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Experimental Research of Wire Cut EDM for SR & MRR using Taguchi Method

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***Abstract:** The present research work is to examine & advance the latent procedure factors affecting the MRR, SR and Electrode Attire despite the fact machining of Nickel composites utilizing WEDM progression. This exertion includes investigation of the connection amid the different information route considerations like Pulse-on time(Ton), Pulse off time(Toff), Pulse Peak Current(IP), Wire substantial, Work piece material & procedure factors. In light of the picked information parameters and execution estimates L-16 symmetrical exhibit is chosen to streamline the most appropriate qualities for machining for nickel amalgams by WEDM…*

***Keywords:** Surface Quality; EDM; Taguchi Method;MRR.*

I. INTRODUCTION

Wire Cut Electric Discharge Machining process with a slight wire as a cathode changes electrical vitality to warm vitality for cutting materials, WEDM is considered as an interesting reception of the customary EDM process, which utilizes a cathode to instate the starting procedure [1]. The assortments of crop rejoinders with route strictures were numerically confirmed by utilizing non-direct deterioration examination [2]. The models were checked for their ampleness. Consequence of affirmation tests demonstrated that the set up scientific models can foresee the yield reactions with sensible exactness [3]. Be that as it may, WEDM uses a constantly voyaging wire anode made of slender copper, metal or tungsten of breadth 0.05-0.30 mm, which is equipped for accomplishing extremely little corner radii [4-6]. The wire is kept in strain utilizing a mechanical tensioning gadget diminishing the inclination of creating wrong parts [5-7]. During the WEDM procedure, the material is dissolved in front of the wire and there is no immediate contact between the work piece and the wire, wiping out the mechanical worries during machining [8, 9].

II. EXPERIMENTAL PROCEDURE

Examinations have been performed so as to explore the impacts of at least one elements of the procedure parameters superficially finish of the wire cut machined surface. Fig 1 to 8 shows the EDM machine which comprises the input variables and taguchi design and analysis and their process parameters.

Fig 1 Control panel of EDM.

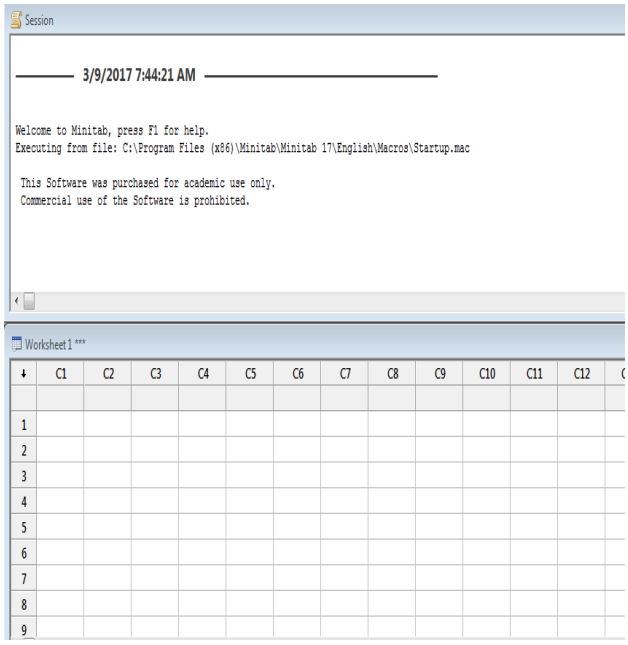

Fig 2 Input screen of EDM.

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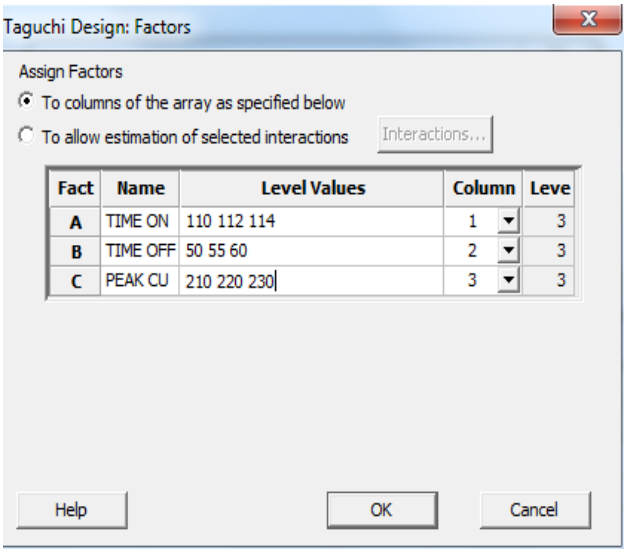


Fig 3 Display Available Designs Select – L9 (2-4)

