

Prediction of Machine Effectuated Factor via Statistics Analysis using Data mining

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Abstract—Different machine use in various industries and making different type of product. Using technique of Statistics analysis, we see different factor which is direct effect on machine working hour. For analysis using SQL for fetching data and Crystal report using visualization of graph form and table form. Using analysis, we increase maximum usage of time, in this purpose we are using SPEL Company data set

Keywords—SQL queries, Statistics techniques, Utilization, Efficiency, Crystal Report

Introduction

Industry level machine [1-4] work and produced different product. Machine working 24 hour in different shift. Shift basically use in working hour of

Employee, its means shift are directly depend on employee working hour.

1 Shift = 8hr

2 Shift = 16hr

3 shift = 24hr

In one shift have 30 mint off time for worker, so machine also off at that time. Its means every shift have 7:30hr. Machine working hour in one day is 22:30hr. Its means 24hr/22:30hr in a day. This is one scenario which shows all calculation and

another scenario is based on just 2 shift. Which is 12hr shift.

1 Shift = 12hr

2 Shift = 12hr

In this scenario working time of machine is 11:30hr in each shift and also labor working hour is 11:30hr. Now machine working hour in one day is 23hr. It means 24hr/23hr. We use SPEL company data for

machine working and Efficiency and Utilization also find those parameters which effect on machine utilization and efficiency.

We use 2 term Machine Utilization and Machine Efficiency [5-8] which means by

- **How much time Utilize a Machine at available shift or time is called machine Utilization**
- **Given time of that machine how much time machine work properly is called machine Efficiency**

Literature Survey

Different industry have own method to find Utilization and Efficiency. It have different parameter and different criteria. But same method fallow using Statistics analysis. It use Statistics analysis techniques. Mostly industries have own data they use Statistics technique like query writing for fetching data and pass out filter data and cleaning process through query, according our own requirements for machine utilization. Similarly SPEL Company have data and we fetch required data.

Statistics Analysis

FOR Statistics Analysis I use many technique use Statistics analysis

- Query's
- Means
- Percentages
- Efficiency
- Graph

In data set I have categorize two different level

1. Unit Level
2. Location level

Unit level

Industry have many plants, and different location. In SPEL Company scenario have many UNIT. Each unit have differd location, means UNIT5RYK location is "Rahim Yar Khan" .Unit I have in data set is

1. UNIT1
2. UNIT2
3. UNIT3
4. UNIT4
5. UNIT5RYK

Unit1, 2, 3, 4 location is Lahore.

Now in each unit I have more categorize in own location.

1. DIE SHOP
2. EXTRUSION
3. FORMING
4. FPD
5. MACHINE SHOP
6. PC HALL
7. PRINTING HALL
8. RYK
9. SHAMPOO HALL

UNIT1

Firstly we analysis machine utilization in unit level. Each Unit have own graph and own parameters which are commonly use in each unit.

Utilization

How much time Utilize a Machine at available shift or time is called machine Utilization

Machine Code	Machine Name	MACHINE RUNNING TIME	PLANNED CLOSED
UNIT1			
PC HALL			
M-0061	IBM001-ASB 650EXHS 1 (Unit1)	36.22	59.62
M-0062	IBM002-ASB 650EXHS 2 (Unit 1)	94.27	-2.47
M-0068	IBM003-ASB 650EXHS 3 (Unit 1)	73.59	21.61
M-0077	IBM004-ASB 650EXHS 4 (Unit 1)	78.71	6.35
M-0089	SP-01 PC Bottle Printing	32.51	27.52
M-0090	SP-02 PC Bottle Printing	16.18	60.43
Average :		55.25	28.84
Total:		331.48	173.06

Figure 1(Machine running time and planned closed)

