Hardness – What else?
A look at wear tests on wear resistant martensitic steels

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Any component that has (repeated) contact to solid matter is subjected to wear. The value of mining industry equipment or earth-moving machines rely on wear resistance, as have the flintstones of a stone-age craftsman. The reduction of wear – and thus the increase of service life – is an important task in materials development. For containers, tippers, dredgers, loader buckets, etc. fully martensitic steels with a hardness in the range of 400 HB to 500 HB are an excellent choice. In addition to their hardness (that is linearly related to the tensile strength), they offer good bendability, toughness and weldability – perfectly suited for structural parts, too.

To avoid expensive and poorly reproducible field tests, a lot of cheap but reliable laboratory experiments were and are still being developed. From the huge amount of published data on abrasion and impact wear tests we have selected special ones and added our unpublished results.

Is it hardness alone that determines wear in these tests? We say “Yes” – when dealing with wear resistant martensitic steels in the (extended) above mentioned hardness range. Depending on used abrasives and test conditions, we find simple mathematical relations between wear and hardness – from linear over power laws to perfectly exponential behavior.

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