



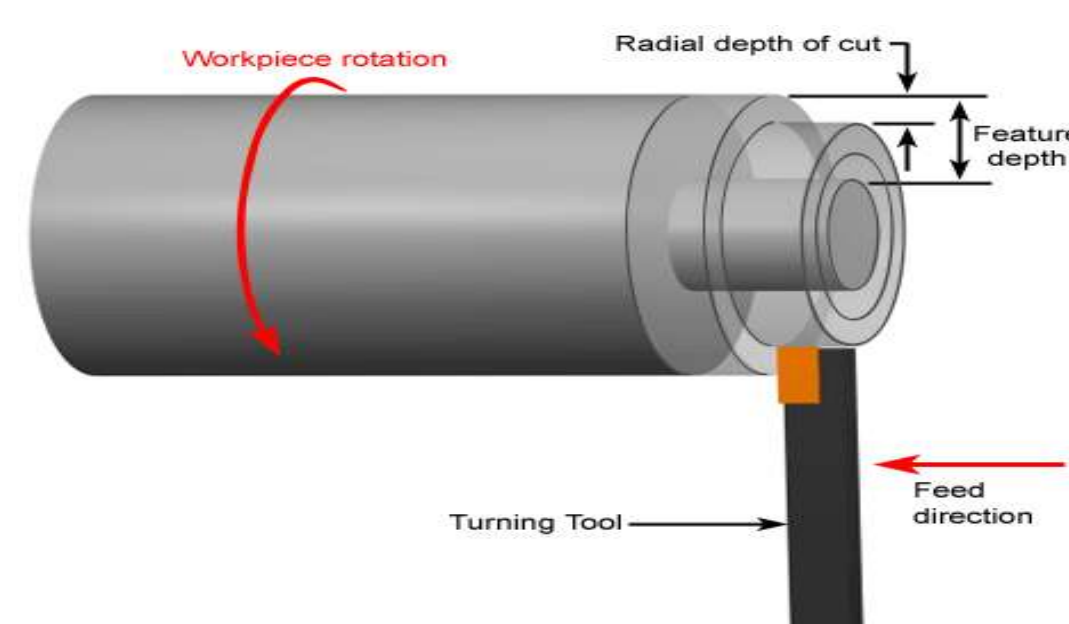
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# EXPERIMENTAL INVESTIGATION ON EFFECT OF PROCESS PARAMETERS ON MATERIAL REMOVAL RATE IN TURNING OF ALUMINIUM-6061 T6 USING TAGUCHI METHOD

