An inspired moment for
quick couplers
When Jack Kelly needed a quick
coupler for the company’s line of
excavator buckets, he scanned the
market and found it had nothing to
offer that lived up to his standards.
He simply had to develop one of
his own design. One that made it
easy to change buckets and other
attachments and to still be able
to cope with the toughest jobs.
Long-lasting performance has
always been a hallmark of Kelly
Attachments’ products. The quick
coupler had to perform at the same
high level.

Stepping up in pin performance
Kelly Attachments had previously
used pins in 4140 steel in its other
products. These pins were turned to
the right dimension and then heat
treated to reach sufficient hardness.
Experience had shown that this was
far from an ideal solution, for several
reasons.

The 4140 pins had to be shipped
away for heat treatment. This was
quite costly and had a turn-around
time of about three weeks. The heat
treatment itself often caused the
4140 pins to warp and grow slightly,
causing problems when assembling
the products. Maintaining the
correct diameter is important to
avoid play in the holes, which would
cause additional wear. Another
disadvantage with the 4140 steel
was the poor welding properties.

The external heat treatment also
required a large batch of pins
to be produced before shipping.
This didn’t give any flexibility in
the production. Together with the
other issues, the new quick coupler
needed a better solution for the pin
material.

Jack Kelly didn’t have to look far to
find it.

“I have used Hardox® wear plate
for a long time and I know that it’s
way better than anything else I
have tried. The plates are straight
and the wear resistance has no
competition. Since the plates
worked fine, trying Hardox®
round bars made sense. And it
proved to be a good choice,”
says Jack Kelly.
Hardox® round bars save time and last longer

Hardox® round bars are delivered heat-treated and ready to use. The hardness of Hardox® 400 round bar is typically 400 HBW. It’s also hard from the surface to the core. Even though it’s a hard material, the low-carbon, homogeneous microstructure makes it machinable with regular workshop equipment.

The quick coupler from Kelly Attachments uses five pins, four fixed and one that is removed when changing attachment. The pins are turned to the right diameter in a CNC lathe.

"With Hardox® I can take the bar, put it in the lathe, take it out and it’s a finished part with a fine surface. I don’t have to do anything with it, just put on some rust protection. It’s a hard material and that is what we are looking for. Still, our machines can handle it fine, we just have to turn over the tool inserts more often. That’s no big deal compared to the wear performance we get with the Hardox® round bars," says Jack.

**Proven performance**

Kelly Attachments has so far made well over 1,000 quick couplers that are all Hardox®. The pins are Hardox® round bar and the body of the quick coupler is made of Hardox® wear plate. The couplers have been on the market for about three years without any need for pins to be replaced, or with any other problems for that matter. It goes to show that design as well as manufacturing processes and choice of material more than fulfil the customers’ demands.

Buckets from Kelly Attachments also use Hardox® wear plate for the side cutters and for the lip with teeth that are machined from one single piece of Hardox®. The solid teeth give excellent breakout force when working in hard ground.

**The all-round round bar**

Hardox® round bars are ideal for a wide range of applications that benefit from the steel’s hardness, strength, toughness and fatigue resistance. They are used, for example, in sieving buckets, agriculture machinery, mining, material handling equipment and machine components.

Hardox® round bars come in diameters between 40 and 100 mm (1.575–3.937 in.) and lengths up to 5000 mm (196.85 in.). AR 500 development round bars are available in diameters of 20–160 mm (0.786–6.298 in.). The dimensional tolerances for diameter and roundness are very tight and consistent, ensuring efficient and repeatable production.

The low carbon equivalent in Hardox® round bars gives the material high weldability compared to other steels such as 4140 or 42CrMo4V steel. Welding can be performed without pre-heating.

<table>
<thead>
<tr>
<th>PROPERTIES</th>
<th>HARDOX® 400 ROUND BAR</th>
<th>AR 500 DEVELOPMENT BAR</th>
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</thead>
<tbody>
<tr>
<td>Hardness (HBW)</td>
<td>370–430</td>
<td>500</td>
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<tr>
<td>Yield strength</td>
<td>1000</td>
<td>1200</td>
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<tr>
<td>Toughness</td>
<td>65 at -40°C (-4°F)</td>
<td>27 at -20°C (-4°F)</td>
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<tr>
<td>Tensile strength</td>
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<tr>
<td>Carbon equivalent</td>
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A complete data sheet for Hardox® 400 round bar can be downloaded at www.hardox.com

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