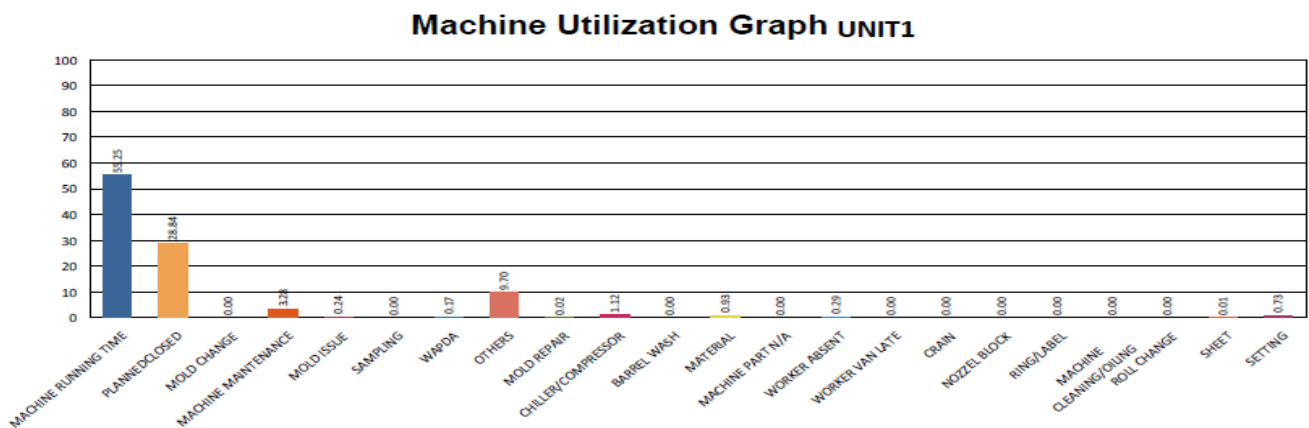


Figure 2(Machine Utilization Graph)

This [Figure 1] has shown Machine Running time and Planned closed in each machine.

UNIT1 describe 6 machine running in May month and running time average is 55.25 and total running time is 331.48 and planned closed time are 173.06 as shown in [Figure 2]

Unit 1 Efficiency

Given time of that machine how much time machine work properly is called machine Efficiency

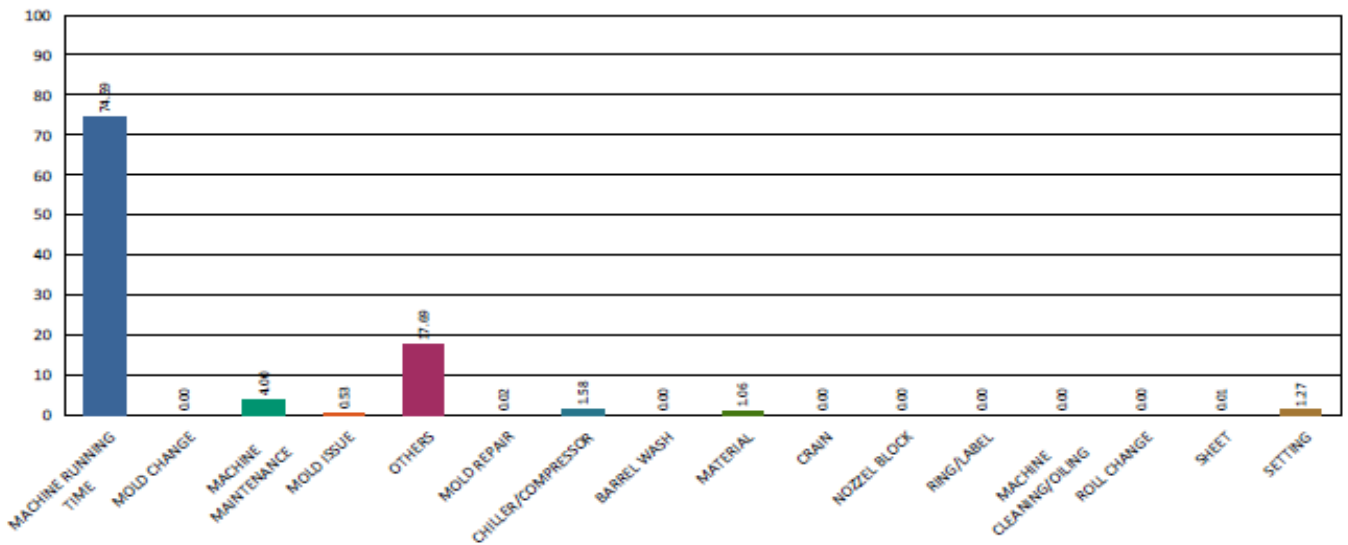


Figure 3(Machine Efficiency Graphical machine efficiency factor)

