BROKEN BOLTS CAUSED DERAILMENT

Damage was not seen on inspections 3 days prior

— Administrator of the Federal Railroad Administration Sarah Feinberg

US Coast Guard photo

Problem	| What	| When	| Where	| Impact to the Goals
---|---|---|---|---
Problem(s)	| Train derailment, oil spill, massive fire	| June 3, 2016	| Mosier, Oregon	| Safety
Date	| 12:15 PM PDT	| Facility, site	| No injuries; high potential	| Safety Goal
Time	| Inspections within days of derailment did not identify damaged bolts	| Unit, area, equipment	| Service Goal
Different, unusual, unique	| Labor/Time Goal
Inspections at least 50 homes	| Task being performed	| Labor/ Time Goal
94-car train	| Property/Equipment Goal
Hauling crude oil from North Dakota	| Frequency	| Only one other known instance where failed lag bolts caused a derailment

Analysis

| Safety Goal Impacted	| Customer Service Goal Impacted	| Labor/Time Goal Impacted	| Regulatory Goal Impacted
---|---|---|---
No injuries; high potential	| Evacuation of at least 50 homes	| Response, investigation	| Potential for penalties

Solutions

| No.	| Action Item	| Cause	| Owner(s) (Names)
---|---|---|---
1	| Replace with heavier-duty bolt	| Failure of lag bolts	| Railroad
2	| Perform GRMS 4x/year	| Not identified by GRMS	| 
3	| Enhanced hyrail inspections 3x/week	| Damage not identified prior to failure	| 
4	| Increase track inspections to 3x/week	| 
5	| Perform lag curve walking inspections monthly	| 

Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

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