Development of Micro Hole Drilling Tool to Hard and Brittle Material

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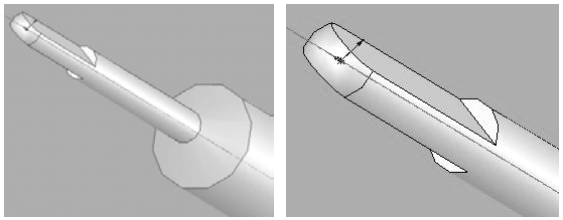

(a) Tool shape (b) Tool head

Fig. 1 Schematic drawing of designed tool

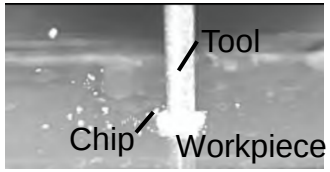

Fig. 2 Observation of chip removal

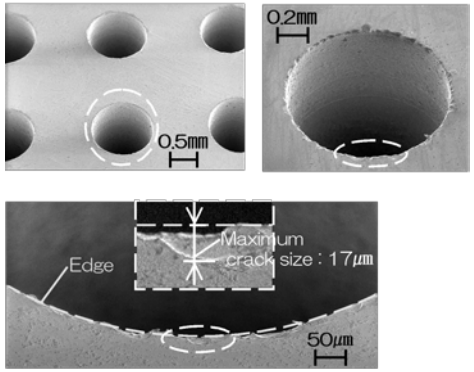

Fig. 3 Appearance of drilled hole

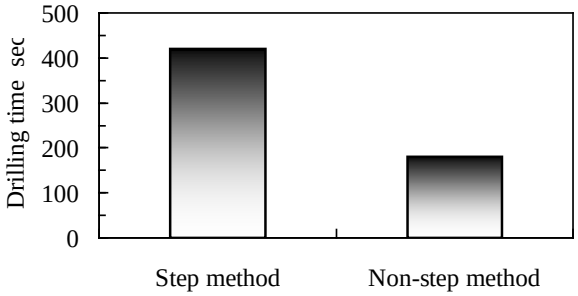

Fig. 4 Comparison of drilling time between step and non-step method

Content:

The aim of this study is the establishment of high drilling quality, high drilling efficiency and low drilling cost in through-hole drilling of hard and brittle material using an electroplated diamond tool. During drilling, the chipping is generated at the entrance side and the exit side of the material. In addition, chip generated is easy to adhere to the tool. By the adhered chip, the tool is damaged and the material is broken. In this study, we examined effectiveness of designed tool to improve chip removal in order to carry out crack-free drilling of the material.

Figure 1 shows the image of the tool designed. The tool is composed of a cylindrical body and a hemisphere shape with two straight planes. The tool has the following advantages compared to common tools.

(1) Chip adhered on the tool is little(Fig. 2).

(2) Drilling is possible without a backing plate(Fig. 3).

(3) Drilling time is shorter(Fig. 4).

(4) Drilling cost is cheaper.

Keywords : electroplated diamond tool, high quality, high efficiency

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