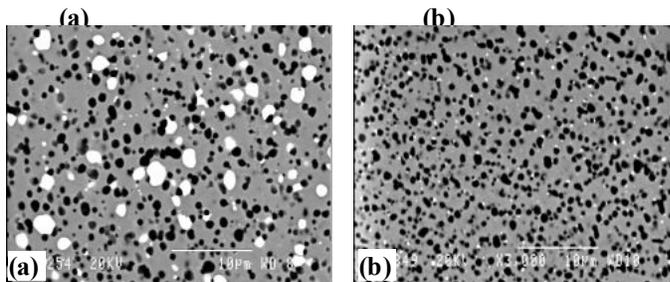


Enhanced Cold Work Tooling Performance with Vancron

By: Dr. F.T. Lee, Böhler-Uddeholm Ltd., Canada.



Are hidden problems with your Cold Work tooling threatening your metal forming and blanking business? Are you facing an increasing array of material choices, making your choice of tooling material for your specific application difficult? Böhler-Uddeholm's advanced steel mills have recently developed two special Powder Metal (PM) Cold Work Tool Steel grades that could significantly reduce your tooling & operating costs, while increasing productivity. Through the use of 3rd generation P/M processing techniques and Hot Isostatic Pressing (HIP) of tiny super clean powder particles, Böhler-Uddeholm has developed Vancron 40 and Vancron 50 alloyed Tool Steel grades. These grades can be used without surface coating, and are characterized by: (i) very high galling & adhesive wear resistance; (ii) high compressive strength; (iii) good dimensional stability & through hardening properties; (iv) good chipping/cracking resistance; and (v) good resistance to tempering back. These new grades are ideal for severe Cold Work applications such as powder compacting and blanking and forming of carbon steel, high strength steel, stainless steel, aluminium, nickel, titanium, and any materials that tend to gall, stick or clad to the working tool.



Microstructures in hardened & tempered condition (@ 1050°C + 560°C/3x1h).

- (a) **Vancron 40** - 19% M(C,N) + 5% M₆C, (62 HRC); and
(b) **Vancron 50** - 26% M(C,N) + 0,4% M₆C, (62 HRC)

This unique P/M processing route has resulted in cleaner & defect/segregation-free isotropic steel microstructures that are characterized by homogeneous distribution of very fine metallic carbonitride, M(C,N) <black phase> and M₆C <white phase> type carbide particles. This phase of finer particles of carbonitride, presented at higher contents in its microstructure, not only significantly increases the galling resistance as in coated tool materials but also results in overall better material properties and structure compared to conventionally produced grades for Cold Work tooling applications. Vancron 50 is still in the development stages, however in test after test Vancron 40 has proven itself to be superior to conventional tooling material. In a number of cases a 10 fold increase in tool life was achieved on the production line. The higher initial cost of Vancron

material is significantly offset by the much improved performance, providing better resistance to tool wear, with less down-time and improved overall tool life. Reliable tooling does not only reduce the need for frequent maintenance but also increases the availability of the die for production. For example, in a case study for the producing of parts for the automobile lower control arm, a forming station using the uncoated Vancron 40 produced 323,250 parts with little wear, compared to a TD coated conventional AISI D2 grade which had to be re-polished after only 10,000 hits and had to be re-stripped, re-stoned, re-polished and re-coated after 30,000 hits. The results of these extended production runs are proof that Vancron 40 is the material of choice for improving operation performance in metal forming.

Additionally, both Vancron 40 and 50 are designed to eliminate the high cost and time-consuming surface coating process (CVD/PVD/TD) as they have an integrated surface coating inherent into their structure. This built-in surface coating layer is not an applied coating, therefore there are no risks of flaking, adhesion or dimensional problems. The presence of this unique inherent surface coating, which consists of low friction particles distributed throughout the matrix, provides Vancron 40 and 50 with anti-stick and anti-galling properties which enhance part-release by forming a barrier which prevents the working materials from sticking or bonding to the die surface. Time, money and resources are also saved as this built-in surface coating never wears off and therefore any dimensional problems can be easily readjusted after the heat treatment process.

Vancron 40 has proven itself to be a superior tooling material which can fulfill the most demanding production requirements for building quality tools achieving faster and consistent quality parts, which has led to great customer satisfaction. If you are interested in learning more about Böhler-Uddeholm's Vancron grades and exploring how they can help you in reducing your tooling costs by 50% or more, while extending your tooling life 2 to 10 times, please contact our qualified technical representatives via telephone no. 905-812-9440 / 800-665-8335 **OR** visit our website: www.bucanada.ca