UNIT2

Unit 2 which is located by Lahore in “Pandokey”

Unit 2 Utilization

Machine Utilization Graph UNIT2

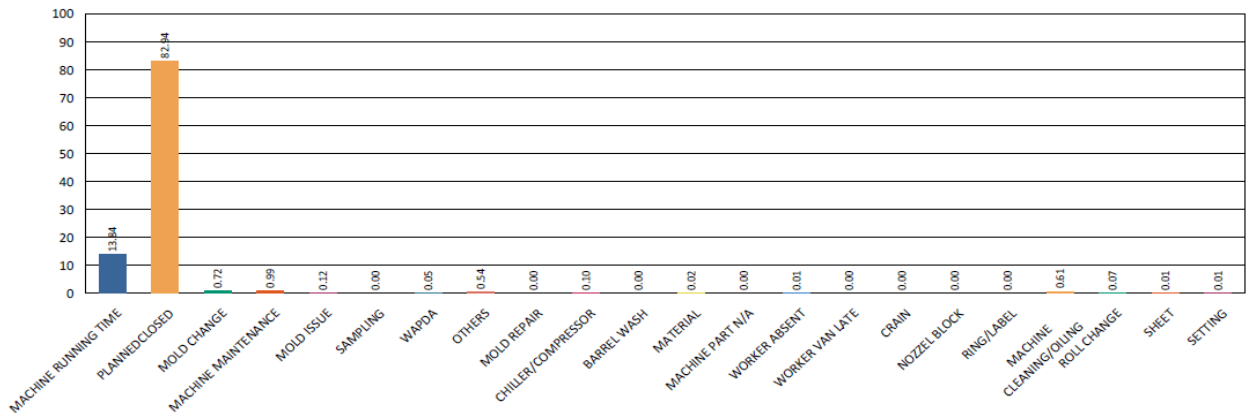


Figure 4(UNIT2 graph machine Utilization)

All factor are explain in graph. In those factor machine are not working and we define in graph of each factor, these factor shown in [Figure 4] percentage form.

Machine Code	Machine Name	MACHINE RUNNING TIME	PLANNED CLOSED
UNIT2			
EXTRUSION			
M-0040	E3-Gwell	24.75	70.42
M-0076	E4-Jwell	22.88	74.67
Average :		23.82	72.55
Total:		47.63	145.10
FORMING			
M-0041	F1-Wonderpack	71.20	21.09
M-0050	HF1 Hengfeng	2.24	97.36
M-0051	LF01-Rulaan Polyprint	0.59	98.88
M-0052	LF02-Rulaan Polyprint	17.65	77.26
M-0066	HF2 Hengfeng	3.30	96.04
M-0074	HFS Hengfeng	8.57	88.15
M-0107	LF03-Rulaan Polyprint	5.89	91.36
M-0109	HF4 Hengfeng	3.84	95.28
M-0119	HFS Hengfeng	27.75	70.33
Average :		15.67	81.75
Total:		141.03	735.74
PRINTING HALL			
M-0056	P003-Towin Light	12.78	80.57
M-0075	P009-Van Dam	6.17	82.87
M-0078	P010-Kammann Printing	5.78	94.03
M-0117	P012-Towin QJY-H9125	3.76	94.80
M-0118	P013-Towin QJY-H9125	4.31	93.89
Average :		6.56	89.23
Total:		32.80	446.16
Grand Total :		221.46	1,326.99

Figure 5(UNIT2 Machine running time and planned closed)

Unit2 have 2 location 3 location use Extrusion, Forming, Printing Hall which have one average and total as shown in

[Figure 5]. The total running time is 221.46 and planned closed is 1326.99 which is month of May analysis.

