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Optimization or Improve the Ring Frame Efficiency by Utilizing Effective Auto-Doffing System

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ABSTRACT

This project work deals for improvement in ring frame efficiency by effective utilizing auto doffing device. The following parameters related to doffing device, more doffing time, Gripper failure, high end breakage rate, Start-up breakage. So by controlling the above parameters in auto doffing and controlling and maintaining the air pressure setting and doffer holding time. This project also deals the study of maximum utilization of machine to improve the efficiency of Auto doffing and machine efficiency is defined as the ratio, expressed as a percentage of the actual production per shift to the maximum possible production, if each spindle has work continuously for the entire duration of the shift. By controlling doffing parameters this is helpful for improvement in ring frame efficiency as well as productivity. This project study is taken for air pressure setting and doffing time. Results are collected of before and after changes Following Parameter settings.

Key factors: - doffing time, gripper failure, end breakage rate & start up breaks

INTRODUCTION

Ring spinning has been in existence since its introduction by an American, John Thorpe in 1828 and then Jenks developed the traveler that rotated on the ring. These two steps opened the door to our current ring spinning technology that is the standard of yarn manufacture. Other spinning technologies have been developed that are higher in productivity, but are lacking in many aspects of the yarns desirable characteristics.Ring spun yarn has retained its position as the system that produces the strongest, finest, softest and most lustrous yarn and fabric. To spin high quality yarn at high spindle speeds the fiber and its preparation have to be controlled to high standards. The ring frame cannot spin superior yarn from inferior material or roving.

EXPERIMENTAL WORK

Doffing Time Trials: 1st

Doff No.	M/C No.	Total Time (Min.)	Doff. No.	M/C No.	Total Time (Min.)
1	66	4.13	14	78	3.33
2	67	3.96	15	68	3.21
3	65	3.28	16	65	3.15
4	70	4.15	17	67	3.26
5	65	3.26	18	68	3.31
6	67	3.83	19	69	3.48
7	72	3.13	20	64	3.61
8	80	3.36	21	68	3.73
9	80	3.78	22	71	3.05
10	72	4.02	23	80	4.23
11	75	3.85	24	80	3.71
12	79	7.53	25	67	3.53
13	79	3.01			

Table 3: Doffing Time Trial-1 Trials: 1st

Average Doffing time is: - 3.97 min.

1. Then first we have observed that the doffing bar is activated at the beginning of doff. When winding length is 50 meter remains.
2. After that we have set the 35 meter length at the previous 50 meter length. When the doffing bar is activated at the beginning at the doff.

Trials: 2nd

Doff. No.	M/C No.	Total Time (Min.)	Doff. No.	M/C No.	Total Time (Min.)
1	78	3.37	14	73	3.91
2	80	3.32	15	68	4.09
3	67	4.01	16	64	3.78
4	66	3.99	17	69	3.92
5	63	3.13	18	71	4.01
6	69	3.53	19	75	3.39
7	65	4.23	20	77	3.28
8	63	3.39	21	69	3.25
9	79	3.71	22	72	4.36
10	75	3.61	23	71	3.37
11	70	3.48	24	78	4.31
12	77	3.15	25	68	4.37
13	68	3.33			

Table 4: Doffing Time Trial-2

Trials: 2nd

Average doffing time is 3.40 minutes.

1. After that we have set the 40 meter length at the previous 35 meter length. When the doffing bar is activate at the beginning of the doff.

Trials: 3rd

Doff No.	M/C No.	Total Time (Min.)	Doff No.	M/C No.	Total Time (Min.)
1		3.13	13		3.12
2		3.05	14		3.12
3		3.26	15		3.09
4		2.95	16		2.81
5		2.73	17		2.92
6		2.27	18		3.09
7		3.03	19		3.03
8		2.98	20		2.99
9		2.78	21		2.88
10		3.01	22		3.38
11		2.91	23		2.79
12		2.90	24		2.93
			25		2.92

Table 5: Doffing Time Trial-3

Trials: 3rd

Average doffing time is 3.31 minutes.

