CHAPTER 6

CONCLUSION

Introduction

Summary of Findings

Discussion

Shortcoming or Limitation of Analysis

Prospects for Further Work

ıtroduction

Ianufacturing always face the difficulties in testing the product at various ˙ test insert on different testers, i.e. yield variation from tester to tester. ꞉ would like to analysis if there is any significant different in yield due to tester at each test insert. In addition, we also interested to know if ıny day to day variation as well. The statistical analysis methods used are of variance, non-parametric tests, Tukey's test and etc. The result or of finding was summarized in subsequent section.

iummary of Findings

Ve would like to determine whether there are any significant differences verage yield by tester at TOS, TLO and THI test process. The analysis ꞉s from non-parametric Kruskal-Wallis test shown that the median scores 'our testers are equal at TOS test insert. As for TLO and THI test insert, we e that there is significance differences in the average yield performance the testers. In order to determine which of the means are significantly ıt from each other, Tukey's T method was used and we found that that no significant difference between each pair of means at TLO test insert. ər, there is significance difference between tester KLM53 and KLM58 at ꞉t insert, we conclude that KLM58's yield performance is the best.

We wanted to determine whether there is evidence of a difference in yield nance by day at each test insert. Kruskal-Wallis test was used due to both ıity and homogeneity-of-variance is seriously violated. From the analysis we conclude that the yield were the same with respect to median yield ance.

We have examined the yield across the various test inserts and have d that TLO insert is the lowest yield, which results in most defects. We :d the analysis and investigated the major defect type from TLO test 'rom Pareto chart, we observed that the most defects fell in bin 6.

Discussion

We found that there is day to day variation in yield performance. There gnificant yield differences at the THI test insert and KLM 58 was the best s determined by Tukey's test. In examining yield across the test insert, we hat TLO insert is the lowest yield as compared to the other two test inserts. her investigated and discover that the highest reject bin was contributed by :t would be useful to identify and select process variable in bin 6 which ute most to yield loss.

The engineer at company A analyzed the defects in bin 6. There are process variables that are categorized under bin six. In order to increase ciency of integrated circuit process surveillance and simplify the task, only key process variables and disturbances that have a significant effect on s output were selected for monitoring. The selection of these process es was based on the results of sensitivity analysis (Sharifzadeh S et al, mong all the process variables and disturbances, one variable was ɜach time to be shifted from its nominal value by 3δ, while keeping all riables at their nominal values, δ is the standard deviation of the ɜd manufacturing variation. If the yield lost (reject quantity divided by ·) being observed showed a significant shift from its nominal values, or yond the predetermined control limits, then this unusual shift was ɪ to the change of the process variables disturbance shifted. This process was then taken as one of the process variables that have significant ɔn yield lost, and thus placed in the set of process variables to be ɜd. If yield loss showed a significant shift, on the other hand, the variable shifted was considered insignificant and no further monitoring necessary ɪis procedure was used to identify one of the process variables, DRET, as ting to the greatest yield loss at TLO.

.mong all the process variables, the engineer found that DRET has caused th .it parameters significant shift from its nominal values. The outcome is g: Table 6.2 below.

T 1 Sample of DRET when the correlated disturbance shifted to 3δ

Sample	DRET
1	64.121
2	64.093
3	64.125
4	64.153
5	64.127
6	64.116
7	64.126
8	64.075
9	64.097
10	64.095
$\bar{x}$	64.1128
S	2.2622e-2

Using the equation as stated below:

$$t_0 = \frac{\bar{x} - \mu_0}{S/\sqrt{n}}$$

$$= \frac{64.1128 - 64.3706}{0.0226/\sqrt{10}}$$

$$= -36.0387$$

Decision rule = $|t_0| > t_{0.0005,9}$

α=0.001, so the hypothesis $H_1 : \mu \neq \mu_0$ holds true with 100(1-α) = confidence. These findings actually correlated with the daily highest yield ıfer lot's data that had been gathered regularly by engineer, which showed being the highest functional fallout or greatest yield lost at TLO.

Shortcoming or Limitation of Analysis

The primary factor that has not been addressed in this analysis is the :s in the line. In industry, variability in the production line introduced by rs is an important concern. This study only covered one aspect of operator e. day to day variation but not shift to shift variation.

A manufacturing line undergoes a lot of changes during its lifetime. ient are removed or added as old products are phased out or new products troduced. This might increase machine-to-machine variations.

There are unequal sample sizes in different groups exist in the data set. ıl variances from group to group can have serious effects on drawing ces made from the analysis of variance. Furthermore, power computations duce, as it is depends on the magnitude of the true differences and the size too (Marija J. Norusis, 1994).

We were not able to quantify and rank which process variable or defect as the most or the second most and etc. significant contributor to yield loss. ition, the main reject test was not able to analyze in depth too.

?rospects for Further Work

:t is recommended that further investigations be made in the following

Firstly, one can perform analysis-of-variance to determine if there is any ınt yield different by shift, which the variation in yield might introduced ators.

Secondly, to present multiple regression analysis, it is used to quantify the f defect units on yield at different test insert. Multiple regression is used to a dependent variable by several independent variables, where it is d that the dependent variable is normal distributed. The coefficient of ınation (R^2) expresses the proportion of the total variation in the values of ɔendent variable that can be accounted for or explained by the linear ıship with the values of the independent variables.

Thirdly, to present a generalized linear model (GLM). It is a process e correlated with the reject rate of an electrical test. GLM is an extension of le regression in which two main factors – linearity and the normality of the lent variable are not assumed (Bergeret. F, 1999). The principle, however, ıs the same, i.e. to calculate a test statistic to determine whether the ndent variables have a significant effect on the dependent variable. A rd multiple regression was also performed, i.e. a stepwise selection was ɔ determine the main significant test rejects.