Unit 2 Efficiency

- | | |
|------------------------|-----------------------------|
| 1. MOLD CHANGE | 10. MATERIAL |
| 2. MACHINE MAINTENANCE | 11. MACHINE PART NA |
| 3. MOLD ISSUE | 12. WORKER ABSENT |
| 4. SAMPLING | 13. WORKER VAN LATE |
| 5. WAPDA | 14. CRAIN |
| 6. OTHERS | 15. NOZZEL BLOCK |
| 7. MOLD REPAIR | 16. RING LABEL |
| 8. CHILLER COMPRESSOR | 17. MACHINE CLEANING OILING |
| 9. BARREL WASH | 18. ROLL CHANGE |

Report Date : 5-May-20 Start Date : 04/01/2020
End Date : 04/30/2020

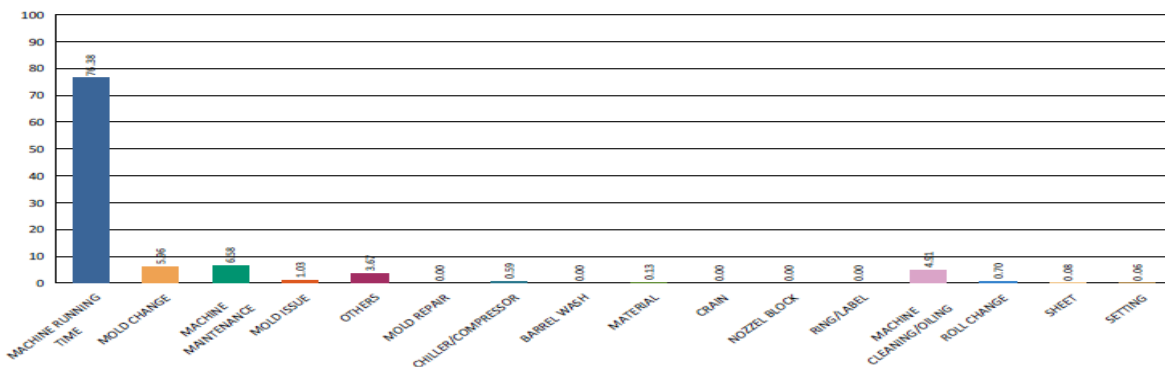


Figure 6(UNIT2 Machine Efficiency Graphical machine efficiency factor)

UNIT3

Unit 3 which machine is located by Lahore in “Pandokey”

