A COMPARISON OF MECHANICAL PROPERTIES OBTAINED FROM CONVENTIONAL STRENGTH SPECIMENS AND FROM AS-SINTERED COMPONENTS

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ABSTRACT

Experimental access to the *in-situ* strength properties of components is difficult, which explains why such data are not generally available. The present paper introduces a new methodology which permits direct access to the strength properties of components. Such information is retrieved from small rectangular bars (size ≈ 40x5x5 mm^3) which are prepared directly from a component by water-jet cutting and subsequent grinding. Using a synchronizer-hub as a typical P/M component, the tensile strength, the impact resistance and the transverse rupture strength in 3-point bending were evaluated from these bars for a high-alloyed Fe(Mo)-Ni-Cu P/M steel, and compared to the strength and impact properties of conventional tensile specimens (DIN EN ISO 2740). Within the limits of experimental error, the data sets obtained from components and specimens are fully consistent.To confirm the validity of the comparison, the similarity of both specimen types is verified by a comprehensive chemical and microstructural characterization.

The new method is subsequently applied to assess the effects of processing variations on the mechanical properties of synchronizer hubs. Finally, a correlation between the transverse rupture strength and the tensile strength of the small tensile specimens is established.

KEY WORDS

Mechanical Properties, Hardness, Tensile Properties, Transverse Rupture Strength