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Experimental Studies on Reduction of Cyclic Time for Drilling Processfor Assembly Method in Diffuser

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ABSTRACT
Our paper focuses on the cycle time reduction in drilling elbow for diffuser assembly. Multi drilling elbow are the main part diffuser assembly.Normally drilling the elbow exceeds the time drawn due to various reasons. Mainly due to setting time of the multi drilling. This result in customer dissatisfaction loss of good will and profit fit of the company. This project studies the various activities involved in drilling the elbow and the time consumed of multi drilling elbow. It is all so presents some valuable suggestions to reduce the cycle in the drilling the elbow. On completion of project there is substantial save in time and money as well as increase in productivity and reduce the operator fatigue level. Increase in business potential for the manufacturer.

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I. INTRODUCTION

In this there are the way to reducing the cycle time. Majorly reducing the job setting for the drilling operation of the multi drilling elbow.We are introducing the universal dividing head. Drilling universal head is one of the fixtures. This is used to holding the multi drilling elbow to done drilling operation on the circumference of that elbow. The main objectives of this project are to reduce the cycle time in multi drilling elbow for diffuser assemble and to increases productivity. Aim to maintaining the quality of work pieces and maintaining the accuracy. The diffuser is assembly in site. So, the quality and accuracy of the multi drilling elbow. Study of technical details and working principles were done in depth and elaborate.

II. PRODUCT DEFINITION

Mixing sphere is one of the major assemblies of Once Through Super Critical boiler (OTSC). Mixing sphere consists of a pressure part sphere with a vertical inlet for the hot water from Separator/Separator storage tank at top and mixed water outlet at bottom. The cold water from feed water line enters radially through a nozzle connection on the side of the sphere. The sphere also has perforated plate internals to act a screen to protect the pump from debris. The sphere design is optimized for low-pressure drop in the recirculation line particularly for the little feed water flow.A diffuser is the mechanical device that is designed to control the characteristics of a fluid at the entrance to a thermodynamic open system. Diffusers are used to slow the fluid's velocity and to enhance its mixing into the surrounding fluid. In contrast, a nozzle is often intended to increase the discharge velocity and to direct the flow in one particular direction. Frictional effects may sometimes be important, but usually they are neglected. However, the external work transfer is always assumed to be zero. It is also assumed that changes in thermal energy are significantly greater than changes in potential energy and therefore the latter can usually be neglected for the purpose of analysis.In this diffuser assembly consist of the three parts (or) total diffuser assembly is separated in to three various parts. This has two straight pipes in this one pipe having the multi holes on the circumferences. One of the main middle parts is multi drilling elbow it having the number of holes.

- Flared pipe D219 x 8.18 matching the ID of recirculation nozzle
- A 45 Deg SR ELL D219.1 x 8.18 (having 300 holes of Dia. 10 mm drilled radically towards the Elbow centre with no holes on compression zone of Elbow.
- Pipe D219 x 8.18– Closed pitch holes of dia. 10 mm drilled radial with no hole on axes facing the sphere wall.

As the name implies this elbow has the several holes in its circumference. This is middle part of diffuser assembly. We are going to make drilling on the 45^{o} Multi elbow. This elbow has the 300 holes towers both the axis (tangential axis and

rotational axis). That 45^0 elbow are divided in towel datum lines.

III. EXISTING SYSTEM

The current method employs a v – clamp for holding the multi drilling elbow. The v – clamp made of hardened stainless steel holds the job tightly to ensure proper drilling.

In the current process, it employs a redial drilling machine with a 10mm drill bit attached to it. The multi drilling elbow is clamped to the bed through a v-clamp. The work piece is held tightly through bolts clamped on either side to ensure. The job has to be unclamped for each hole to be drilled and reset for further drilling. This is for increases the total time for drilling the component.

In this worker should be in alert in all times. If any mistake is carried that job is totally through scrap. Here everything is waste without alert during the operation and also job setting.

