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Measuring Effect of Machining Parameters on Surface Roughness with Turning Process- Literature Survey

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ABSTRACT

This paper aims to study the effect of the machining parameters on surface roughness. A literature survey has been presented to identify and mention the gap for further research after the study of a good number of published papers.

Keywords: *Machining Parameters; Speed; Feed; Depth of Cut; Nose Radius; Rake Angle; Surface Roughness.*

1.0 Introduction

In industry lot of production activity is carried out to manufacture many things. The process of production of large number of items requires removing the excess material from the raw material. The activity involves large number of machine as well as human parameters which makes it complex phenomenon. The production activity determines the overall cost of the basic product. In the age of competition the cost has to be minimal. To achieve this, production activity needs to be optimized in terms of cost/time. The cost/time of production depends upon human parameters such as competency level and wages whereas the machine parameters are speed, feed, depth of cut and the number of passes. These parameters apart from the production rate, influence quality of finished product during a machining operation. To study the influence of various parameters involved one needs to find out from the available data, the practice involved and the shortcomings if any and the possible remedial measures.

2.0 Literature Review

In this paper the Literature Review has been presented in a tabular form. A number of published papers related to the machining area have been studied. Nearly 80 papers related to study of machining parameters have been separated for further consideration of detailed study.

Machining parameters such as speed, feed, depth of cut, nose radius and rake angle have been studied in detail along with their effect on surface roughness.

Many researchers have considered only Speed, feed and Depth of cut as input parameters. The review table given below explains the details of parameters considered in earlier studies by various researchers.

Y represents the consideration of the parameter and X represents parameter not in consideration.

Wherever the parametric values are available, they have been mentioned respectively in the table given below.

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Table 1: Published Work on the Study of Effect Machining Parameters on Surface Roughness

Serial No	Author	Spindle Speed (rpm) / Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Nose Radius (mm)	Rake Angle (Degrees)
1.	[1971]Rasch and Rolstadas	Y	Y	X	Y	X
2.	[1974]Taraman and Lambert	Y	Y	Y	X	X
3.	[1990]Hassan and Suliman	Y	Y	Y	X	X
4.	[1998]A. K.M. Nurul Amin et al.	160, 200, 240	0.2	1	X	X
5.	[2001]B. Y. Lee and Y.S. Tarng	53.44, 57.95, 59.85, 75.70, 81.58, 84.78, 106.88	0.06, 0.16, 0.29, 0.40, 0.52	1.5, 0.5, 1.0	X	X
6.	[2002]Aloysius U. Anagonye et al.	X	X	X	0.4 ,0.8, 1.2, 1.6	X
7.	[2003]J. L. C. Salles and M. T. T. Gonçalves	160, 220, 280, 340, 400	0.025, 0.05, 0.10, 0.15, 0.20, 0.25, 0.30	X	X	X
8.	[2003]Yongjin Kwon and Gary W. Fischer	X	0.07, 0.12	X	X	X
9.	[2004]K.Palanikumar et al.	100, 250	0.10, 0.50	0.5, 1.0	X	X
10.	[2004]Yue Jiao et al.	1200, 1700, 2200	0.15, 0.305, 0.508	0.508, 1.016, 1.524	X	X
11.	[2005]M. Bro˘zek	86.4, 122.7	X	X	X	X
12.	[2005]Wassila Bouzid	Y	X	X	X	X
13.	[2007]Mr. John Cooper and Dr. Bruce DeRuntz	X	0.1	X	X	X
14.	[2008]Ataollah Javidi et al.	80	0.05, 0.1, 0.2, 0.3, 0.4	0.5	0.2, 0.4, 0.8	X
15.	[2008]M. Anthony Xavior and M. Adithan	38.95, 61.35, 97.38	0.2, 0.25, 0.28	0.5, 1.0, 1.2	X	X
16.	[2008]Raviraj Shetty et al.	45, 73, 101	0.11, 0.18, 0.25	0.5	X	X
17.	[2008]Zhanqiang Liu et al.	170	0.1 to 0.6	0.5	X	X
18.	[2009]B. Sidda Reddy et al.	Y	Y	Y	X	X
19.	[2009]K. Kadirgama et al.	140, 180, 100	0.15, 0.2, 0.1	0.1, 0.15, 0.2	X	X
20.	[2009]Vipin and Harish Kumar	100, 120, 140	0.025, 0.05, 0.075	0.2, 0.3, 0.4	X	X
21.	[2010]Ali Riza Motorcu	150, 210	0.11, 0.24	0.3, 1.0	0.8, 1.2	X
22.	[2010]E. Daniel	2500,	0.002,	0.010,	X	X

