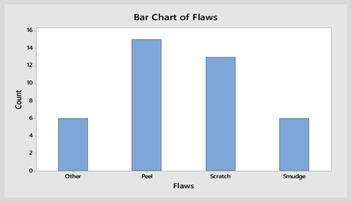
A MINITAB PROJECT BASED ON QUALITY CONTROL : GRAPH PLOT , DATA MODELLING & DATA VISUALIZATION

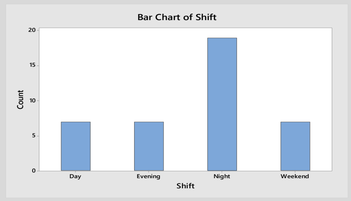
IPE 314 – Quality Management Sessional

Assigned by – Asst. Professor Tanmoy Das **Submitted by – Tasnim Ahmed Tahasin (201636026)**

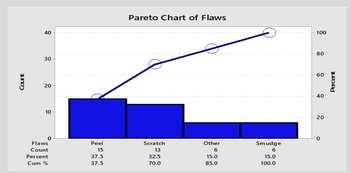
GRAPH PLOT

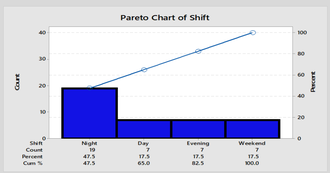
BAR CHART



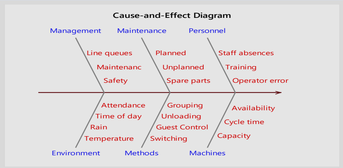


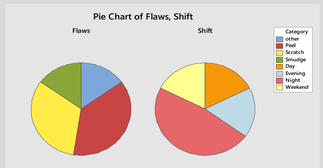
PARETO CHART



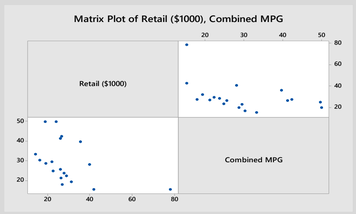


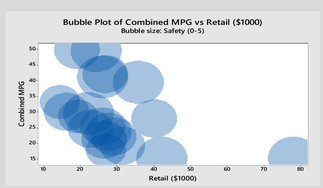
CAUSE AND EFFECT DIAGRAM & PIE CHART



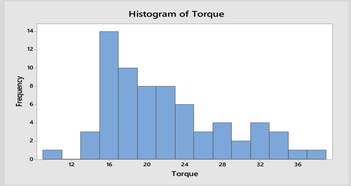


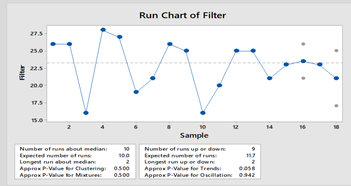
MATRIX PLOT AND BUBBLE PLOT





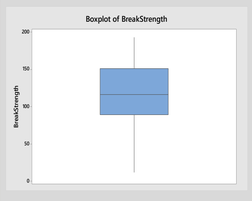
HISTOGRAM & RUNCHART

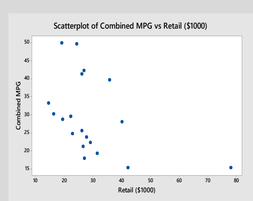


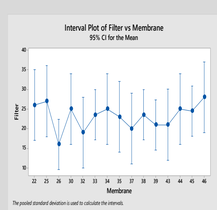


GRAPH PLOT

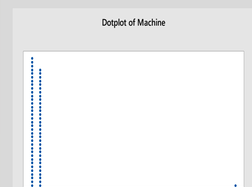
BOXPLOT,SCATTERPLOT & INTERVAL PLOT

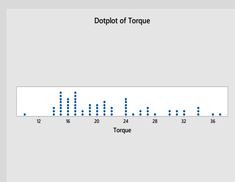


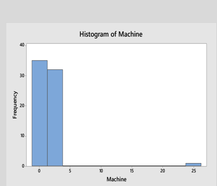




DOTPLOTS & HISTOGRAM







DATA SET

BAR CHART , PIE CHART, PARETO CHART AND CAUSE AND EFFECT DIAGRAM DATASETS

Flaws	Shift
Scratch	Day
Scratch	Day
Peel	Day
Peel	Day
Smudge	Day
Scratch	Day
Other	Day
Other	Evening
Peel	Evening
Peel	Evening

Personnel	Machine	Maintenance	Methods	Management	Environment
Staff absences	Capacity repairs	Planned	Switching	Line queues	Temperature
Training	Cycle time repairs	Unplanned	Guest Control	Maintenance plan	Rain
Operator error	Availability	Spare parts	Unloading	Safety checks	Time of day
			Grouping		Attendance