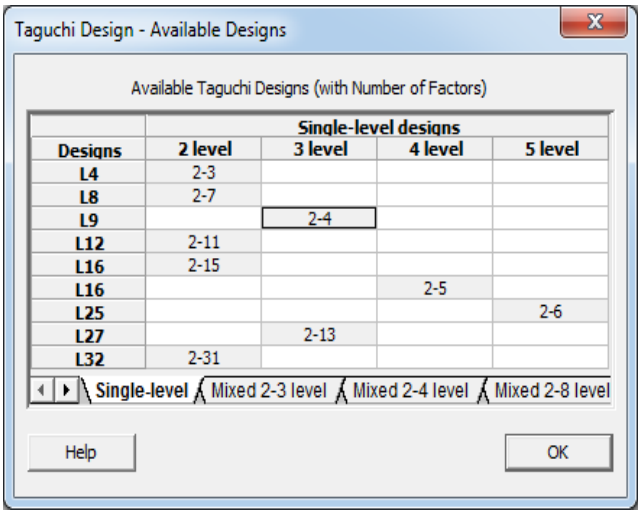
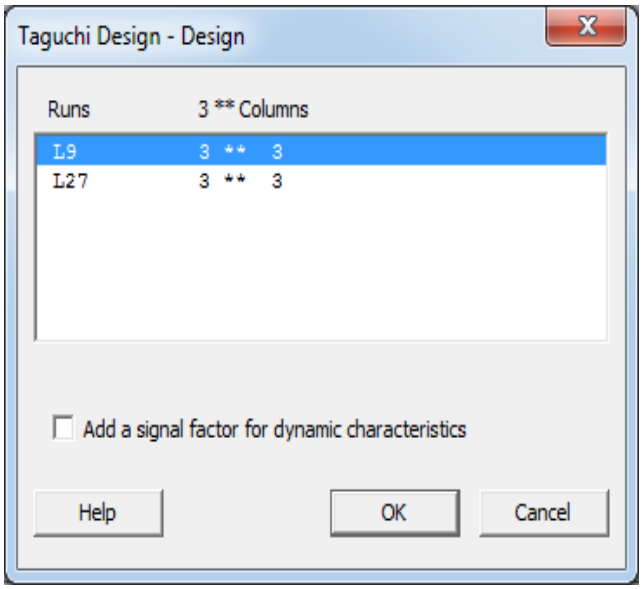
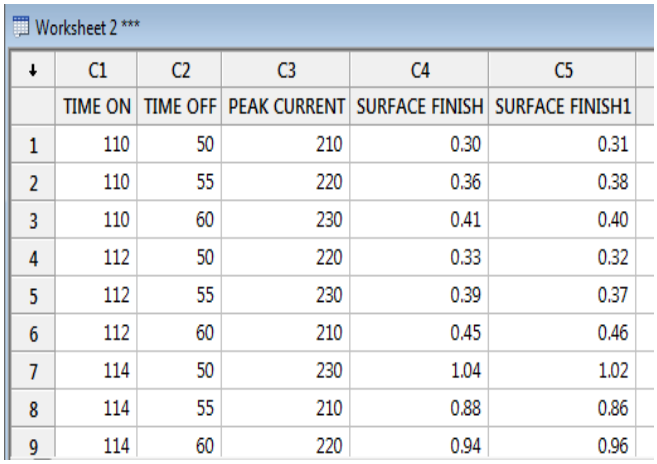


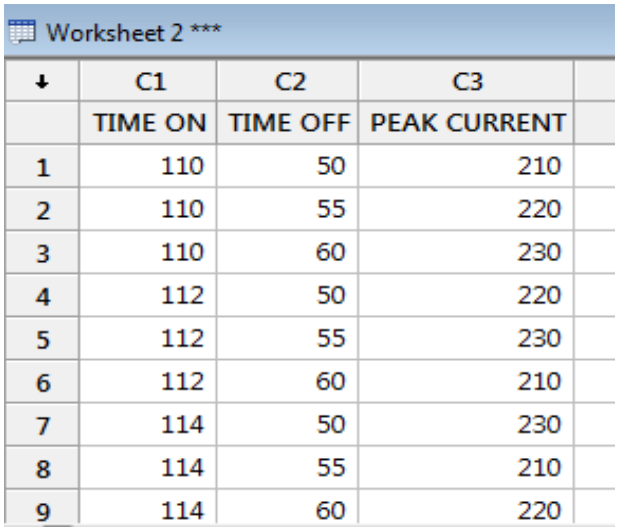
Fig 4 Select Designs Select – L9





↓	C1	C2	C3	C4	C5
	TIME ON	TIME OFF	PEAK CURRENT	SURFACE FINISH	SURFACE FINISH1
1	110	50	210	0.30	0.31
2	110	55	220	0.36	0.38
3	110	60	230	0.41	0.40
4	112	50	220	0.33	0.32
5	112	55	230	0.39	0.37
6	112	60	210	0.45	0.46
7	114	50	230	1.04	1.02
8	114	55	210	0.88	0.86
9	114	60	220	0.94	0.96

