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Experimental studies in abrasive water jet cutting of materials

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Abrasive waterjet cutting is one of the unconventional machining processes capable of cutting wide range of difficult-to-cut materials. This process incurs comparatively higher initial investment, maintenance and operating costs. Therefore optimum choice of the process parameters is essential for the economic, efficient and effective utilization of this process. This paper assesses the influence of process parameters on depth of cut and surface roughness which are the important cutting performance measures in abrasive waterjet cutting of materials. Experiments were conducted by varying water pressure, nozzle traverse speed,

abrasive mass flow rate and standoff distance for cutting materials using abrasive waterjet cutting process. The effects of these parameters on depth of cut and surface roughness have been studied based on the experimental results. In order to correctly select the process parameters, empirical models for the prediction of depth of cut in abrasive waterjet cutting of materials is developed using dimensional analysis technique. These developed models have been verified with the experimental results that reveal a high applicability of the models within the experimental range used.

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