

Uddeholm's tool steels in HPS-applications

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Uddeholm's tool steels are normally associated with industrial production tools for the manufacture of metals or plastics.

Tool steels are now used more and more in applications subject to extreme conditions.

Wherever high wear occurs, there is a possibility of increasing the lifetime by using HPS-steel (High Performance Steel).

One example is in ground perforation for the production or maintenance of roads. This work involves the erection of:

- safety fences
- noise barriers
- road signs
- wire fences for separating road lanes
- traffic signs
- orientation boards

Common to all is the need of a hole in the ground. The hole has earlier been dug or drilled to enable the casting of a cement foundation on which the respective pole is set to erect the board or fence in question.

In recent times it has been increasingly common to make holes and erect the pole directly into the ground or to hammer down a welded foundation with the help of a hole mandrel. In making the hole, high requirements are placed on the hole mandrel in terms of:

- wear resistance
- strength
- toughness
- straightness



The steel grades which have normally been used are SS1650 (W.nr 1.0060 / 1.0503) or SS2541 (W.nr 1.6582). SS1650 deforms, bends and wears heavily. SS2541 has, due to somewhat higher hardness, a better wear resistance and deforms/bends less. The problem is however that one wants better wear resistance, better strength and a straight mandrel for a long lifetime. This can

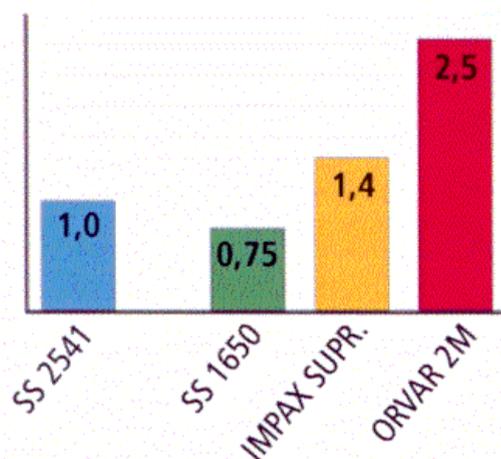
be achieved by increasing the hardness or by changing to another steel. If the hardness is increased, then the risk for chipping and fracture increases. One must therefore search for a tough and at the same time strong steel, which retains these properties even at somewhat higher hardness.

Toughness is achieved by using a steel with a high cleanliness. We therefore judged that UHB ORVAR and UHB IMPAX SUPREME would be suitable steel grades for this type of equipment.

Tests have been carried out with UHB IMPAX SUPREME and UHB ORVAR 2M, IMPAX SUPREME with a normal hardness (300 – 330 HB) and ORVAR 2M with a hardness of approx. 42 – 44 HRC.

The mandrels have been produced by Uddeholm Machining and hardened in Uddeholm Tooling's heat treatment department.

If the total lifetime (straightness, deformation, wear) for mandrels made of SS2541 is set at 1 then the following can be concluded:



The result can naturally vary from case to case, but overall test results show that a high strength tool steel of type ORVAR 2M gives the best total lifetime.

With material, manufacture and heat treatment concentrated to our facilities in Hagfors, we have control over optimal production methods.

A mandrel is put "out of commission" when it first bends or breaks. Before this happens, mandrel tip wear is the main point for maintenance. Use of our steel-grade-tailored welding electrodes can further lengthen the mandrel's total lifetime by restoring the mandrel tip to near-original condition in shape and properties.

Mandrels made of UHB ORVAR 2M at Uddeholm Machining are now standard for many of those in this type of ground work business.

At Uddeholm we have a group of specialists who advise on applications for HPS-steels. You are naturally welcome to contact your nearest Uddeholm office, and we will assist you in the search for an optimal solution.



Mandrel with attached welded footing for ground insertion of noise barrier foundation.



Mandrel with attached welded footing for insertion into road asphalt as safety fence foundation.



Mandrel with attached welded footing for ground insertion of a foundation.



Mandrels \varnothing 203 mm are manufactured at Uddeholm Machining from hardened Orvar 2M.