Machine Utilization Graph UNIT3

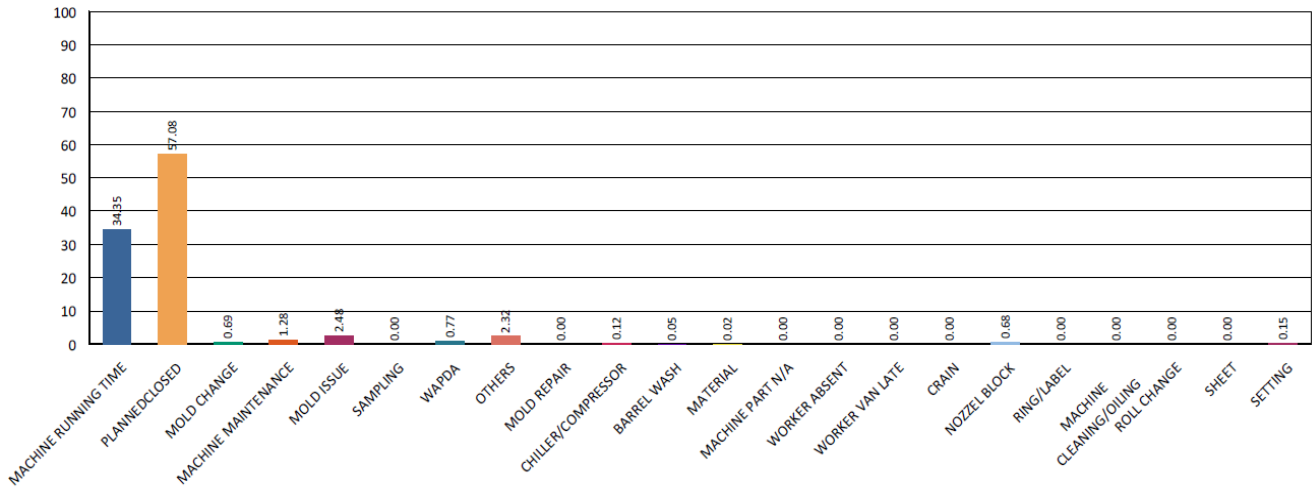


Figure 7(UNIT3 graph machine Utilization)

Machine Code	Machine Name	MACHINE RUNNING TIME	PLANNED CLOSED
UNIT3			
FPD			
M-0110	M-19-FPD Leinfa 190 Ton	0.84	99.12
	Average :	0.84	99.12
	Total:	0.84	99.12
SHAMPOO HALL TS			
M-0092	BIM01- FCS 420 Ton Bi-Injection	55.42	36.23
M-0093	BIM02- FCS 420 Ton Bi-Injection	55.85	32.09
M-0094	BIM03- FCS 420 Ton Bi-Injection	25.28	60.90
	Average :	45.52	43.07
	Total:	136.55	129.22
	Grand Total :	137.39	228.34

Figure 8(UNIT3 Machine running time and planned closed)

Mostly machine is closed which percentage is 57.06% and machine running time is 34.35% do we analysis mostly

machine is closed due to different factor which is measure and shown in [Figure 8] and [Figure 7].

Same case UNIT3 have 2 location open, one is FPD and second is SHAMPOO HALL TS.

- FPD average running time is 0.84 and plans closed is 99.12

- SHAMPOO HALL TS average running time is 136.55 and plans closed is 129.22

Unit 4 Efficiency

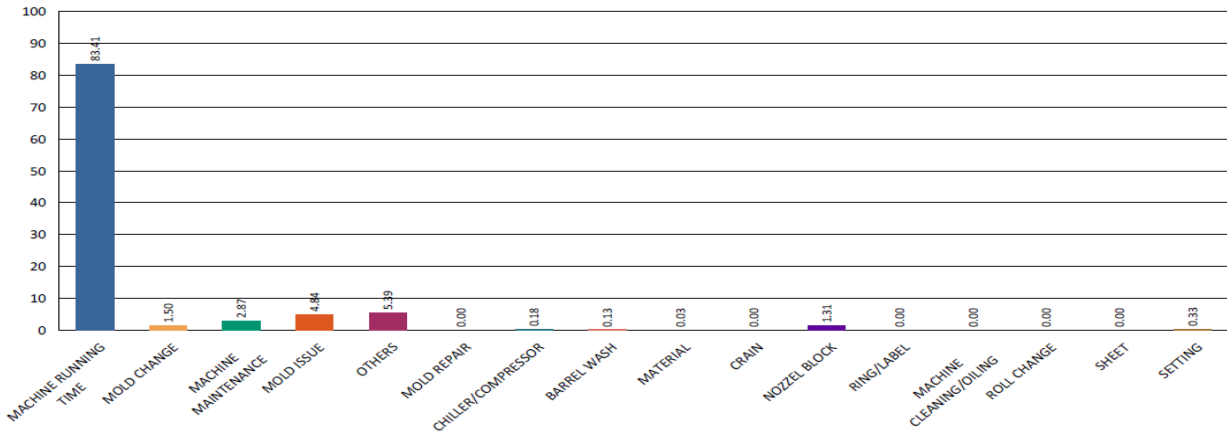


Figure 9(UNIT4 Machine Efficiency Graphical machine efficiency factor)

UNIT4

UNIT5RYK

Unit 4 is closed because no order for sale is required. So that why unit3 is not work.

