approach was been used for finding out the optimum values of the variables in order to get the maximum value of MRR. From the graph it is clear that highest value 6.4 mm^3/min is obtained for the following combination of the variables 15740 as Speed,0.002 as Feed and 5 as DOH. But Speed of 15740 is not in the combination so nearest higher value 18000 RPM was selected.

Confirmation test

As discussed earlier considering the Speed as 18000 RPM, Feed as 0.002mm/rev and DOH as 5mm, the confirmation test is carried out on a CNC Micro-drilling machine. CNC program is run for this and after the operation is performed MRR is calculated by using the following formula,

$$MRR = \frac{\text{Initial weight- Final weight}}{\text{Density x Machining time}}$$

So MRR comes out to be 7 mm^3/min.

RESULTS

After the confirmation test MRR is calculated as from Regression as follows,

MRR = -5.299 + 0.000294 Speed + 3532 Feed + 0.000 DOH
= -5.299+0.000294x18000+3532x0.002+0.000x5=7.057

mm^3/min.

As per regression equation the MRR comes out to be 7.057 mm^3/min.

Percentage difference between predicted values and experimental value is calculated as

$$\% \text{ diff} = \frac{\text{Experimental value- Predicted value}}{\text{Experimental value}} \times 100$$

$$= 7.65\text{-}7.057/7 \times 100 = 0.12\ \%$$

From above it is found that the optimized value is worth, verification of the optimum result achieved is compared by assuming the Benchmark parameters as in between high and low i.e medium which will be 18000 RPM for Speed, 0.0015 mm/rev for Feed and 4 for DOH. From this MRR achieved will be 5.30 mm^3/min which less than optimum result obtained.[23]

CONCLUSIONS

After performing experiment on Aluminium material the highest value of MRR was 9.42 mm^3/min and minimum value was 3.53 mm^3/min, while 5.30 mm^3/min was the middle value ,which was set as Benchmark. Analysis was carried out by Response Surface Method from which the optimum value obtaine d was 7.057 mm^3/min which was more feasible which was justified from confirmation test with Speed as more Influencing factor and also significant. Due to this Analysis Micro-Drilling has been workout without tool failure.This mrthod is also suggested for other materials like Brass, Copper and Steel.

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