Problem definition

During Drilling Of Elbow, Following Steps Are Involved:All The 300 Holes Have To Be Located Exactly And Pointing Towards Centre. For Maintaining That We Have.To Do Setting For Each And Every Hole.Setting Is Required On Both Rotational And Translational Axes.This Requires More Concentration And Alertness. The Fatigue Level Of The Operator Increased.

IV. MODIFIED METHOD:

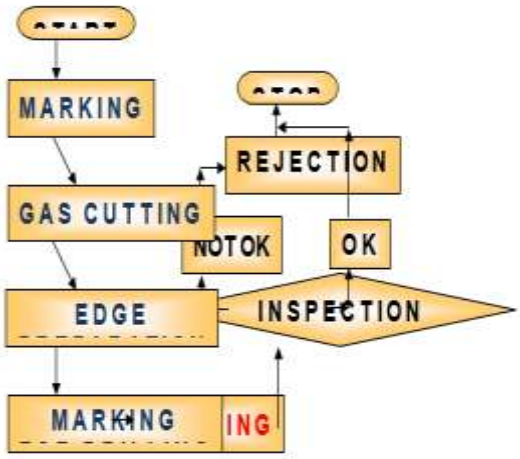
- At first job is marked for edge preparation and drilling
- Edge preparation for the elbow is carried out in horizontal boring.
- The job is held in the indexing head with the support of screw jack.
- By using the swiveling arrangement of indexing head the job can be easily rotated for drilling.
- The dimension and degree is accurately maintained . There by enabling all the 300 holes are drilled radially.
- Setting time for each and every hole is largely reduced and thus more productivity is achieved.

Developing the solution:

PLAN :To hold the job in universal dividing headDO : To select the proper universal dividing head

CHECK: After completion, we checked all the 300 holes. All the holes are found O K

ACT : Use the new modified method to others



V. CYCLE TIME CALCULATION

Existing system

SL	WORK ORDER	DU NO	TIME IN HRS			
			JOB SETTING	DRILLING	MARKING	EDGE PREPARATION
1	1701 24 806	001	24	8	1	2
2	1702 24 806	001	24	8	1	2
3	1703 24 806	001	24	8	1	2
TOTAL			72 HR	24 HRS	3 HRS	6 HRS
AVERAGE			24 HR	8 HR	1 HR	2 HRS
PERCENTAGE			68.57%	22.85%	2.81%	5.71%

Modified System

SL	WORK ORDER	DU NO	TIME IN HRS			
			JOB SETTING	DRILLING	MARKING	EDGE PREPARATION
1	1701 24 806	001	8	8	1	2
2	1702 24 806	001	8	8	1	2
3	1703 24 806	001	8	8	1	2
TOTAL			24 HR	24 HRS	3 HRS	6 HRS
AVERAGE			8 HR	8 HR	1 HR	2 HRS
PERCENTAGE			22.85%	22.85%	2.81%	5.71%

VI. RESULT COMPARISON

No	BEFORE	AFTER
1	More cycle time (35 HRS)	Reduced (19 HRS)
2	Setting is difficult	Setting is simplified.
3	Drilling towards center is difficult	Foolproof method is established
4	Setting is required on both the axes	Setting is required only in translational axis
5	Maintaining the degree is difficult	Accurate degree is maintained.
6	Fatigue to operator	Operator delight
7	Less productivity	Productivity is increased

VII. CONCLUSION:

Our paper cycle time reduction in drilling elbow for diffuser assembly deals with the methods used at present and how to reduce the cycle time and fatigue level of operator. And also increase the quality of the product. For that all the activities used in drilling the elbow are analyzed .first and foremost PDCA cycle concept is dealt in this paper to reduce the cycle time. The major time taken are due to job setting by using v clamp. If the job setting is done in the universal dividing head, contrary to the v-clamp to hold the elbow at present, then setting time is more there will be a setting time is play the major role in overall cycle time. There are implementing this job setting will be reduce in massively.

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