



RCA Name Manufacturing NCR Example
 Report Number 522012
 Report Date 5/2/2012
 RCA Owner John Smith

Root Cause Analysis Report

Problem Statement

Focal Point Non-Conformance Reported on Brass Tubesheet 1324

When

Start Date 5/2/2012 End Date 5/3/2012
 Start Time N/A End Time N/A
 Unique Timing During increased production schedule, After 11 straight 12 hour night shifts,

Where

Location Morrow Corporation, 4413 Hwy 67 Laporte, TX 77572
 Location Machine shop, boring mill # 3, cnc drill # 2, radial drill # 2

Actual Impact

		Cost
Safety	None	\$0.00
Customer Service	Late production schedule concession.	\$1,000.00
Revenue	Lost on-time production bonus.	\$6,000.00
Cost	Scrapped brass.	\$1,400.00
Cost	Overtime Labor.	\$2,200.00
Cost	Retooling and Setup.	\$500.00
	Actual Impact Total:	\$11,100.00

Frequency 4 times per year

Frequency Notes 4th occurrence this year of NCR and scrapped tubesheet

Potential Impact

Safety	Additional risk due to rework.	\$0.00
Customer Service	Potential supplier quality downgrade.	\$5,000.00
Revenue	Potential lost customer.	\$350,000.00
Cost	Potential labor and materials.	\$2,500.00
	Potential Impact Total:	\$357,500.00

Report Summaries

Executive Summary

On May 2, 2012 quality control issued a non-conformance for project #1234 (brass tubesheet). The non-conformance was issued due to an incorrect bolt pattern (34 hole pattern drilled and 36 hole pattern required) and scratched gasket surfaces.

The causes of the incorrect bolt pattern were a combination of engineering oversight and no quality check performed by the machinist. The scratched gasket surfaces were caused by clamping the tubesheet without protective gasket material between the tubesheet and the clamps.

Solutions:

1. Implement Standard Operation Procedure to verify hole location with drawings and engineering.
2. Relocate gasket material near machinery that requires clamps.
3. Require parts to be secured at the end of every shift. No parts should be left unsecured.
4. Adhere gasket material to bottom of all clamp surfaces.
5. Require material handling training for both raw materials and materials in process.
6. Implement standard operation process of performing quality control checks on engineering designs prior to manufacturing.

Cause and Effect Summary

On May 2, 2012 quality control issued a non-conformance for project #1234 (brass tubesheet). The non-conformance was issued due to an incorrect bolt pattern (34 hole pattern drilled and 36 hole pattern required) and scratched gasket surfaces.

The incorrect bolt pattern was caused by an engineering oversight and no quality check from the drill operator after spot drilling. Engineering provided the CNC drill operator with a design used one month prior for the same customer. Engineering was not aware the the bolt patterns were different. Engineering used the previous program/design to reduce design costs to the customer. The CNC operator only checks spot drilling for hole locations and uniformity. It is not typical for the CNC drill operator to check the hole locations against the blue print during this stage in production, and the operator assumed the program provided from engineering was correct.

The scratched gasket surface was caused by missing gasket material between the radial drill table clamps and the tubesheet. Missing gasket material between the raising blocks and the tubesheet also generated additional scratches to the gasket surface. The 2nd shift radial drill operator has not been formally trained on setup and has not had to setup a pieces/project for work. Historically the 2nd shift operator has completed setup prior to end of shift, but in this case the 2nd shift operator did not have time to setup. The 2nd shift operator has also never worked on brass tubesheets before. The 2nd shift operator is new to the organization and has only been here 5 weeks.

Solutions

ID	Label	Description		
1	Solution	Implement Standard Operation Procedure to verify hole location with drawings and engineering.		
	Cause	Only checked drill tip spots for uniformity		
	Note	Require quality control check after spot drilling with engineering, design, and customer request. There will be a slight increase in costs associated with production.		
	Assigned	Brian Hooghess	Criteria	Pass
	Due	5/11/2012	Status	Approved
	Term	Short	Cost	\$0.00
2	Solution	Relocate gasket material near machinery that requires clamps.		
	Cause	Gasket material not located near radial drills		
	Note	Ensure all materials required to complete the job are available to the machinists.		
	Assigned	Mel Eggbert	Criteria	Pass
	Due	5/11/2012	Status	Selected
	Term	Short	Cost	\$0.00
4	Solution	Adhere gasket material to bottom of all clamp surfaces.		
	Cause	Clamps scratched top gasket surface		
	Note	Implement clamps as part of tool check-out requirement, and have the tool warehouse maintain clamps with approved gasket material.		
	Assigned	Theodore Nugent	Criteria	Pass
	Due	5/18/2012	Status	Approved
	Term	Medium	Cost	\$500.00
6	Solution	Implement standard operation process of performing quality control checks on engineering designs prior to manufacturing.		
	Cause	Tubesheet does not meet design specifications		
	Note	Mandate QC check of blueprints and drawings before manufacturing. Reference blueprints/drawings with customer before production approval.		
	Assigned	Brian Hooghess	Criteria	Pass
	Due	5/18/2012	Status	Approved
	Term	Medium	Cost	\$0.00

Chart Type Legend

- ▶ Transitory
- Non-transitory
- ⏸ Omission - Transitory
- Omission - Non-transitory
- ★ Focal Point
- ⦿ Solution Implemented

