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Reduction in ruffledness in Usha Martin Ltd. Ranchi

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***Abstract*:- Manufacturing industry is the backbone of economy of nation. Due to globalization there is stiff competitions in the industry for producing the quality products with reduce cost and increase quality level. As USHA MARTIN is the manufacturing company of wire and wire rope, therefore number of manufacturing process occurs like as pickling, patenting, galvanizing, ,wire drawing ,stranding. During the pickling process the cleaning and phosphate coating process occurs on the rod. During the patenting and galvanizing process heat treatment and zinc coating process occurs. During the wire drawing process first fall out occurs. Wire breakage and ruffledness these two are the major reason of first fall out. Wire breakage is simple breaking of wire during the wire drawing process when machine is running. Ruffledness is non uniform layering of wire in the spool or bobbin. These two play major role in reduction in production, scrap and financial loss of company. On average the loss due to ruffledness is 92 bobbins per month this effect loss due to production is 4mt/month and scrapes generation is 0.8mt/month in wire mill and stranding. The total average loss of the company is approximately 2 lacks per month. Due to Ruffledness the quality of product is low. In this chapter we will discuss the cause of Ruffledness and how to remove the Ruffledness.**

Keywords: Bobbin, Galvanizing, Ruffledness, Wire drawing, wire breakage

I. INTRODUCTION

In USHA MARTIN the measure region for productivity and financial loss is ruffledness. Ruffledness is basically the non uniform layering of wire when binding in bobbin. It is the measure region of wire breakage and scrape. Due to ruffledness the strengthening of the wire decreases and when the wire drawing process takes place the wire breakage occurs. Due to breakage of wire all thee material goes for the scrap and this become the financial loss of the company. All the measure region of ruffledness and all the suitable steps to control the ruffledness are discussed in this chapter.

II. OBJECTIVE

The main objective of the project is to reduce the no of ruffled bobbin up to 80~90% and scrap. The second main objective is to reduce financial loss of the company by the proper utilization of resources.

III. OBSERVATION

In the machine running condition the layering of wire when binding in the bobbin is not in linear condition, it gets irregular shape this is the cause of braking of wire or reduction in production, the ruffled bobbin shown in the following fig.

Fig.1 Ruffled bobbin

IV. DATA COLLECTION

All the reasonable data by which ruffled occur are measured with the help of filler gage, vernier caliper, spirit level, dial gage, and measuring tape. All data are shown in the following table.

***1*).Traverse wire spooling system measurement**
Table 1 shows the measurement of traverse/ wire spooling system in wire mill, basically it shows the clearance between the rod and bearing. the maximum clearance between rod and bearing should be 0.1mm.All the table 1 data measured by the filler gage and vernier caliper

TABLE1 TRAVERSE WIRE SPOOLING SYSTEM MEASUREMENT

m/c no	Rod dia(R1)mm	Clearance Between Rod and Traverse Bearing/Bush (L-1) Micron	Rod dia(R2)mm	Clearance Between Rod and Traverse Bearing/Bush (L-2) Micron
W13J	20.08	0	20.08	0
WET-V	38.06	300	38.13	300
W12N	29.79	More than 1000	29.90	More than 1000
WHSW1	19.88	200	19.90	300
W16C	24.87	0	29.90	500
W18H	38.17	600	38.17	600

W12D	37.96	400	37.96	400
WETU	38.15	200	38.16	200
W22C	38	800	38.1	900
W12M	38.07	300	38.07	300
W14B	38.09	300	38.15	300
W17C	20.05	0	20.05	0
W16B	20.05	0	20.05	0
W12P	25.47	0	29.44	More than 1000

2). Pintle and Adopter deviation

Table 2 shows the deviation in pintle and adopter of head stock and tail stock of spooler. The maximum acceptable deviation is 10 micron. For the measurement this data we use dial gage as a measuring device. we take the reference base of the spooler

TABLE2:MEASUREMENT OF PINTLE AND ADOPTER DAVITION

M/C NO	HEAD STOCK(mm)		TAIL STOCK(mm)	
	PINTLE	ADOPTER	PINTLE	ADOPTER
W13J	0.68	0.45	4.08	2.00
WETV	0.77	0.00	0.88	0.00
W12N	0.20	0.10	0.81	0.43
WHSW1	3.79	0.85	1.45	3.14
W16C	2.68	2.06	1.10	0.00
W18H	0.50	0.05	0.00	0.00
W12D	2.63	0.55	2.49	1.25
WETU	0.19	0.27	1.80	0.57
W22C	3.00	2.11	0.00	0.00
W12M	5.10	1.10	0.00	0.20
W14B	0.49	0.00	2.13	0.70
W17C	0.40	0.41	4.00	5.20
W12P	1.40	2.20	0.28	0.00

3). Vertical axis alignment

Table 3 shows the measurement of vertical axis alignment. The maximum acceptable alignment is 0.70mm.The spirit level and true bar are used to measure this measurement .The formula used for calculation is Triangle ratio formula

