

Influence of the Cutting Condition on Cutting Performance with Twisted Fixed Abrasive Diamond Saw Wire (ADW)

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ADW is a fixed abrasive diamond saw wire manufactured by brazing diamond grains to a metal wire. Brazing makes it possible to firmly bond a diamond grain onto a metal wire. Therefore, ADW has a longer operating life compared with conventional electroplated diamond wire saws. However, it was found that when this tool is used on a single track with larger cutting force, there is the possibility of the tool breaking easily from the past experiments. Therefore, we developed twisted ADWs for improving the strength of ADW. In this study, good cutting conditions, such as cutting force, tension, wire speed, were investigated experimentally for high speed cutting performance with twisted ADWs. Observing the SEM photographs of used twisted ADWs for cutting, the contact state of diamond grains and brazing metal, the behavior of diamond grains in cutting were considered. As the result, the best cutting conditions (cutting force is 30 N, tension is 30 N, wire speed is 150 m/min) were found from two viewpoint of cutting performance and operating life.

Key Words : Resource saving, Diamond saw wire, Fixed grain, Metal bonded, Twist