1. Due to which the pressure and time required for doffing bar holding is reduced.

Gripper Failure

Trials: 1st

Doff No.	M/C No.	LHS Total Gripper Failure	RHS Total Gripper Failure	Doff No.	M/C No.	LHS Total Gripper Failure	RHS Total Gripper Failure
1		07	06	14		05	02
2		04	---	15		04	03
3		05	04	16		04	03
4		06	07	17		04	05
5		07	06	18		03	04
6		06	06	19		04	03
7		---	04	20		03	02
8		05	04	21		04	01
9		07	08	22		04	04
10		04	04	23		05	04
11		04	04	24		05	02
12		04	03	25		02	04
13		04	05				

Table 6: Gripper Failure Trial-1

Gripper Failure Percentage

= Total gripper failure / Total no. of doff
= 208 / 25
=Avg. gripper failure.
=8.32.
=Avg. gripper failure * 100 / No. of spindle
= 8.32 * 100 / 1200
=Answer * Total no. of m/c
= 0.69 * 16
= Answer
= 11.09 %

1. Then we have checked the gripper air pressure on M/C no. 75.
2. Then we have change the gripper air pressure set on 4 bar at the previous 5 bar setting.

Trials: 2nd

Doff No.	M/C No.	LHS Total Gripper Failure	RHS Total Gripper Failure	Doff No.	M/C No.	LHS Total Gripper Failure	RHS Total Gripper Failure
1		07	06	14		05	02
2		04	---	15		04	03
3		05	04	16		04	03
4		06	07	17		04	05
5		07	06	18		03	04

6		06	06	19		04	03
7		---	04	20		03	02
8		05	04	21		04	01
9		07	08	22		04	04
10		04	04	23		05	04
11		04	04	24		05	02
12		04	03	25		02	04
13		04	05				

Table 7: Gripper Failure Trial-2

Trials: 2nd

= 146 / 25
= 5.84
= 5.84 * 100 / 1200
= 0.48 * 16
= 7.78 %

1. Then we have change the gripper air pressure set on 4.5 bar at the previous 4 bar setting.

Trials: 3rd

Doff No.	M/C No.	LHS Total Gripper Failure	RHS Total Gripper Failure	Doff No.	M/C No.	LHS Total Gripper Failure	RHS Total Gripper Failure
1		01	---	14		01	01
2		---	---	15		01	01
3		02	03	16		---	01
4		---	01	17		01	01
5		01	02	18		---	---
6		01	03	19		02	02
7		02	---	20		02	---
8		---	---	21		---	02
9		01	02	22		---	---
10		02	01	23		03	02
11		---	01	24		02	01
12		01	01	25		01	---
13		02	---				

Table 8: Gripper Failure Trial 3

Trials: 3rd

= 51 / 25
= 2.04
= 2.04 * 100 / 1200
= 0.17 * 16
= 2.72 %

1. Then 3rd setting 4.5 bar, the gripper failure result is better than previous 4 bar & 5 bar settings.

RESULTS & DISCUSSION

Doffing Time for Different Settings

Trials	Doffing Time (Min.)	Length Remains For Doff.
1	3.97	50
2	3.40	35
3	3.31	40

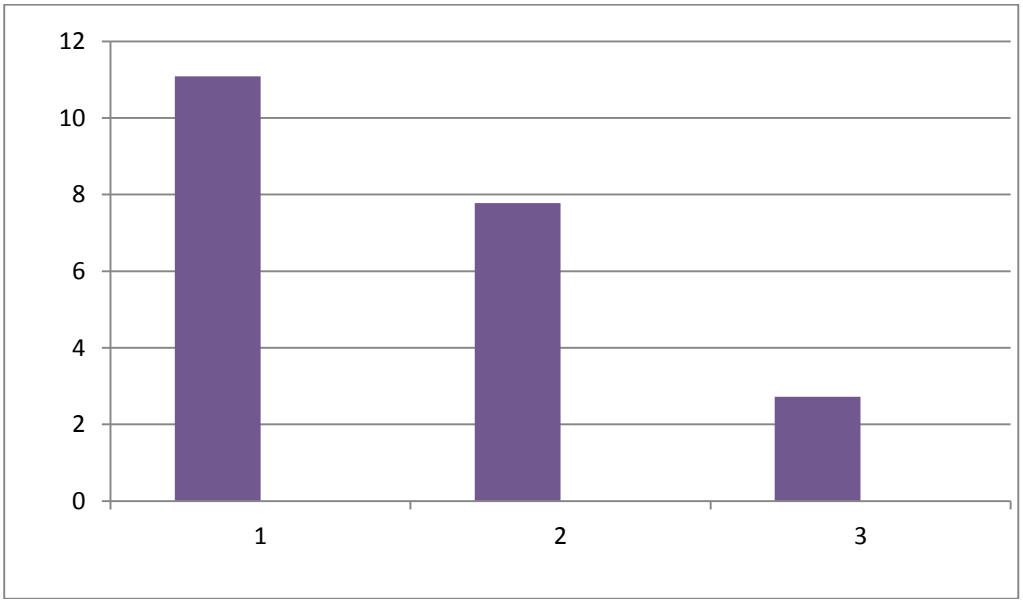
Table 9: Doffing Time Result

Gripper Failure for Different Air Pressure Settings

Trials	Gripper Failure (%)	Air Pressure Setting.
1	11.09	5 bar
2	7.78	4 bar
3	2.72	4.5 bar

