

A Comparison of Tensile, Rotating Bending Fatigue,
and Axial Fatigue Test Results of P/M Alloys

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ABSTRACT

Preliminary data that compares ultimate tensile strength, rotating bending fatigue (RBF) strength, and axial fatigue (AF) strength for pressed and sintered powder metal alloys is presented. Full descriptions of both the rotating bending and axial fatigue test methods are included. Fully-reversed tension-compression fatigue loading ($R = -1$) was used for both test methods. The tests were executed using the staircase method to determine the high-cycle fatigue strength (50% survival) of the powder metal alloys at 10^7 cycles. A normal distribution of the data was assumed.

1 INTRODUCTION

P/M materials provide the advantages of near-net shape manufacturing of complex parts and reduced machining waste. One of the impediments in developing new applications is the lack of dynamic properties. The dynamic properties of P/M materials, such as high-cycle fatigue strength, are being collected under a U.S. Navy sponsored project entitled "Material Standards of Powder Metallurgy (P/M) Alloys." The goal of the project is to collect and disseminate mechanical and physical properties of P/M commercial alloys. The data are being transferred to defense and industrial communities to promote the use of cost effective P/M components. A series of ferrous and copper based P/M alloys were