HISTOGRAM , GOODNESS-OF-FIT TEST ,BOXPLOT ,MATRIX PLOT & ANOVA DATASETS

Torque	Machine
24	2
26	26
18	1
27	2
17	2
32	2
31	2
27	2
21	2
27	1

Combined MPG (Y)	Retail ($1000) (X)
19.25	31.3
25.50	26.0
39.55	35.6
29.50	22.1
41.20	26.0
30.15	16.2
17.80	26.9
22.25	28.9
28.00	40.0
15.25	78.0

Defects	Observed
0	26
1	41
2	18
3	28

Break-Strength
82.40
26.00
127.96
150.78
135.75
92.01
159.67
117.74
152.05
12.38

Filter	Membrane
26	45
26	33
16	26
28	46
27	25
19	32
21	33
26	22
25	30
16	26

DATA MODELLING

ANOVA

One-way ANOVA: Filter versus Membrane

Method

Null hypothesis	All means are equal
Alternative hypothesis	Not all means are equal
Significance level	α = 0.05

Equal variances were assumed for the analysis

Factor Information

Factor	Levels	Values
Membrane	15	22, 25, 26, 30, 32, 33, 34, 35, 37, 38, 39, 43, 44, 45, 46

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Membrane	14	201.70	14.41	1.17	0.465
Error	5	61.50	12.30		
Total	19	263.20			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
3.50714	76.63%	11.21%	*

Means

Membrane	N	Mean	StDev	95% CI
22	1	26.00	*	(16.98, 35.02)
25	1	27.00	*	(17.98, 36.02)
26	2	16.00	0.00	(9.63, 22.37)
30	1	25.00	*	(15.98, 34.02)
32	1	19.00	*	(9.98, 28.02)
33	2	23.50	3.54	(17.13, 29.87)
34	1	25.00	*	(15.98, 34.02)
35	1	23.00	*	(13.98, 32.02)
37	1	20.00	*	(10.98, 29.02)
38	2	23.50	3.54	(17.13, 29.87)
39	2	21.00	5.66	(14.63, 27.37)
43	1	21.00	*	(11.98, 30.02)
44	1	25.00	*	(15.98, 34.02)
45	2	24.50	2.12	(18.13, 30.87)
46	1	28.00	*	(18.98, 37.02)

Pooled StDev = 3.50714

GOODNESS-OF-FIT Correlation, Covariance TEST

Poisson Regression Analysis: Observed versus Defects

Method

Link function	Natural log
Rows used	4

Source	DF	Adj Dev	Adj Mean	Chi-Square	P-Value
Regression	1	0.5118	0.5118	0.51	0.474
Defects	1	0.5118	0.5118	0.51	0.474
Error	2	8.9919	4.4959		
Total	3	9.5036			

Model Summary

Deviance R-Sq	Deviance R-Sq(adj)	AIC
5.38%	0.00%	33.56

Coefficients

Term	Coef	SE Coef	VIF
Constant	3.429	0.153	
Defects	-0.0602	0.0843	1.00

Regression Equation

Observed = exp(Y')

Y' = 3.429 - 0.0602 Defects

Goodness-of-Fit Tests

Test	DF	Estimate	Mean	Chi-Square	P-Value
Deviance	2	8.99188	4.49594	8.99	0.011
Pearson	2	9.07348	4.53674	9.07	0.011

Fits and Diagnostics for Unusual Observations

Obs	Observed	Fit	Resid	Std Resid	
2	41.00	29.05	2.09	2.48	R
3	18.00	27.35	-1.91	-2.29	R

R Large residual

CORRELATION, COVARIANCE

Correlations

	Hydrogen	Porosity
Porosity	0.625	
	0.017	
Strength	-0.790	-0.527
	0.001	0.053

Cell Contents
Pearson correlation
P-Value

Covariances: Hydrogen, Porosity, Strength Covariances

	Hydrogen	Porosity	Strength
Hydrogen	0.00072582		
Porosity	0.00357582	0.04512967	
Strength	-0.00704865	-0.03710245	0.10963907

SUMMARY

Minitab is a powerful statistical software for statistical analysis in quality management. By using minitab interface and its system environment facilitates we imported data to check 2D and 3D data visualization up to data exploration and analytical statistics. Excellent graphs were produced using minitab graph option from the menu bar. Minitab is used worldwide for the implementation of Six Sigma projects and provides standard statistical methods for Anova, regression, quality tools and quality control charts etc . Using the Stat option from the menu bar Anova , Goodness-of-fit test etc were done In short this submission helped us to get hands on experience in the minitab platform

Reference

Minitab sample data