The case of the variable laminates

Business

The Case of Variable Laminates In the current scenario, there are three major experimental variables that need to be investigated simultaneously for their effect on process outcome. These variables are soak time, soak temperature and knife pressure. Knife setting is being left out since it has no discernible impact on process output. The typical operating ranges for these parameters are outlined in the table shown below.

Soak Time (minutes)

Soak Temperature (oC)

Knife Pressure (psi)

30

150

250

60

200

300

Operating Range

30

50

50

A rational approach for enhanced process control would be to investigate these parameters such that for each experiment each variable’s operating range is divided by 5 to reveal a sizable increment. This would indicate that soaking time is incremented by 6 minutes, soaking temperature by 10oC and knife pressure by 10 psi. The resulting Taguchi experimental design orthogonal array would assume the form shown in the Appendix. The total number of experiments required would be 36.

The thickness measurements are previously being made at every 15 minutes but a greater frequency for soaking time has been defined in order to ensure that process control experimentation resolution is enhanced. The contention in running these experimental runs is to measure the resulting laminate thickness. Once laminate thickness has been tabulated against each experimental run, statistical methods can be used to determine the optimal running conditions. Multiple combinations of operating parameters may produce the desired thickness so other factors such as power consumption may be used to decipher the final operating conditions.

Appendix

Experiment Number

Soak Time (minutes)

Soak Temperature (oC)

Knife Pressure (psi)

1

30

150

250

2

30

160

260

3

30

170

270

4

30

180

280

5

30

190

290

6

30

200

300

7

36

150

250

8

36

160

260

9

36

170

270

10

36

180

280

11

36

190

290

12

36

200

300

13

42

150

250

14

42

160

260

15

42

170

270

16

42

180

280

17

42

190

290

18

42

200

300

19

48

150

250

20

48

160

260

21

48

170

270

22

48

180

280

23

48

190

290

24

48

200

300

25

54

150

250

26

54

160

260

27

54

170

270

28

54

180

280

29

54

190

290

30

54

200

300

31

60

150

250

32

60

160

260

33

60

170

270

34

60

180

280

35

60

190

290

36

60

200

300