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## Introduction

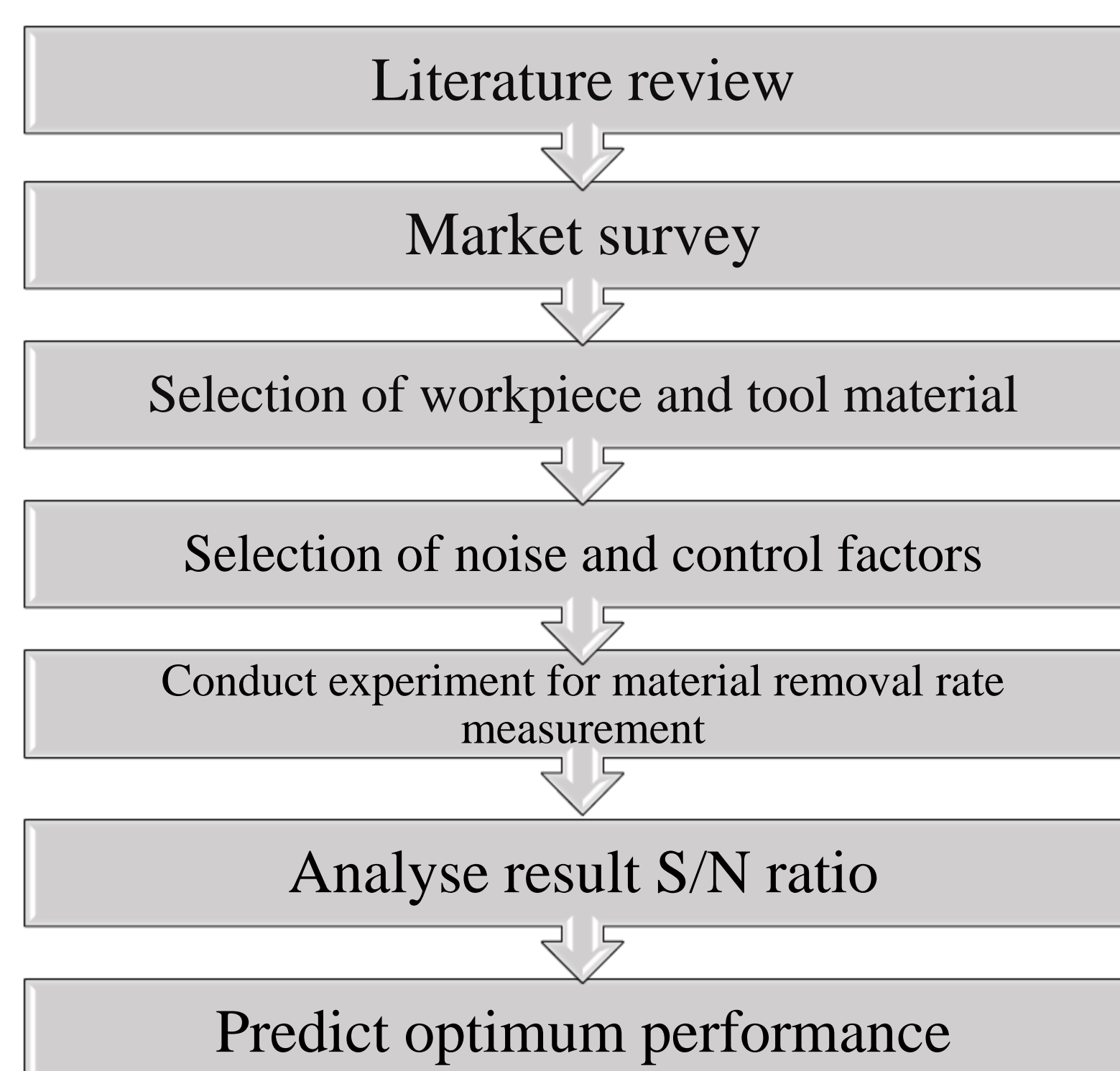
- In any machining process like turning, apart from obtaining the accurate dimensions, achieving a high material removal rate is also desirable.
- A machining process involves many process parameters which directly or indirectly influence the MRR of the product in common.
- MRR may be influenced due to various parameters involved in the operation.
- This study aims at analysis of cutting parameters spindle speed, feed, depth of cut in CNC machine of Aluminium 6061 T6.



