



RCA Name Near Miss - Asphalt Drop
 Report Number RCA 2012.314
 Report Date 3/2/2012
 RCA Owner Safety Manager

Root Cause Analysis Report

Problem Statement

Focal Point Near miss incident

When

Start Date 3/7/2012 End Date 3/7/2012
 Start Time 9:00pm End Time 9:00pm
 Unique Timing After partial bridge demolition

Where

Location ABC bridge, Bothell, WA

Actual Impact

Safety Near Miss due to falling object
 Revenue
 Revenue
 Cost

Cost

Actual Impact Total:

\$0.00

Frequency 1 times overall

Frequency Notes N/A

Potential Impact

Safety Serious injury/fatality
 Revenue Negative safety score could impact future bid qualifications
 Revenue Penalties for unsafe environment
 Cost Liability, property damage, medical

Report Summaries

Executive Summary

A large chunk of asphalt fell from the partially demolished bridge deck to the ground between the sidewalk on C Street and the existing bridge 16/5 E Pier 16. The piece of asphalt was approximately 6' X 4' X 4" and weighed around 1800 pounds. It fell approximately 50' to the ground. Nobody was in the immediate area when the piece fell at approximately 9:00pm. However, the demolition subcontractor was working on the opposite side of C Street at the time. The chunk was a part of the asphalt overlay on the bridge deck and had been loosened by the demo that had occurred in the day prior to the event. The demolition subcontractor had been using the demo tool on the end of the excavator arm to clear all loose debris on the partially demolished deck edge at the end of every shift and visual checked with a manlift, however, inspection of the deck the morning after the incident showed large chunks of loose asphalt near the deck edge.

To reduce the risk of similar incidents occurring in the future, we are recommending implementation of the following three solutions:

- To control the cause "manlift inspection did not reveal the debris", we propose the addition of an end-of-shift inspection from the top side for all elevated road decking demo jobs.
- To control the cause "inadequate lighting", we propose to equip crews with high powered lighting for inspections
- To control the cause "1800 lb asphalt chunk fell off bridge", we propose to install protective safety restraints over top of elevated roads to prevent asphalt movement after demo work.

Cause and Effect Summary

We had a near miss incident when a large asphalt chunk fell in an area where people could have been present. People could have been present because this occurred on an open public street where construction crews were working. Crews were working there because the bridge was due for demolition because it had been ruled unsafe. The asphalt chunk fell because it was elevated on the partially-demolished bridge, it was close to the edge, and vibration from the nearby roadway moved it. It was elevated because it was not cleared and it was missed in inspection. It was not cleared because the crew used a long demo tool and did not see the chunk. We are unsure why the chunk was not found in inspection.

Solutions

ID	Label	Description		
3	Solution	Additional end of shift inspection from top side for all elevated road-decking demo jobs		
	Cause	Manlift inspection did not reveal the debris		
	Note	Cost is per day. This solution is intended for example purposes only.		
	Assigned	Chris Eckert	Criteria	Pass
	Due	3/12/2012	Status	Selected
	Term	Short	Cost	\$50.00
4	Solution	Equip crews with high powered lighting for inspections		
	Cause	Inadequate lighting?		
	Note	This solution is intended for example purposes only.		
	Assigned	Brian Hughes	Criteria	Pass
	Due	3/19/2012	Status	Selected
	Term	Short	Cost	\$1,000.00
5	Solution	Erect a protective tunnel for sidewalk and road on all bridge demo jobs		
	Cause	Large object fell		
	Note	This solution is intended for example purposes only.		
	Assigned	Choose	Criteria	Fail
	Due		Status	Identified
	Term	Choose	Cost	\$0.00
6	Solution	Install safety net at end of shift, under demo bridge to catch falling debris		
	Cause	Large object fell		
	Note	This solution is intended for example purposes only.		
	Assigned	Choose	Criteria	Pass
	Due		Status	Identified
	Term	Choose	Cost	\$0.00
7	Solution	Reroute vehicle and pedestrian traffic		
	Cause	Area access not restricted		
	Note	This solution is intended for example purposes only.		

