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題名	Suppression of burrs in austenitic stainless-steel by applying magnetic-field-assisted method
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概要	Austenite stainless-steels are frequently used as the materials of precise instruments because of their excellent properties. However, the machining of these materials is relatively difficult. In particular, the suppression of burr formation and deburring are important problems in addition. When machining stainless-steel into the required shape, it usually needs to be cut from the material, and a process to remove cutting burrs needs to be added. However, when austenitic stainless-steel is machined, relatively large burrs are generated and the Vickers hardness exceeds 500, making deburring difficult. On the other hand, the transformation from an austenite structure to a martensite structure causes material embrittlement and can be thought of as reducing burrs caused by plastic deformation of the material. The martensite transformations are accelerated by the application of a magnetic field. The magnetism at the cutting point was gradually increased by attaching neodymium magnets to the tool holder and increasing the number of magnets. When the magnetic flux of attached neodymium magnet more than 11.7T, the structure changes from austenite to martensite. The changes of the burr height due to magnetic transformation was investigated while using different cutting machine such as a lathe. In this study, we suggested the suppression of burr formation by the application of a magnetic-field-assisted method while cutting SUS304. Main results obtained in this paper are as follows. (1) The burrs decrease in size by the application of the magnetic-field-assisted method. (2) The brittleness of the material is confirmed that using the magnetic-field-assisted method will be increased. This tendency is particularly significant in the cutting of small-undeformed chip thickness. (3) When using a normal lathe, the hardening of the workpiece due to the structural transformations from the austenitic structure to the martensitic structure causes the wear and damage to the cutting tool. (4) As a result of attempts to suppress burr when abrasive cutting austenitic stainless-steel by a magnetically assisted method, burr formation was suppressed.
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