



RCA Name Front Wheel Group - Hauler
 Report Number RCA 2012.1215
 Report Date 11/6/2012
 RCA Owner SOLOGIC EXAMPLE

Root Cause Analysis Report

Problem Statement

Focal Point Customer requests service credit

When

Start Date 11/6/2012
 Unique Timing This is always the case during scheduled overhauls on all Hauler trucks

Where

Location Salt Lake City, UT USA
 Site Bag End Mine
 System Ore Trucks (all types)
 Component Front wheel assembly, bearing and race, spindle and hub
 Component Wear appears on the weight-bearing (bottom) of spindle and race

Actual Impact

| | Cost |
|--|--------------------|
| Cost Overhead | 20,000.00 |
| Customer Service Perception of quality issue | |
| Actual Impact Total: | \$20,000.00 |

Frequency Notes It happens on every truck of this type... not unique to our products, but also occurs on our competition's products.

Potential Impact

| | |
|--|---------------------|
| Safety Potential risk due to additional machining requirements | 0.00 |
| Revenue Potential loss of revenue | 900,000.00 |
| Customer Service Potential long-term negative impact | |
| Potential Impact Total: | \$900,000.00 |

Solutions

| | | | | | |
|-----------------|-----------------|--|--|-----------------|----------|
| 1 | ID | Label | Description | | |
| | | Solution | Specify larger bearings in future designs. | | |
| | | Cause | Specification = 14.9985" +/- 0.0005" | | |
| | | Note | Provide to the design team for evaluation. This may not be economically feasible, but it's possible that this design change will pencil out. | | |
| | | Assigned | Brian Hughes | Criteria | Pass |
| | | Due | 1/18/2013 | Status | Approved |
| | | Term | Long | Cost | \$0.00 |
| 2 | Solution | Contact Loctite - is there a better product for binding these parts/taking up additional space? | | | |
| | Cause | Movement between spindle and race | | | |
| | Note | This is not a solution per se, however we need to gather information about the types of bonding products available. We may be able to make a better bond during the preload process. | | | |
| | Assigned | Marcus McCoy | Criteria | Not Checked | |
| | Due | 12/28/2012 | Status | Approved | |
| | Term | Short | Cost | \$0.00 | |
| | 3 | Solution | Conduct periodic preload adjustments | | |
| Cause | | Movement between spindle and race | | | |
| Note | | During periodic maintenance cycles, include the preload adjustment to account for any slack that occurs. This will help keep the components tightly fitted together and reduce the damage. | | | |
| Assigned | | Choose | Criteria | Pass | |
| Due | | 1/11/2013 | Status | Approved | |
| Term | | Short | Cost | \$1,000.00 | |
| 4 | | Solution | Compare road conditions with other clients. Identify a list of benefits from keeping the roads in better shape. | | |
| | Cause | Road conditions | | | |
| | Note | Road conditions cause/accelerate other maintenance issues as well... not just this one. We will help conduct the survey... the customer would be responsible for maintaining their roads. | | | |
| | Assigned | Marcus McCoy | Criteria | Pass | |
| | Due | 1/18/2013 | Status | Approved | |

| | | | | |
|---|-----------------|--|-----------------|------------|
| | Term | Medium | Cost | \$1,000.00 |
| 5 | Solution | Recommend speed limits based on road conditions. | | |
| | Cause | Time/duration of trips | | |
| | Note | This works in combination with the road conditions... the better the conditions, the faster the trucks can travel while minimizing damage. | | |
| | Assigned | Chris Eckert | Criteria | Pass |
| | Due | 1/18/2013 | Status | Approved |
| | Term | Medium | Cost | \$1,000.00 |
| 6 | Solution | Confirm specification/hardness. | | |
| | Cause | Hardness of spindle | | |
| | Note | We need to double check the hardness of the spindle material. It needs to be flexible enough not to crack yet hard enough to maximize wear. | | |
| | Assigned | Chris Eckert | Criteria | Pass |
| | Due | 1/18/2013 | Status | Approved |
| | Term | Medium | Cost | \$500.00 |
| 8 | Solution | Review loading techniques... adjust style to improve longevity of equipment | | |
| | Cause | Force from loading the truck | | |
| | Note | If soft material is loaded first and then harder, larger material, it will minimize the amount of motion transferred to the truck during the loading process. | | |
| | Assigned | Chris Eckert | Criteria | Pass |
| | Due | 1/18/2013 | Status | Approved |
| | Term | Medium | Cost | \$500.00 |
| 9 | Solution | Revise the way we communicate with our customer on service orders. Include pictures. Provide customer with examples upon next site visit. | | |
| | Cause | Customer had incomplete information | | |
| | Note | This is something that we've needed to do for a long time. We have other communication breakdowns - they lead to misunderstandings that are always counter-productive. | | |
| | Assigned | Brian Hughes | Criteria | Pass |
| | Due | 12/28/2012 | Status | Approved |
| | Term | Short | Cost | |

Team

| ID | Label | Description | Label | Description |
|-----------|-------------------|--------------------------|------------------|--------------------|
| 1 | First Name | Chris | Last Name | Eckert |
| | Phone (1) | 989-835-3402 | Phone (2) | |
| | Role | Reliability Engineer | Group | |
| | Email | chris.eckert@sologic.com | | |
| 2 | First Name | Brian | Last Name | Hughes |
| | Phone (1) | 206-282-7703 | Phone (2) | |
| | Role | Participant | Group | |
| | Email | brian.hughes@sologic.com | | |
| 3 | First Name | Marcus | Last Name | McCoy |
| | Phone (1) | 989-835-3402 | Phone (2) | |
| | Role | Participant | Group | |
| | Email | marcus.mccoy@sologic.com | | |

