Appendix -A

1. Analysis of ANOVA for Surface roughness

Table A1. Analysis of Variance for surface roughness of face A

Source	DF	Adj SS	Adj MS	F-Value	P-Value
LT	1	3.119	3.11944	258.04	0.000
NT	1	0.079	0.07882	6.52	0.020
PS	1	0.389	0.38872	32.16	0.000
RW	1	0.004	0.00436	0.36	0.556
$(LT)^2$	1	8.964	8.96414	741.52	0.000
$(NT)^2$	1	0.068	0.06756	5.59	0.030
$(PS)^2$	1	0.452	0.45192	37.38	0.000
$(RW)^2$	1	0.008	0.00782	0.65	0.432
Error	18	0.218	0.01209		
Total	26	113.582			

Table A2. Analysis of Variance for surface roughness of face B

Source	DF	Adj SS	Adj MS	F-Value	P-Value
LT	1	4.177	4.1771	895.81	0.000
NT	1	1.088	1.0881	233.34	0.000
PS	1	0.009	0.0093	2.00	0.175
RW	1	0.103	0.1030	22.10	0.000
$(LT)^2$	1	11.122	11.1225	2385.28	0.000
$(NT)^2$	1	1.058	1.0584	226.98	0.000
$(PS)^2$	1	0.029	0.0294	6.31	0.022
$(RW)^2$	1	0.194	0.1944	41.69	0.000
Error	18	0.084	0.0047		
Total	26	132.219			

Table A3. Analysis of Variance for surface roughness of face C

Source	DF	Adj SS	Adj MS	F-Value	P-Value
LT	1	1.2854	1.28538	169.87	0.000
NT	1	0.9604	0.96040	126.93	0.000
PS	1	0.1810	0.18102	23.92	0.000
RW	1	1.6780	1.67798	221.76	0.000
$(LT)^2$	1	2.5834	2.58345	341.43	0.000
$(NT)^2$	1	0.9573	0.95734	126.52	0.000
$(PS)^2$	1	0.1431	0.14312	18.91	0.000
$(RW)^2$	1	1.7424	1.74241	230.27	0.000
Error	18	0.1362	0.00757		
Total	26	21.0057			

Where, DF – Degree of freedom, Adj SS - Adjusted sums of squares, Adj - Adjusted mean squares, F value -Test statistic, P-value – Probability value

Table A4. Model summary for surface roughness

	S	R-sq	R-sq(adj)	R-sq(pred)
Face A	0.109949	99.81%	99.72%	99.57%
Face B	0.0682859	99.94%	99.91%	99.86%
Face C	0.0869866	99.35%	99.06%	98.54%

Where, S denotes standard deviation of data from fitted value, R-sq - R saquared, R-sq(adj) – R squared adjusted, R- sq(pred)- R squared predicted

1.1 Regression Equation

Surface roughness (face A)

$$= 60.2 - 77.01 \times LT - 0.458 \times NT - 0.0894 \times PS - 4.63 \times RW$$
$$+ 612 \times (LT)^2 + 0.001061 \times (NT)^2 + 0.000686 \times (PS)^2$$
$$+ 7.37 \times (RW)^2 \tag{A1}$$

Surface roughness (face B)

$$= 177.5 - 89.12 \times LT - 1.704 \times NT + 0.01383 \times PS + 22.49 \times RW$$
$$+ 682.2 \times (LT)^2 + 0.0042 \times (NT)^2 - 0.000175 \times (PS)^2$$
$$- 36.73 \times (RW)^2 \tag{A2}$$

Surface roughness (face C)

$$= -139.8 - 49.44 \times LT + 1.6 \times NT + 0.0610 \times PS - 90.76 \times RW$$
$$+ 328.8 \times (LT)^2 - 0.003994 \times (NT)^2 - 0.000386 \times (PS)^2$$
$$+ 109.98 \times (RW)^2 \tag{A3}$$

2. Analysis of ANOVA for Production Time

Table A5. Analysis of Variance for production time

Source	DF	Adj SS	Adj MS	F-Value	P-Value
LT	1	75.131	75.1314	2217.72	0.000
NT	1	7.841	7.8407	231.44	0.000
PS	1	10.414	10.4138	307.39	0.000
RW	1	2.573	2.5733	75.96	0.000
$(LT)^2$	1	30.440	30.4400	898.52	0.000
$(NT)^2$	1	7.989	7.9888	235.81	0.000
$(PS)^2$	1	6.168	6.1678	182.06	0.000
$(RW)^2$	1	3.120	3.1200	92.10	0.000
Error	18	0.610	0.0339		
Total	26	854.662			

Table A6. Model summary for production time

S	R-sq	R-sq(adj)	R-sq(pred)
0.184059	99.93%	99.90%	99.84%

2.1 Regression Equation

Production time

$$= 489.5 - 377.95 \times LT - 4.573 \times NT - 0.4627 \times PS + 112.4 \times RW$$
$$+ 1128.5 \times (LT)^2 + 0.011539 \times (NT)^2 + 0.002535 \times (PS)^2$$
$$- 147.2 \times (RW)^2 \tag{A4}$$

3. Analysis of ANOVA for Volume Percentage Error

Table A7. Analysis of Variance for volume percentage error

Source	DF	Adj SS	Adj MS	F-Value	P-Value
LT	1	0.2184	0.21836	6.72	0.018
NT	1	1.7866	1.78657	54.95	0.000
PS	1	0.7002	0.70018	21.53	0.000
RW	1	0.6085	0.60849	18.71	0.000
$(LT)^2$	1	0.0128	0.01276	0.39	0.539
$(NT)^2$	1	1.7402	1.74018	53.52	0.000
$(PS)^2$	1	0.5652	0.56523	17.38	0.001
$(RW)^2$	1	0.5999	0.59987	18.45	0.000
Error	18	0.5853	0.03251		
Total	26	14.9186			

Table A8. Model summary for volume percentage error

S	R-sq	R-sq(adj)	R-sq(pred)
0.180318	96.08%	94.33%	91.17%

3.1 Regression Equation

Volume percentage error

$$= -233.4 + 20.38 \times LT + 2.183 \times NT + 0.1200 \times PS + 54.7 \times RW$$
$$- 23.1 \times (LT)^2 - 0.005385 \times (NT)^2 - 0.000767 \times (PS)^2$$
$$- 64.5 \times (RW)^2 \hspace{4cm} (A5)$$