Table 10: Gripper Failure Result

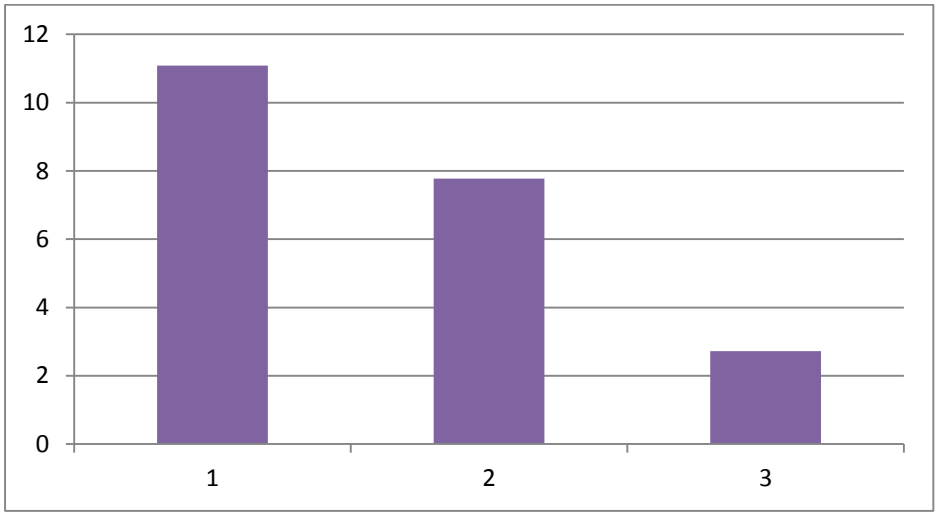
PROJECT TRENDS



Graph 1: Doffing Time Graph

Trials: 1st50 meter length remains.
Trials: 2nd 35 meter length remains.
Trials: 3rd 40 meter length remains.
Inference: The Graph 1 it shows that at 40 meter length remains for doffing time result are as compare to trials 1 & 2, this happen due to the pressure and time required for doffing bar holding is reduced.

PROJECT TRENDS



Graph 2:Gripper Failure Graph

Trials: 1st 5 bar air pressure.
Trials: 2nd 4 bar air pressure.
Trials: 3rd 4.5 bar air pressure.
Inference: The Graph 2 it shows that at 4.5 bar air pressure the gripper failure are less as compare to trials 1& 2,this may happen due to the pressure and time required for doffing bar holding is reduced.

CONCLUSION

In case of Doffing time, Gripper failure, End breakage rate, Start-up breakage and machine efficiency losses are reduced and efficiency increases by respectively after implementing the remedial measures.
It is concluded that for above parameters implementation of remedial measures gives better efficiency results.

Parameters	Efficiency Improved.
For doffing time (min.)	0.66 minutes per doff.

Table 11: Final Result for Doffing Time

Parameters	Reduction For Gripper Failure.
For gripper failure (%)	8.37 %

Table 12: Final Result for Gripper Failure

This project deals the study of maximum utilization of machine to improve the machine efficiency as well as doffing efficiency, griper failure percentage; more end breakage rate and start up breakages are reduced. This project is totally related with maintenance.

- Before taken action the ring frame efficiency was 88%.
- And production of the department at 88% efficiency is 299.27 kg/shift for 1 m/c.
- Then after reducing the doffing time, gripper failure & end breakage rates the m/c efficiency increases to at 91% there is 3% improvement in efficiency.
- The production of the department at 91% efficiency is 309.47 kg/shift for 1 m/c.
  The production increases to
  309.47 - 299.27 = 10.2 kg/Shift
  10.2 * 3 = 30.6 kg/Day
  30.6 * 30 = 918 kg/Month
  918 * 12 = 11016 kg/Year

REFERENCES

1. W. Klein, A practical guide to opening carding, volume-2, The Textile Association Manchester, 1994.
2. A. R. Khare, Elements of Ring frame and Doubling.
3. The textile association (India) A.T.A. Examination. 1996-2000.