

Testing and Understanding Screwdriver Bit Wear

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Abstract

This thesis is focused on gaining a better knowledge of how to design and test Phillips screwdriver bits. Wear is the primary concern in applications where the bit is used in a power driver. Such applications include drywalling, decking and other construction and home projects.

To pursue an optimal design, designers must have an understanding how the bit geometry changes with wear. To make use of the geometrical data, the designer must also have an understanding of the fundamentals of the bit/screw surface contact and its effect on force distribution.

This thesis focuses on three areas. First, understanding how the tool and bit are used, and what factors contribute to bit wear. With this understanding, a test rig has been designed to emulate typical users and, in doing so, produce the factors that cause wear. Second, there must be a means to analyze geometric changes in the bit as it wears. A method for doing this was developed and demonstrated for a Phillips bit, but the process can be applied to other bits. Finally, the fundamentals of surface contact must be understood in order to apply the geometrical information obtained to improved bit design.

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