	Kirby	3500	0.003, 0.004, 0..5	0.020		
23.	[2010]L. Rico et al.	625, 950	1.6, 3.0	0.0156, 0.1250	X	X
24.	[2010]M. Kaladhar et al.	111, 200	0.15, 0.4	0.25, 0.35	0., 0.8	X
25.	[2010]Mohan Singh et al.	Y	Y	X	Y	X
26.	[2010]Young Kug Hwang and Choon Man Lee	100, 300	0.1, 0.3	0.4, 1	X	X
27.	[2011]A. Y. Mustafa and T. Ali	X	0.15, 0.30, 0.45	0.5, 1.0, 1.5	X	X
28.	[2011]Alexandru STANIMIR et al.	120, 200	Y	Y	X	X
29.	[2011]Ilhan Asiltürk and Harun Akkus	90, 120, 150	0.18, 0.27, 0.36	0.2, 0.4, 0.6	X	X
30.	[2011]LB Abhang and M Hameedullah	39, 112, 184	0.2, 0.1, 0.15	0.2, 0.4, 0.6	0.4, 0.8, 1.2	X
31.	[2011]M. Naga Phani Sastry and. K. Devaki	1500, 2000, 2500	0.20, 0.50, 1.0	0.2, 0.3, 0.5	X	X
	Devi					
32.	[2011]Yigit Kazancoglu et al.	110, 300, 600	0.2, 0.4, 0.6	0.5, 1.0, 1.5	X	X
33.	[2012]A. V.N.L.Sharma et al.	228, 450, 740	0.05, 0.08, 0.1	0.4, 0.6, 1	X	X
34.	[2012]D. Lazarević et al.	65, 115, 213	0.049, 0.098, 0.196	1, 2, 4	0.4, 0.8	X
35.	[2012]Jitendra Verma et al.	100, 125, 150	0.05, 0.1, 0.15	0.5, 1.0, 1.5	X	X
36.	[2012]Manish Kumar Yadav et al.	180, 280	0.071, 0.14	0.8, 1.4	X	X
37.	[2012]Muhammad Munawar et al.	X	0.100, 0.125, 0.150	X	0.4, 0.8, 1.2	X
38.	[2012]Neha Khatri et al.	1000, 2000, 3000	1, 3, 6	X	X	X
39.	[2012]nh Nikunj Patel et al.	X	X	X	0.2, 0.4, 0.8, 1.2	0 - 6
40.	[2012]Osarenmwinda. J O	76, 600	0.5	1	X	X
41.	[2012]Sita Rama	88, 150,	0.05,	0.2, 0.3,	X	X

	Raju K et al.	250	0.07, 0.1	0.4		
42.	[2012]Srinivasan. A et al.	100-125	0.1, 0.15, 0.2	0.5, 0.75, 1.0	X	X
43.	[2012]Upinder Kumar Yadav et al.	175, 220, 264	0.1, 0.2, 0.3	0.5, 1.0, 1.5	X	X
44.	[2012]V. R. Chaudhari and Prof. D. B. Gohil	265, 356, 440	0.06, 0.08, 0.12	0.1, 0.15, 0.2	X	X
45.	[2012]Wada Tadahiro et al.	Y	Y	Y	X	X
46.	[2013]A. V.N.L.Sharma et al.	740, 580, 450	0.09, 0.07, 0.05	0.25, 0.3, 0.1	X	X
47.	[2013] Ananthakumar. P et al.	210, 530, 850	0.045, 0.090, 0.135	0.5, 1.0, 1.5	X	X
48.	[2013]K. Manilavanya et al.	360, 740, 1150	0.05, 0.1, 0.13	0.5, 0.75, 0.10	X	X
49.	[2013]Mustafa Günay and Emre Yücel	50,100, 150	0.05, 0.075, 0.1	0.25, 0.50, 0.75	X	X
50.	[2013]Samuel. M et al.	100, 150, 200	0.1, 0.15, 0.2	1, 1.5, 2	X	X
51.	[2013]T. Sreenivasa Murthy et al.	360, 450, 580	0.05, 0.07, 0.09	0.05, 0.1, 0.15	X	X

3.0 Conclusions

- From the published work, it is clear that most of the earlier research work used speed, feed and depth of cut as input parameters for studying the surface roughness.
- Some of them have considered nose radius as one of the parameter.

The published work is silent on simultaneous effect of tool geometry and material properties on surface roughness.

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