Assigned	Choose	Criteria	Fail
Due		Status	Identified
Term	Choose	Cost	\$0.00

8	Solution	Install protective safety restraints over top of elevated roads to prevent asphalt movement after demo work	
	Cause	1800 lb asphalt chunk fell off of bridge	
	Note	This solution is intended for example purposes only.	
	Assigned	Cory Boisoneau	Criteria Pass
	Due	3/23/2012	Status Selected
	Term	Medium	Cost \$5,000.00

9	Solution	Temporarily reroute large vehicles until demo work is complete	
	Cause	Traffic includes large vehicles	
	Note	This solution is intended for example purposes only.	
	Assigned	Choose	Criteria Fail
	Due		Status Identified
	Term	Choose	Cost \$0.00

Team

ID	Label	Description	Label	Description
1	First Name	Cory	Last Name	Boisoneau
	Phone (1)		Phone (2)	
	Role	General Contractor	Group	
	Email	cory.boisoneau@sologic.com		
2	First Name	Brian	Last Name	Hughes
	Phone (1)		Phone (2)	
	Role	Demo subcontractor	Group	
	Email	brian.hughes@sologic.com		
3	First Name	Chris	Last Name	Eckert
	Phone (1)		Phone (2)	
	Role	Facilitator	Group	
	Email	chris.eckert@sologic.com		
4	First Name	John	Last Name	Thomas
	Phone (1)	1234567890	Phone (2)	
	Role	Job Safety Rep	Group	
	Email	john.thomas@safety.com		
5	First Name	Suzy	Last Name	Kramer
	Phone (1)	12221212112	Phone (2)	
	Role	DOT Rep	Group	
	Email	suzyk@dot.org		

Evidence

ID	Label	Description
1	Evidence Cause(s)	Data log Large object fell Construction crews working in area General public has access to area Rebuilding bridge & roadway Located on public roadway Asphalt chunk elevated 50ft Asphalt was part of elevated roadway Active roadways nearby Loosened by bridge demolition Bridge section being demolished Asphalt is on bridge Bridge deemed unsafe Make way for new bridge Procedure
	Location	
	Link	
	Contributor	Choose
	Type	Document
	Quality	★★★★★
2	Evidence Cause(s)	Demo sub statement Asphalt chunk moved over the edge of bridge 1800 lb asphalt chunk fell off of bridge Vibration Large asphalt chunk not removed Asphalt chunk close to edge Manlift inspection did not reveal the debris Visually checked with manlift Demo crew didn't see loose asphalt? Loose Asphalt far away from operator Used demo tool @ end of excavator arm to clear debris Demo tool is very long Work crew accidentally pushed asphalt chunk over edge Demo crew unaware of large asphalt chunk Procedure
	Location	
	Link	

Contributor Choose
Type Direct Statement
Quality ★★☆☆☆

3 **Evidence** GC statement
Cause(s) Potential for people to be under falling object
Area access not restricted
Not found in inspection
Asphalt chunk close to edge
Vehicle traffic moving nearby

Location
Link
Contributor Choose
Type Direct Statement
Quality ★★★★★

4 **Evidence** GC observation
Cause(s) Traffic includes large vehicles
Large vehicles generate significant vibration
Asphalt being removed was near open edge of bridge

Location
Link
Contributor Choose
Type Direct Observation
Quality ★★★★★

5 **Evidence** Statement from multiple crew members
Cause(s) Never looked for loose asphalt
Gravity
1800 lb asphalt chunk existed
Asphalt being removed was near open edge of bridge

Location
Link
Contributor Choose

Type Direct Statement
Quality ★★☆☆☆

Chart Type Legend

- ▶ Transitory
- Non-transitory
- ⌚ Omission - Transitory
- ⌚ Omission - Non-transitory
- ★ Focal Point
- ⊙ Solution Implemented

★ Near miss incident

▶ Large object fell

Evidence
Data log

Solutions
Erect a protective tunnel for sidewalk and road on all bridge demo jobs
Criteria Fail Status Identified
This solution is intended for example purposes only.

Install safety net at end of shift, under demo bridge to catch falling debris
Criteria Pass Status Identified
This solution is intended for example purposes only.