This unit is located in “Reham yar khan”

Average :	58.69	35.97
Total:	1,584.73	971.18
Grand Total :	1,584.73	971.18

Figure 10 (UNIT5RYK Machine running time and planned closed)

Machine Utilization Graph UNIT5RYK

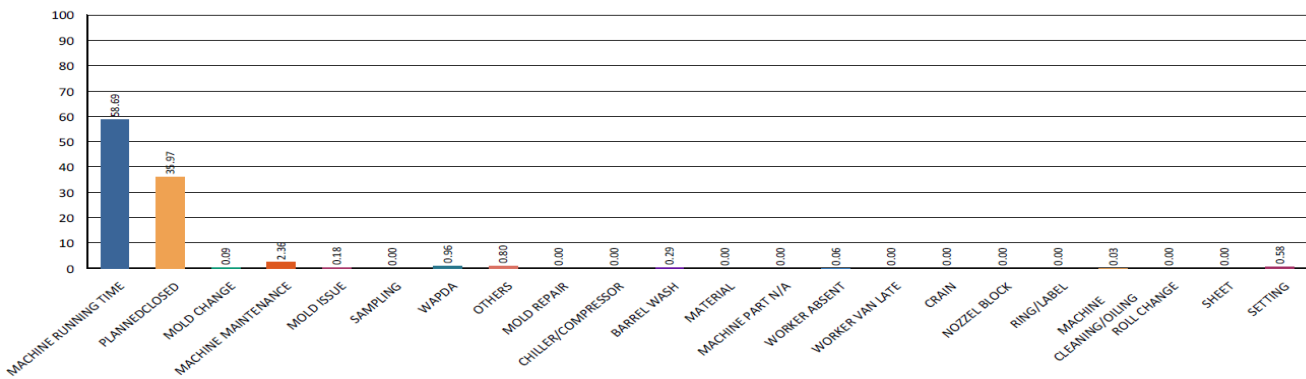


Figure 11(UNIT5RYK graph machine Utilization)

Unit5RYK mostly work and its 58% work and 35% closed as shown in [Figure 11] and [Figure 12].

UNIT5RYK Efficiency

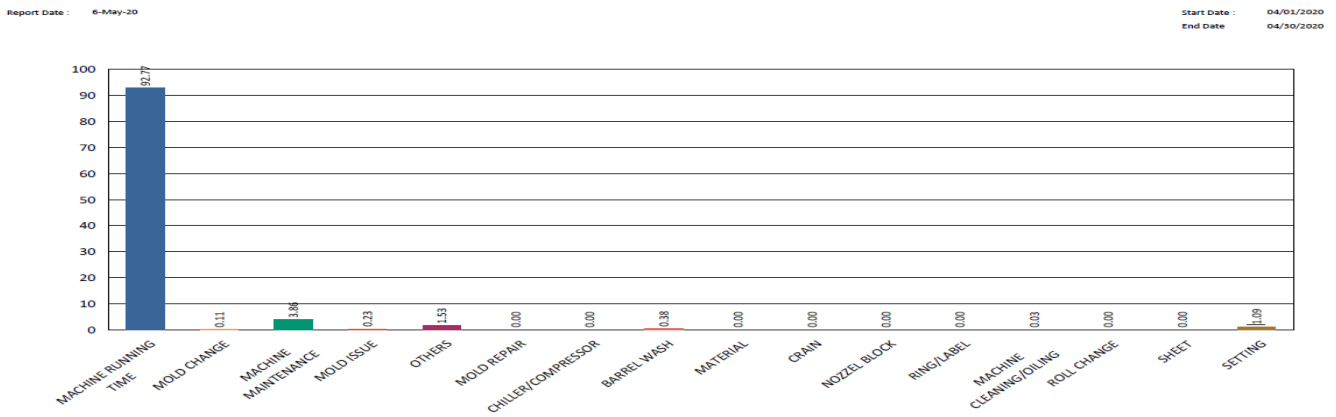


Figure 12(UNIT5RYK Machine Efficiency Graphical machine efficiency factor)

Conclusion

Using analysis of machine efficiency and utilization we find attributes which is directly effect in machines .Running time of machine can be increased if we overcome that factor which is direct hit, if machine running time is increased then it also increases our sales and our revenue increase, our production is increase.

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