CRUSHING THE MANGANESE MYTH

Choosing the right alloy for your wear parts
Choosing the right alloy for your parts is just like buying a pair of reading glasses – stronger isn’t necessarily better! When it comes to manganese alloy, there is no one-size-fits-all solution. Every job has unique demands. The first step is to crush long-held false beliefs with the light of some straightforward objective truths.
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4 MYTHS TO CRUSH

CRUSH THE MANGANESE MYTH!
The myth about manganese alloy started somewhere in the 1980’s, when 18 % manganese alloy became the ‘be all and end all’ for crushing chambers. It was a convenient myth to uphold, as it simplified the sales process and helped sales.

The myth of the optimum percentage rapidly spread across our industry. But quality means finding the right solution for your needs. And that means taking a good look at the big picture. Here are 4 aspects of the manganese myth we’d like to crush!

1. THE MYTH OF PREMIUM PRICE
Sometimes, less really is more. But unfortunately, it is human nature to try and throw money at problems. Choosing a high content of manganese is often equated with ‘upgrading’ a crushing chamber, when it could actually be the totally wrong way to go. It doesn't make any sense to pay more if you don’t need to. Your alloy choice should depend on your overall needs; from the type of application you are using, to the nature of the material you are feeding into your chamber, to the kind of results you want at the end of the day.

2. THE MYTH OF DURABILITY
Tougher isn’t always stronger. A lower manganese percentage results in higher flexibility that is critical for some applications. High manganese content in wear parts can have a tendency to make the part brittle, whereas 13-14 % alloys are more ductile and therefore more durable - they can absorb more hits before they crack. At the end of the day, only choosing a harder alloy isn’t necessarily going to extend wear life.
3. THE MYTH OF FAMILIARIY
The devil you know is still a devil! Psychology shows us that we humans often feel more comfortable just sticking to what we know. An in-built reluctance to change is as common in our industry as any other. A good example is the purchasing between different countries. Countries with very similar contexts, materials, equipment and ways of working have still managed to evolve very different preferences. In the past, 95% of all wear parts had around 13% manganese alloy. It was seen as good enough for the job. Then suddenly 16.5 – 20.5% became the only acceptable alloy in some countries, whereas others prefer 17.0 – 19.5%. There is no proof that these assumptions are correct in anyway. The global manganese myth has resulted in similar countries having very different manganese preferences based on assumptions rather than facts.

4. THE MYTH OF SIMPLICITY
Keeping it straight isn’t always simple. An aversion to risk is also a natural human trait. Very often, people are willing to pay a premium for any type of product or service in order to reduce risk, even though there is often no basis for that assumption. Moreover, purchasers often buy into the idea that a simpler purchasing pattern also reduces risk. They prefer to buy consignments of one type of product or material because they fear that making their purchasing patterns more complicated may result in unknown risks.
We want to help you make sound evidence based business decisions. To help you rethink and discuss your needs we have a few simple ‘rule of thumb’ facts to consider. Our ambition at Sandvik is to help make your process as easy as possible, but also as relevant as possible -- to produce the very best results. When you buy a Sandvik solution, you are investing in significant, measurable, long-term returns. There are no shortcuts to this kind of success. You need to take a holistic approach.

AT LEAST 70 PERCENT OF ISSUES ARE ELSEWHERE
Manganese steel provides very good properties for crusher wear parts, but it is important to choose the right manganese for the job. If there is wear there is also work hardening. But there is no evidence at all that wear can be quicker than work hardening. In fact, there are many other parameters other than alloy that influence wear and tear. We know that poor feeding conditions are 70 % of the effect on a crushing chamber’s lifespan. Other common mistakes include using the wrong crushing chamber, or using the wrong profile settings with the correct equipment. Choosing the right alloy is a very important aspect for saving money and downtime, but it is not the only parameter that needs careful consideration.
Our crushing chambers contain manganese steel alloys. The material is ductile and absorbs impact; the material hardens with pressure, forming a hard surface. When it comes to choosing the right alloy, each alloy has its own characteristics and benefits to consider.

**SANDVIK OFFERING**

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<th>Alloy</th>
<th>Mn %</th>
<th>Main Characteristic</th>
<th>Properties</th>
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| M1    | 13   | Tough                         | Impact and shock resistant  
Work hardens well with hard rocks  
Most common alloy used            |
| M2    | 18   | Tough and Wear Resistant      | High resistance to abrasive rock  
Lower resistance to impact and shock                                       |
| M7    | 18   | Wear Resistant                | Highest resistance to abrasive rocks  
Lowest resistance to impact and shock loads  
Highest resistance to plastic deformation |  

**YOUR NEEDS WHEN IT COMES TO ROCK CONDITIONS**

When selecting the right alloy for your application, having a true insight into the character of your raw material is very important. It is easy to forget that the inherent crushability of the rock is actually more important than how hard it is. Higher manganese content is good for applications where you have abrasive but easy to crush rock, i.e. rock that isn't very hard. What's important is how the rock behaves in crusher. Easy to crush rock can result in too many fines, and hard stones can be easy to crush. Sandstone, for example, may be considered ‘soft’, but needs a lot of pressure to break.
You know what you want. And you know what you’ve got. But do you know what you are really capable of? An accurate assessment and comparison will point the way. Sandvik consultants are here to help you discuss your options. No one knows our crushers like we do.

WHY ARE THERE DIFFERENT ALLOYS?
Different elements have different properties. Your choice has a positive influence on your performance.

- QUALITY OF OUTPUT
- COST CONTROL
- REDUCTION OF WASTE
- EVEN WEAR OF PARTS
- WORK HARDENING
WASTE NOT, WANT NOT!
When you want to optimize, it’s easy to fall back on easy answers, especially when everyone else in the industry is holding onto long-held myths. It’s important to remember that there is no evidence at all that higher manganese percentage reduces wear.

HARD HITTING FACTS
All of our crushing chambers are designed for maximum efficiency. The crushers can easily be adapted to changes in production through proper selection of crushing chambers, eccentric throw and feeding conditions. Together with choosing the right manganese alloy mix, these aspects have the most impact on reducing wear of parts – giving you the competitive edge you deserve.

For more information please see: crushology.sandvik
Call us on + 46 (0)8 456 11 00 for a free consultation at your site!