DEADLY MOSCOW METRO DERAILMENT

1 Problem

What	Problem(s)	Subway derailment
When	Date	July 15, 2014
	Time	~8:30 AM
	Different, unusual, unique	Deepest subway station, rush hour, recent track work
Where	Facility, site	Park Pobedy station
	Unit, area, equipment	Moscow Metro
	Task being performed	Commuting

Impact to the Goals

Safety	23 fatalities, ~150 injured
	Difficult to quickly treat injured
Environmental	N/A
Customer Service	Negative publicity
Regulatory	N/A
Production/ Schedule	Major delay in metro service
Property/ Equipment	Damage to subway train and tracks
Labor/ Time	Major rescue effort and investigation required

On July 15, 2014, a rouinte morning commute on the Moscow subway quickly became a nightmare when a metro train dramatically derailed, resulting in 23 deaths and about 150 injuries. A massive rescue operation took hours and the investigation into the incident promises to be lengthy as well.

The investigation into this horrific accident is still ongoing, but an initial Cause Map can be built to capture the information that is already available and the Cause Map can be expanded as more details are known. A Cause Map is a format for performing a visual root cause analysis. The first step is to define the problem by filling in an Outline with the background information for the incident. Additionally, any different or unique elements are documented because differences should almost always be investigated. The impacts to the overall goals are also documented on the bottom half of the Outline. Once the problem is defined, the analysis is performed by asking "why" questions and using the answer to build the Cause Map.

This safety goal was clearly impacted in this example because of the fatalities and injuries. Why were so many hurt? This occurred because a metro train derailed. According to initial reports in the media, the train derailed because of an issue with a track switch mechanism that had recently been repaired. It appears there was a problem with the repair work that was done and it can be assumed that the supervision or inspection of the work wasn't adequate since the problem wasn't discovered prior to the accident.

Cause Map

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

CAUSE MAPPING

Problem Solving • Incident Investigation • Root Cause Analysis

Step 1	Problem	What's the Problem?
Step 2	Analysis	Why did it happen?
Step 3	Solutions	What will be done?

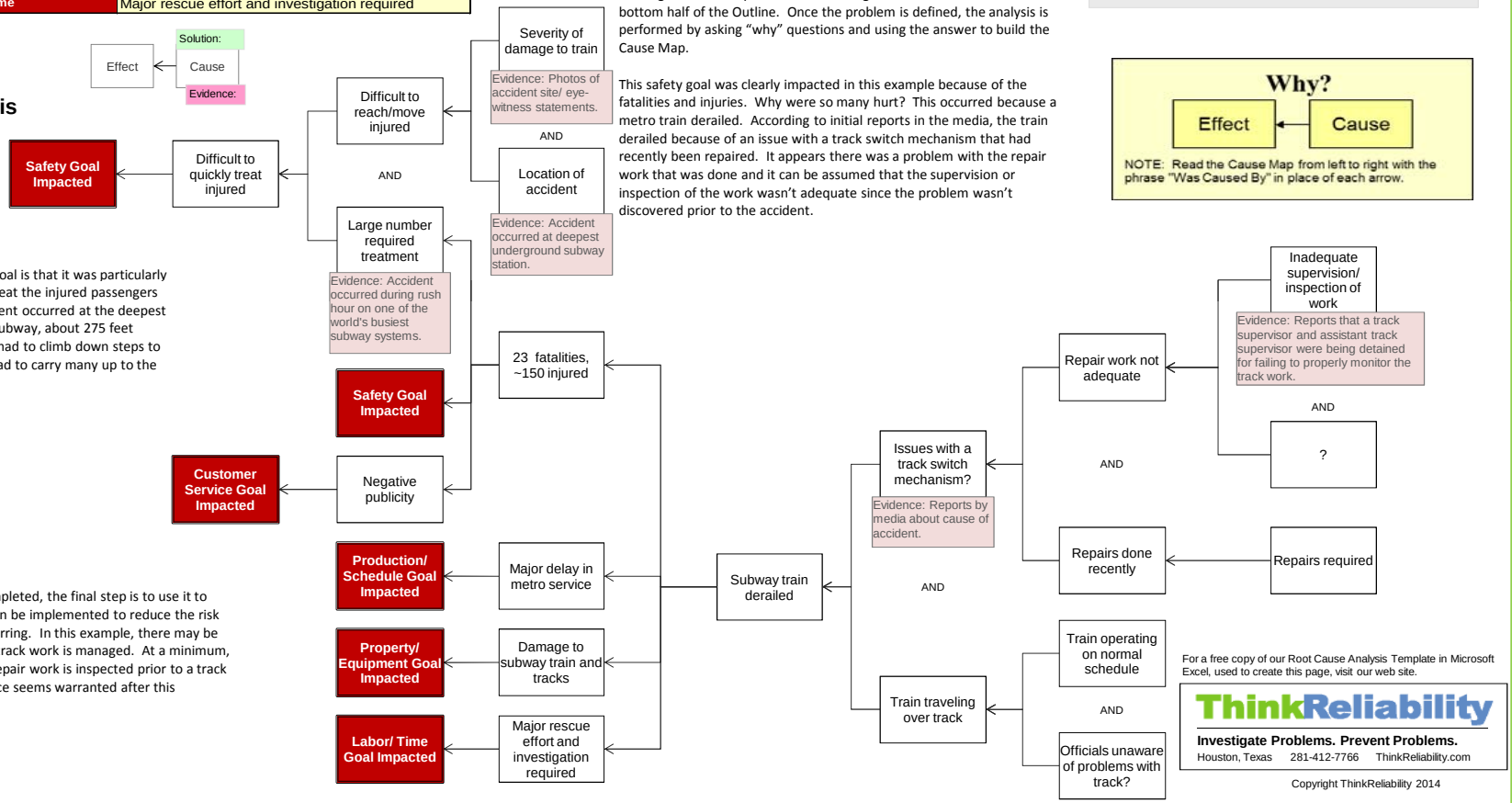
Why?

Effect ← Cause

NOTE: Read the Cause Map from left to right with the phrase "Was Caused By" in place of each arrow.

2 Analysis

Effect ← Cause (Solution:) (Evidence:)



A second impact to the safety goal is that it was particularly difficult to quickly access and treat the injured passengers after the accident. The derailment occurred at the deepest metro station on the Moscow subway, about 275 feet underground. Rescue workers had to climb down steps to reach injured passengers and had to carry many up to the surface.

3 Solutions

After a Cause Map is completed, the final step is to use it to develop solutions that can be implemented to reduce the risk of a similar accident occurring. In this example, there may be changes needed to how track work is managed. At a minimum, a careful look into how repair work is inspected prior to a track being put back into service seems warranted after this accident.

For a free copy of our Root Cause Analysis Template in Microsoft Excel, used to create this page, visit our web site.