

SECTION C: ENGINEERING, ARCHITECTURE AND SURVEYING

MANUFACTURING OF TOOL STEELS AND THEIR PROPERTIES

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The tool steels have been grouped into six types i.e. hot work, cold work, high speed, special purpose, water hardening and shock resisting. This paper deals with manufacturing process of tool steels and variation of properties with their composition and heat-treatment. It describes the specific applicability of the heat-treatment process to the various types of steel.

The properties considered were Hardness (red hardness), Tensile strength, Hardenability, Toughness and Wear resistance. Melting was carried out using a high frequency induction furnace. The charge materials used are high purity steel scrap, Ferro manganese, Ferro silicon, Ferro vanadium, Ferro chromium, Ferro molybdenum and Ferro tungsten. By adding these ferro alloys, it is possible to manufacture the following alloyed tool steels.

- (i) Tungsten-base and Chromium-base hot work die steels.
- (ii) Manganese oil hardening die steel.
- (iii) Tungsten finishing steel.
- (iv) Tungsten chisel steel.
- (v) Chromium vanadium, and Carbon vanadium general purpose steels.

Tool specimens were fabricated by forging. Uses for a range of compositions for tool steels are suggested.