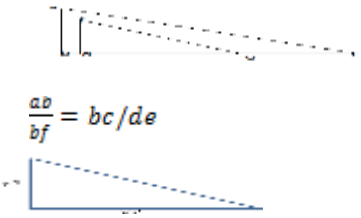

TABLE3:VERTICAL AXIS MEASUREMENT IN (mm)

	HEAD STOCK		TAIL STOCK	
M/C NO	Y1	Θ	Y1	Θ(degree)
W13J	0.75	0.18	–	–
WETV	–	–	0.40	0.10
W12N	0.63	0.15	–	–
WHSW1	0.98	0.23	–	–
W16C	–	–	0.63	0.15
W18H	–	–	0.75	0.18
W12D	0.39	0.09	–	–
WETU	–	–	0.78	0.19
W22C	0.62	0.15	–	–
W12M	–	–	0.66	0.16
W14B	0.62	0.15	–	–
W17C	–	–	0.6	0.14
W12P	–	–	0.73	0.18

4). Distance between traverse pulley and spool

Table 4 shows the measurement of distance between traverse pulley and spool. This measurement is measured with the help of measuring tape. We measure the two side with help of measuring device and we calculate the third side and angle with the help of formula of triangle rule

$$a^2 = b^2+c^2$$

tanφ= perpendicular/base

These two formulas are use to measure the distance between traverse pulley and diameter

TABLE-4:DISTANCE BETWEEN TRAVERSE PULLEY AND SPOOL

M/C NO	HORIZONTAL DISTANCE	VERTICAL DISTANCE	ANGULAR DISTANCE
W13J	136.1	723.9	736.6
WETV	692.6	596.9	533.4
W12N	166.3	533.4	558.8

WHSW1	431.8	660.4	787.4
W16C	685	190.5	711.21
W18H	516.2	660.4	838.2
W12D	408.7	381	558.2
WETU	397.5	355.6	533.4
W22C	304.8	457.2	558.8
W12M	393.44	431.8	584.2
W14B	304.8	406.4	508
W17C	268.7	685.8	736.6
W12P	692.6	596.9	914.4

V. PROBLEM FORMULATION

TABLE-5 PROBLEM FORMULATION

M/C NO	Problem found with respect to standerd measurment			
	Clearance b/w rod and bearing	Pintle and adopter daviation	Vertical axis alignment	Distance b/w traverse and rod
W13J	No clearance	More daviation	More then standerd	more
WETV	More clearance	More daviation	Less then standrd	more
W12N	More clearance	More daviation	Less then standrd	more
WHSW1	More clearance	More daviation	More then standerd	more
W16C	No clearance	More daviation	Less then standrd	more
W18H	More clearance	More daviation	More then standerd	more
W12D	More clearance	More daviation	Less then standrd	more
WETU	More clearance	More daviation	More then standerd	more
W22C	More clearance	More daviation	Less then standrd	More
W12M	More clearance	More daviation	Less then standrd	More
W14B	More clearance	More daviation	Less then standrd	More
W17C	No clearance	More daviation	Less then standrd	More
W12P	No clearance	More daviation	More then standerd	More

VI. METHODOLOGY

After collecting the all data we have seen all the machine has number of problem. Methodology is the process by which we can solve all the problem found in the machine. Folllowing steps are use in the solving the problem.

1)-why-why analysis

2)- Rout cause analysis

3)-Implimetation

TABLE-6 WHY-WHY ANALYSIS

Problem	Region	Why-1	Why-2
Ruffledness	1).More clearance between rod and bearing of traverse	1)-bearing problem 2)rod dia not standerd	Bearing has been rubbished Rod has been rubbished
	2).pintle and adoptor daviation	Pintle damage	Adoptor not has been connected in proper way and pintle has been rubbished
	3).verticle axis alignment	1)Not proper alignment at the time of setting 2)damage of pintle	Pintle has rubbished and not connected in proper way
	4).distance between trverse pulley and spool	Setting problem	Due to traverse bearing and rod damage the standerd distance between pulleyand spoolhas been daviated

- The table-7 shows the rout cause and implimentation of the ruffledness.

TABLE-7 ROUT CAUSE ANALYSIS AND IMPLIMENTATION

Problem	Rout-cause	Implimentation
Ruffledness	Bearing has been rubbished	Bearing has been changed
	Rod has been rubbished	Rod has been changed
	Adoptor not has been connected in proper way and pintle has been rubbished and not connected in proper way	Connected adoptor in proper way and pintle has been changed and connected well
	Due to traverse bearing and rod damage the standerd distance between pulley and spool hasbeen daviated	After changing the rod and bearing of traverse set the pulley and spool at standerd distance

VII. CONCLUSION

As in initial we absorbed the ruffled bobbin produce in Usha Martin per month is 92 and now after all above analysis and steps involves in the implementation the ruffled, no of ruffled bobbin found is 8~10.This ruffled bobbin is consider as human error or natural mistakes. This reduces financial loss and scrap of the company. The total financial loss of the company 85% may be reduce.

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