■ Asphalt chunk elevated 50ft

Evidence
Data log

▶ Asphalt was part of elevated roadway

Evidence
Data log

Terminated because:
Desired state

⊙ 1800 lb asphalt chunk fell off of bridge

Evidence
Demo sub statement

Solutions
Install protective safety restraints over top of elevated roads to prevent asphalt movement after demo work
Criteria Pass Status Selected
This solution is intended for example purposes only.

▶ Asphalt chunk moved over the edge of bridge

Evidence
Demo sub statement

■ Gravity

Evidence
Statement from multiple crew members

Terminated because:
Other causal paths more productive

⌚ Work crew accidentally pushed asphalt chunk over edge

Evidence
Demo sub statement

Terminated because:
Other causal paths more productive

■ 1800 lb asphalt chunk existed

Evidence
Statement from multiple crew members

■ Located on public roadway

Evidence
Data log

Terminated because:
Other causal paths more productive

■ Area access not restricted

Evidence
GC statement

Solutions
Reroute vehicle and pedestrian traffic
Criteria Fail Status Identified
This solution is intended for example purposes only.

OR

⌚ Not enough space to reroute

⌚ Not economical to reroute?

▶ Construction crews working in area

Evidence
Data log

▶ Rebuilding bridge & roadway

Evidence
Data log

Terminated because:
Desired state

▶ Vibration

Evidence
Demo sub statement

▶ Vehicle traffic moving nearby

Evidence
GC statement

▶ Active roadways nearby

Evidence
Data log

Terminated because:
Other causal paths more productive

■ Traffic includes large vehicles

Evidence
GC observation

Solutions
Temporarily reroute large vehicles until demo work is complete
Criteria Fail Status Identified
This solution is intended for example purposes only.

Terminated because:
Other causal paths more productive

■ Large vehicles generate significant vibration

Evidence
GC observation

Terminated because:
Other causal paths more productive

▶ Large asphalt chunk not removed

Evidence
Demo sub statement

■ Asphalt chunk close to edge

Evidence
Demo sub statement
GC statement

▶ Not found in inspection

Evidence
GC statement

■ Asphalt being removed was near open edge of bridge

Evidence
GC observation
Statement from multiple crew members

Terminated because:
Other causal paths more productive

■ Asphalt is on bridge

Evidence
Data log

Terminated because:
Other causal paths more productive

▶ Bridge section being demolished

Evidence
Data log

■ Bridge deemed unsafe

Evidence
Data log

Terminated because:
Other causal paths more productive

▶ Make way for new bridge

Evidence
Data log

Terminated because:
Other causal paths more productive

■ Demo crew unaware of large asphalt chunk

Evidence
Demo sub statement

⌚ Demo crew didn't see loose asphalt?

Evidence
Demo sub statement

⌚ Never looked for loose asphalt

Evidence
Statement from multiple crew members

Terminated because:
Other causal paths more productive

▶ Visually checked with manlift

Evidence
Demo sub statement

■ Procedure

Evidence
Data log
Demo sub statement

Terminated because:
Other causal paths more productive

⌚ Incomplete inspection?

Evidence

Terminated because:
Other causal paths more productive

⊙ Manlift inspection did not reveal the debris

Evidence
Demo sub statement

Solutions
Equip crews with high powered lighting for inspections
Criteria Pass Status Selected
This solution is intended for example purposes only.

Terminated because:
Other causal paths more productive

⌚ Manlift not close enough to be effective?

Evidence

Terminated because:
Other causal paths more productive

▶ Used demo tool @ end of excavator arm to clear debris

Evidence
Demo sub statement

Terminated because:
Other causal paths more productive

■ Loose Asphalt far away from operator

Evidence
Demo sub statement

■ Demo tool is very long

Evidence
Demo sub statement

Terminated because:
Other causal paths more productive

■ Limited visibility?

Evidence

Terminated because:
Other causal paths more productive

▶ Manlift inspection did not reveal the debris

Evidence
Demo sub statement

Solutions
Additional end of shift inspection from top side for all elevated road-decking demo jobs
Criteria Pass Status Selected
This solution is intended for example purposes only.

■ Inadequate lighting?

Evidence

Terminated because:
Other causal paths more productive

■ Manlift not close enough to be effective?

Evidence

Terminated because:
Other causal paths more productive