## Project Objectives

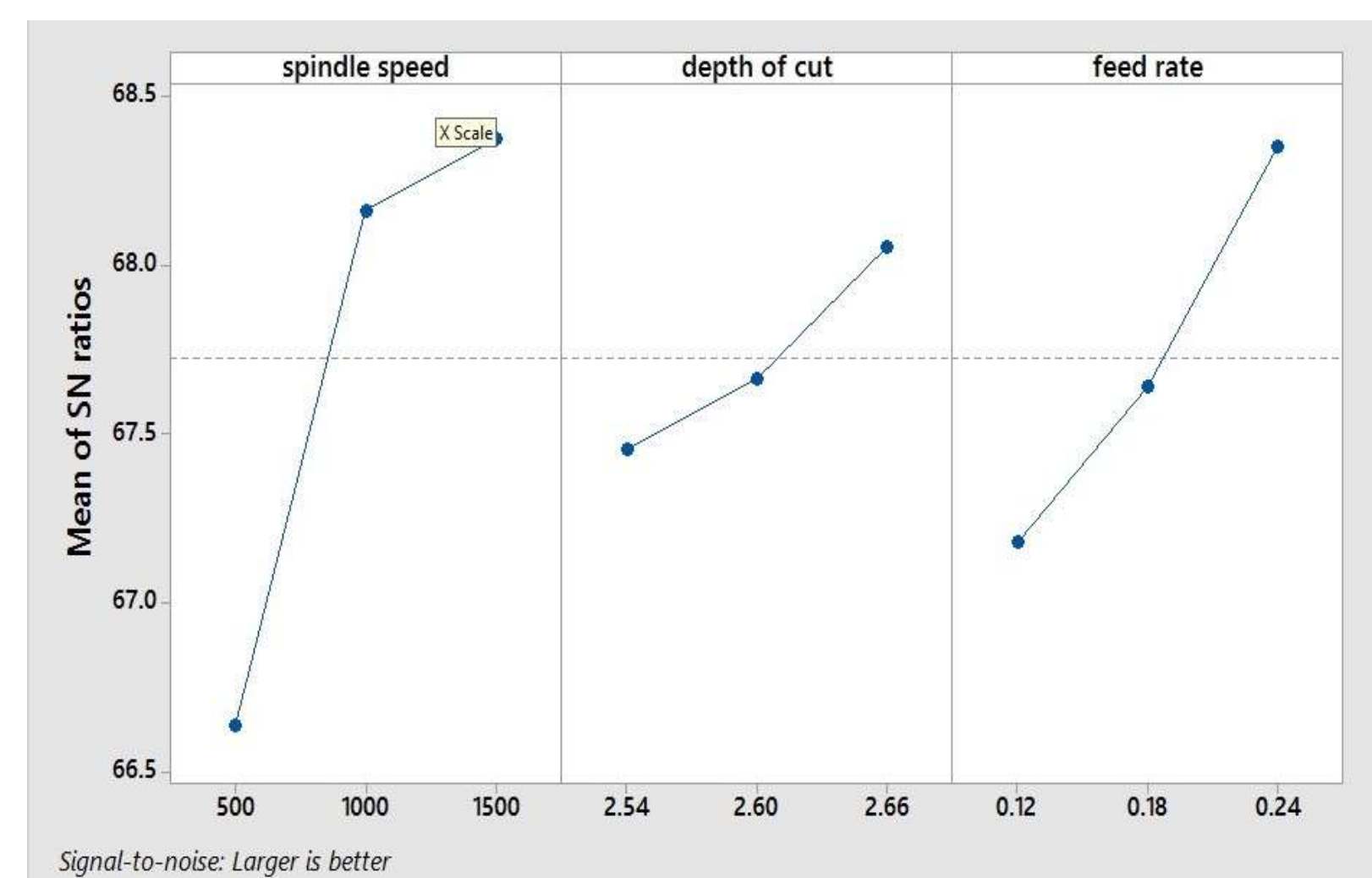
- The objective of this work is to obtain the optimum process parameters spindle speed, feed and depth of cut used in CNC machining on Aluminium 6061 workpiece.
- The optimal parametric combination using Taguchi method have been found.
- The prime objective of our work is to find best optimum value of input parameters for finding best parametric value of MRR (Material removal rate).

## Methodology



## Results and Discussion

Effects of input parameters (Spindle speed, Depth of cut & Feed rate) on Material removal rate:



Main effects plots for S/N ratio

Level	Spindle speed	Depth of cut	Feed rate
1	-53.60	-52.61	-52.95
2	-51.99	-52.52	-52.55
3	-51.68	-52.14	-51.77
Delta	1.92	0.47	1.19
Rank	1	3	2

response table for S/N ratio

Source	DF	Adj SS	Adj MS	F-value	P-value
Spindle speed	2	0.0000003	0.00000035	26.70	0.036***
Depth of cut	2	0.0000007	0.00000012	1.20	0.454*
Feed rate	2	0.0000009	0.00000031	9.48	0.095**
Error	2	0.0000005	0.00000095		
Total	8	0.000001			

Analysis of variance

## Validation of result

Variables	Optimal value of responses	Optimal setting level	Predicted optimal value	Optimal value of MRR	Experimental values	Error%
Spindle speed(A)	1500	A3				
Depth of cut(B)	2.66	B3	0.0028	0.0019 < MRR > 0.0028	0.0027375	2.23%
Feed rate(C)	0.24	C3				

## IMAGES



## Conclusions

- From the analysis of variance results, it is found that none of the turning parameter other than spindle speed has the effect on material removal rate of about 40.2% effect.
- Main effects plots reveal that spindle speed and feed rate are the factors which has considerable influence on material removal rate. Depth of cut has smaller or lesser influence.
- Confirmation test is confirms the improvement of the MRR which also indicates the validity of the present optimisation procedure by Taguchi methodologies.

## References

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*Guided by:*

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