

## Experimental Validation of Machining Models

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Validation of machining models is usually done using experimental conditions that are far from the assumptions of the models. One of the most difficult experimental conditions to replicate is the friction at the chip-tool interface. To solve this issue, orthogonal cutting of 99.94 percent pure lead has been carried out under near perfect sticking friction conditions. This was achieved by cutting with microtome tools, whose rake faces were coated with a well-adherent layer of lead over which the chip slid by internal shear along the chip-tool interface. After cutting at the target depth of cut, it was observed that most of the transferred lead remained on the rake face. It was found that when sticking friction prevailed, as opposed to the typical sliding on a clean tool, the cutting force went up, the thrust force reversed direction, the chip flow was straighter, and the chip thickness increased.