CHAPTER 6

CONCLUSION

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The following conclusions are drawn from the discussion:

1. Pulse on time, discharge current and discharge voltage on metal removal rate (MRR) is highly significant factors when machining with aluminium electrodes. Flushing pressure does not affect much the metal removal rate (MRR).

2. The optimum conditions for maximum metal removal rate (MRR) with aluminium electrodes within the tested range of variables are discharge current of 9.5 A, pulse on time of 180 μsec, discharge voltage of 120 V and flushing pressure of 2.0 kg/cm^2.

3. The maximum metal removal rate (MRR) under the optimum conditions for EDM with aluminium electrodes is 2.21 mm^3/min. Electrode wear ratio (EWR) under these conditions is 9.08% and the diameteral overcut under these conditions is 0.36 mm.

4. While machining with aluminium electrodes, surface roughness is mostly influences by discharge current, discharge voltage and pulse on time.

5. The optimum conditions for minimum surface roughness with aluminium electrodes within the tested range of variables are discharge current of 1.5 A, pulse on time of 30 μsec, discharge voltage of 60 V and flushing pressure of 1.0 kg/cm^2.

6. The minimum surface roughness under the optimum conditions for EDM with aluminium electrodes is 1.4559 μm. Electrode wear ratio under these conditions is 28.12% and the diameteral overcut under these conditions is 0.15 mm.

7. Pulse on time and discharge voltage on metal removal rate (MRR) is significant factors when machining with copper electroplated aluminium electrodes. Flushing pressure does not affect much the metal removal rate (MRR).

8. The optimum conditions for maximum metal removal rate (MRR) with copper electroplated aluminium electrodes within the tested range of variables are discharge current of 9.5 A, pulse on time of 180 μsec, discharge voltage of 120 V and flushing pressure of 2.0 kg/cm^2.

9. The maximum metal removal rate (MRR) under the optimum conditions for EDM with copper electroplated aluminium electrodes is 4.30 mm^3/min. The electrode wear ratio (EWR) under these conditions is 1.327% and the diameteral overcut under these conditions is 0.47 mm.

10. While machining with copper electroplated aluminium electrodes, surface roughness is mostly influences by discharge current, discharge voltage and pulse on time.

11. The optimum conditions for minimum surface roughness with copper electroplated aluminium electrodes within the tested range of variables are discharge current of 1.5 A, pulse on time of 20 μsec, discharge voltage of 60 V and flushing pressure of 0.5 kg/cm^2.

12. The minimum surface roughness under the optimum conditions for EDM with copper electroplated aluminium electrodes is 1.7773 μm. The electrode wear ratio under these conditions is 28.58% and the diameteral overcut under these conditions is 0.14 mm.

13. Aluminium electrode gives superior performance under optimum machining conditions as compared to forged copper electrode for finish machining. Therefore aluminium electrode is recommended in finish machining.

14. Copper electroplated aluminium electrode gives superior performance under optimum machining conditions as compared to forged copper electrode with respect to metal removal rate (MRR). Therefore copper electroplated aluminium electrode is recommended for rough machining.

15. Two stages electric discharge machining is recommended. Rough machining with copper electroplated aluminium electrode and finish machining with aluminium electrode under optimum machining conditions.

16. It is important to select a proper range of levels of input parameters, while using the array design. Otherwise, results will be misleading.

17. The Pareto ANOVA can give the optimum conditions for a particular target function within the tested range of parameters, without putting any constraint on other output functions.