Fig 5 Taguchi – Analyze Taguchi Design – Select Responses



↓	C1	C2	C3
	TIME ON	TIME OFF	PEAK CURRENT
1	110	50	210
2	110	55	220
3	110	60	230
4	112	50	220
5	112	55	230
6	112	60	210
7	114	50	230
8	114	55	210
9	114	60	220

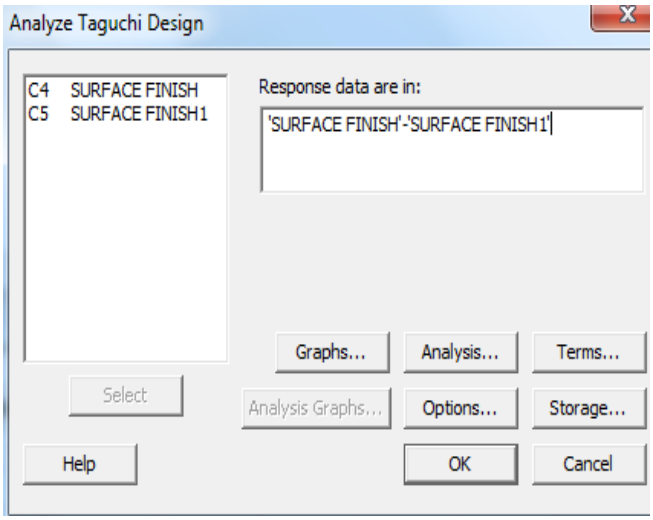


Fig 6 Taguchi Design

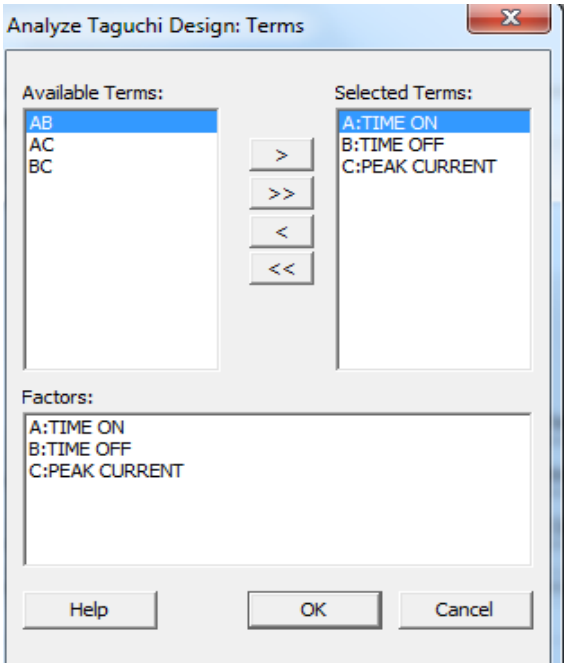


Fig 7 Taguchi Design

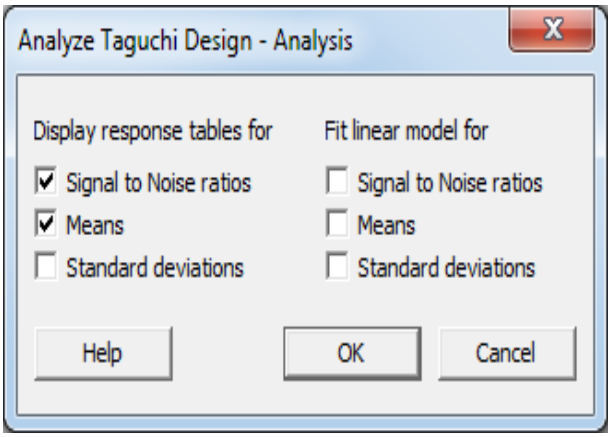


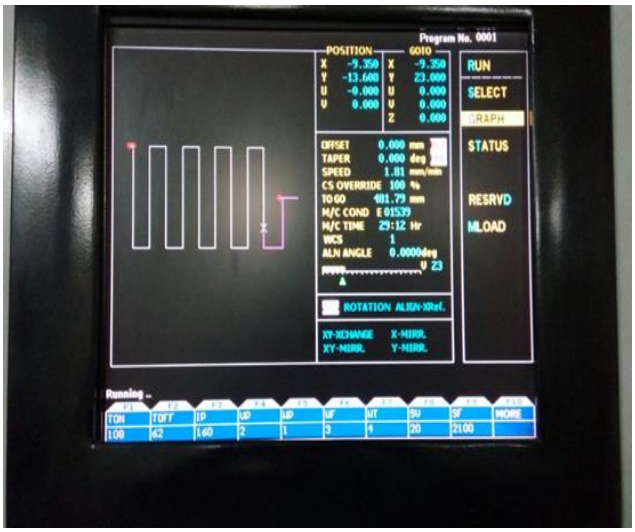
Fig 8 Taguchi Analysis

Table 1. Input Factor

Experiments	Time		Peak current (IP)	Voltage (V)
	On	Off		
1	108	62	160	23
2	109	61	170	23
3	110	60	180	23
4	111	59	190	23
5	112	58	200	25
6	113	57	210	26
7	114	56	220	27
8	115	55	230	28
9	116	54	230	30

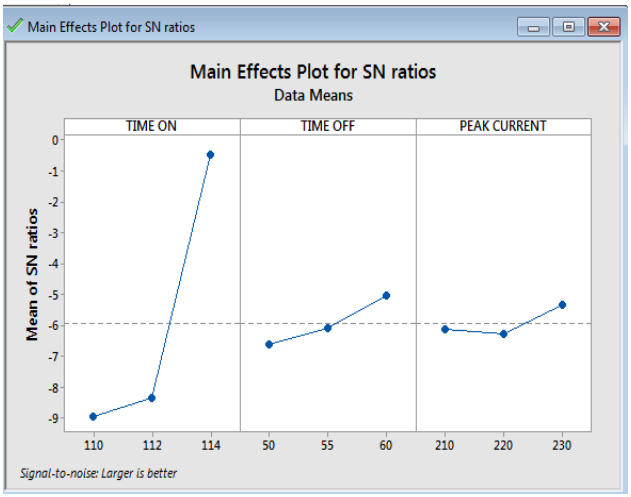
Table 2 . The l9 Orthogonal Array For Input Parameters Pulse On Time, Pulse Off Time And Peak Current

Experiments	Time		Peak current (IP)
	On	Off	
1	110	50	210
2	110	55	220
3	110	60	230
4	112	50	210
5	112	55	220
6	112	60	230
7	114	50	210
8	114	55	220
9	114	60	230



III. RESULTS

Taguchi technique focuses on the significance of examining the reaction variety utilizing the sign to–commotion (S/N) proportion, bringing about minimization of value trademark variety because of wild consideration.



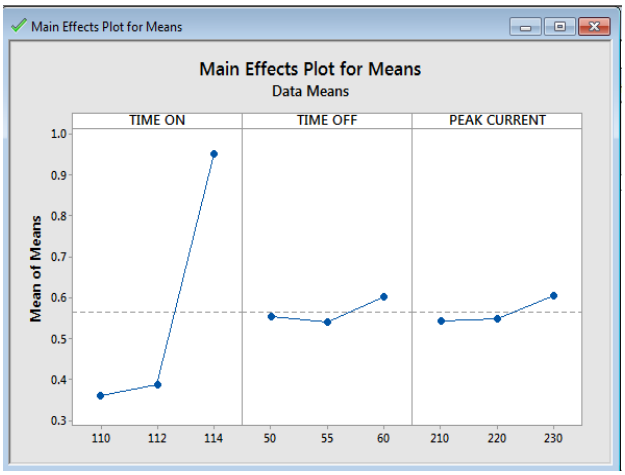


Table 3 Surface Finish Results

Experiments	Time		Peak current (IP)	Surface Finish Values R_a
	On	Off		
1	110	50	210	0.3
2	110	55	220	0.36
3	110	60	230	0.41
4	112	50	210	0.33
5	112	55	220	0.39
6	112	60	230	0.45
7	114	50	210	1.04
8	114	55	220	0.88
9	114	60	230	0.94

IV. CONCLUSION

The target of the contemporary effort is to research the impacts of the different Wirecut EDM progression factors on the machining eminence & the ideal arrangements of procedure factors consequently the nature of machined fragments can be enhanced. Analyses are led on the pieces changing restrictions. The materials utilized for machining are Aluminum combination. Streamlining is finished utilizing Minitab programming..

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Dr.A.Raveendra, Associate Professor and Head of the Department of Mechanical Engineering, Malla Reddy Engineering college (Autonomous),Maisammaguda, Secunderabad. He has 17 years of teaching and 6 years industry experience. His B.Tech degree is from REC –Warangal and M.Tech(Production Engg)from VTU-Belgaum. He has published 35 papers in various International journals and presented 18 papers in International conferences. He has guided 40 B.Tech projects and 21 M.Tech projects. He is the life member of ISTE, IWS, IAENG.