REJECTION REDUCTION IN RIVETING MACHINE

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ABSTRACT

Rivet is a one type of permanent joint used in the production process. To increase the productivity large rejection identified in riveting section. In the riveting section it is observed that rejection rate is high in auto feed rivet machine due to the misplaced rivets in pocket at the time of riveting. Rivet from guide path enters into the pocket due to gravitational force. Pocket is the place where the rivet gets positioned and inserted to the back plate and lining. In this project the productivity is increased by reducing the misalign rejection (waste) of rivets at the time of riveting. This is achieved by introducing cushion effect in auto feed riveting machine by open coil helical spring. It is inserted in the adjustable screw which connects the pocket with the machine. After introduction spring the process is monitored and spring is fixed based on trail and error basis. In each trail the specifications of spring is modified and observations are done to meet required cushion effect. From this the misplacement of rivets at the time of riveting is reduced and this will result in increasing of productivity.

KEY WORD:productivity, riveting machine, spring, misplaced rivet, rejection rate, trail and error method.

INTRODUCTION

Riveting machine is one of the most important devices in production industry. This riveting machine is used to make permanent joints.In the riveting machine rejection of back plates and linings due to the misplaced rivets at the time of riveting.It affects the productivity of the product.Pocket is the place where the rivet gets positioned and inserted to the back plate and lining at the time of riveting. Rivet from guide path enters into the pocket due to gravitational force that time there is chance of occurring misplaced rivet. The scope of this project is to increase the productivity and by reducing the misalign rejection (waste) of rivets at the time of riveting. This is achieved by introducing cushion effect in machine which is been created by spring. The flow of rivet, contraction and expansion of pocket and mechanism of the punch is unaltered. The solution for this problem does not affect the cycle time.

DESCRIPTION

To reduce theserejection due to rivet in the auto feed rivet machine a spring is

introduced in the machine which gives the cushion effect. Due to this cushion effect the rivet is placed correctly in the pocket. So that misalignment of rivet is tends to be reduced.We choose the open coil helical spring with open end and dimensions of the spring is assumed at first and then it is accepted by trail and error method.Based on trail and error method we done four trails and in each trail the spring parameters such as stiffness of the spring, deflection of spring, and force exerted is calculated.

A.Initial observation:

Without making any changes in auto feed rivet machine, we observed it and understood the construction and working of the auto feed rivet machine.

TABLE: **INITIAL OBSERVATION**

Day	No. of brake shoes processed	No. of brake shoes accepted	No. of brake shoes Rejected
1	290	268	22
2	282	258	21
3	305	280	25
4	317	291	20
5	281	258	23
Total	**1475**	**1355**	**120**

% of Reduction = 8.13 %

B.Trail 1

In trail one the spring with two coils is inserted at the left side adjustable screw which holds the pocket and observed the riveting process for duration of five days

and collected the data about the rejection in auto feed riveting machine.

The percentage of reduction remains approximately equal to unaltered one. It is understood that the cushion effect given to pocket is very less and not enough to meet our requirements. So we move on to Trail 2

TABLE: **TRAIL 1 OBSERVATION**

Day	No. of brake shoes processed	No. of brake shoes accepted	No. of brake shoes Rejected
1	292	271	21
2	309	286	23
3	279	257	22
4	287	265	25
5	312	289	23
Total	**1479**	**1365**	**114**

% of Reduction = 7.71 %

C. Trail 2

In trail two the spring with three coils is inserted at the left side adjustable screw which holds the pocket and observed the riveting process for duration of five days and collected the data about the rejection in auto feed riveting machine due to rivets.

TABLE **TRAIL 2 OBSERVATION**

Day	No. of brake shoes processed	No. of brake shoes accepted	No. of brake shoes Rejected
1	307	294	17

2	281	267	14
3	279	264	16
4	315	300	15
5	289	275	14
Total	**1471**	**1395**	**76**

% of Reduction = 5.16 %

The percentage of reduction begins to reduce. It is understood that the cushion effect given to pocket is moderate and so we decided to increase the no. of coils further to satisfy our requirements. So we move on to Trail 3

D. Trail 3

In trail three the spring with four coils is inserted at the left side adjustable screw which holds the pocket and observed the riveting process for duration of five days and collected the data about the rejection in auto feed riveting machine due to rivets.

TABLE: **TRAIL 3 OBSERVATION**

Day	No. of brake shoes processed	No. of brake shoes accepted	No. of brake shoes Rejected
1	298	289	9
2	287	279	8
3	309	303	6
4	277	267	10
5	306	297	9
Total	**1477**	**1435**	**42**

% of Reduction = 2.84 %

The percentage of reduction reduces to reasonable amount. It is understood that

the cushion effect given to pocket is somewhat enough. But in order to reduce further, we move on to Trail 4.

E. Trail 4

In trail four the spring with five coils is inserted at the left side adjustable screw which holds the pocket and observed the riveting process for duration of five days and collected the data about the rejection in auto feed riveting machine due to rivets. Percentage of reduction increases suddenly. It is understood that the cushion effect given to pocket is exceed the required level and so rejection rate increases.So we decided to drop the trail 4

TABLE: **TRAIL 4 OBSERVATION**

Day	No. of brake shoes processed	No. of brake shoes accepted	No. of brake shoes Rejected
1	286	265	21
2	303	278	25
3	274	265	9
4	297	278	19
5	310	293	17
Total	**1470**	**1379**	**91**

% of Reduction = 6.19%
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F. Overall comparison

Overall Comparison
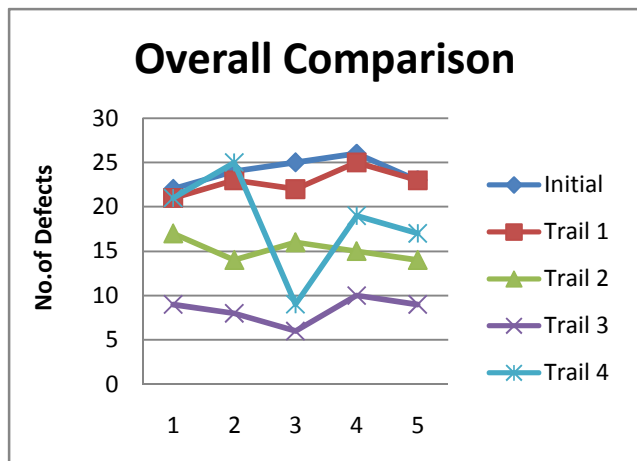
CONCLUSIONS

Based on the four test trail we came to a conclusion that the spring which we used at third trial is suited to solve our problem. This spring contains the 4 no. of active coils which produces the required cushion effect in the auto feed rivet machine. When using this 4 coil spring we achieved a reduction percentage of 2.83%. This shows that productivity has been increased to required level by reducing the in process rejection especially in the riveting machine. To achieve this level continuously a proper maintenance should be carried out throughout the production process. It includes proper lubrication. This spring is covered with washers on both sides of the spring for correct holding of spring.

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