MATEX PM, a company based in Plzen (Pilsen) in the Czech Republic, markets job-shop solutions for various metal applications using diode lasers. A hoisting drum subject to high levels of wear and massive loading on the cable running surfaces is a major risk factor in mining machinery and power station installations. MATEX worked with Laserline to find a solution that would minimize drum wear in operation. The cast-iron hoisting drum is two meters in diameter and weighs about 2,500 kilograms. It is an expensive single component.

The hoisting drum was first hardened by a conventional induction method. When that method failed to deliver the required hardness of >60 HRC, a 3500 W diode laser was deployed. The LDF 3500-60 laser model chosen is compact, light and mobile. The system is used to carry out hardening in conjunction with a robot. A rectangular, square or circular focus can be applied depending on the specific requirements and the component geometry. In this case a homogenizer was used to create a rectangular focus with focal lengths between 150 and 500 mm.

The advantage of this system over the induction method is that it is capable of attaining the required hardness of 60 to 62 HRC and causes much less component distortion. With a maximum laser power of 3.5 kW and typical feed rates of 100 to 400 mm/min, the hardening process is controlled by a pyrometer regulating the temperature.

**Material:** EN JS 2060 (GGG60), cast iron
**Task:** Harden the cable running surfaces with low distortion
**Laser:** LDF 3500-60
**Optic:** Homogenizer optic, 2 inch, rectangular focus
**Parameters:** Feed rate approximately 400 mm/min
**Result:** Hardness results 60 to 62 HRC, much less distortion than with induction hardening
### Laserline Matrix

<table>
<thead>
<tr>
<th>LDF 2000-xx</th>
<th>LDF 4000-xx</th>
<th>LDF 6000-xx</th>
<th>LDF 10000-xx</th>
<th>LDF 15000-xx</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 W</td>
<td>40 W</td>
<td>60 W</td>
<td>100 W</td>
<td>150 W</td>
</tr>
<tr>
<td>20 mm mrad</td>
<td>30 mm mrad</td>
<td>40 mm mrad</td>
<td>60 mm mrad</td>
<td>100 mm mrad</td>
</tr>
</tbody>
</table>

#### Applications
- **Brazing**
- **Heat treatment / Hardening**
- **Cladding**
- **ID Cladding**
- **Welding**
- **Aluminum welding**
- **Keyhole welding**

- **LDF 3500-60**