong> +27 11 827 9372</td>
</tr>
<tr>
<td><strong>Fax</strong> +27 11 827 6132</td>
<td><strong>Fax</strong> +27 11 827 6132</td>
</tr>
<tr>
<td><strong>Mobile</strong> +27 82 779 0156</td>
<td><strong>Mobile</strong> +27 82 334 9878</td>
</tr>
<tr>
<td><strong>Email</strong> <a href="mailto:alwin@webachutes.com">alwin@webachutes.com</a></td>
<td><strong>Email</strong> <a href="mailto:ted@webachutes.com">ted@webachutes.com</a></td>
</tr>
</tbody>
</table>

WEBA South Africa (Pty) Ltd  
99 Nagington Road, Wadeville, Germiston, 1422  
**Tel** 011 827 9372  
**Fax** 011 827 6132  
www.webachutes.com