A Basis for Non-Destructive Testing of Cemented Carbides

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INTRODUCTION

The technology of cemented carbide materials goes back over one-half century to the initial work of H. Moissan[1] in 1896. The manner of its growth to the current eminence as an industrial necessity more closely followed that of an art than a science.

The history of the development of cemented carbides paralleled the industrial buildup associated with the two major wars of the 20th century. In the years prior to World War II, basic study was undertaken of carbide materials and their properties of high hardness and wear resistance to make them available for use as tool materials. The successful work of Schröter[2] and Schwarzkopf[3], which involved limited fundamental scientific procedures, was the basis for the development of the current industrial technology. In general, the growth cycle of cemented carbides can be considered empirical.

The lack of scientific technology caused a serious problem during the manufacture of carbide tools. In addition, the military requirements for carbide cores for projectiles, magnified the lack. Inspection programs, which are normally developed from and based upon prior scientific knowledge of a material, were limited to service tests of production lots and batches. Such emergency-justified inspection practices are currently economically unfeasible. Establishment of sound engineering and testing practices will make such methods unnecessary in the future.

A recent survey of published literature pertaining to cemented carbide materials showed that there are many varied compositions being applied to the same area of endeavor. The absence of a satisfactory method of determining an optimum grade of carbide for a service application often contributes to higher cost, lowered output, and inefficient utilization. Several workers are presently engaged in studying various methods of testing for the discrimination of