

HAZARDOUS CHEMICALS INVOLVED IN EXPLOSIONS, FIRE

Cause Map

Concerns remain over safety in area

On August 12, a fire began at a storage warehouse in Tianjin, China. More than a thousand firefighters were sent in to fight the fire. About an hour after the firefighters went in, two huge explosions registered on the earthquake measurement scale (2.3 and 2.9, respectively). Follow-on explosions continued and at least 114 firefighters, workers and area residents have been reported dead so far, with 57 still missing (at this point, most are presumed dead).

"Sodium cyanide is a very toxic chemical. It would take about a quarter of a teaspoon to kill you. Another problem with sodium cyanide is that it can change into prussic acid, which is even more deadly."

- David Leggett, chemical risk consultant

1 Problem

What
When

Where

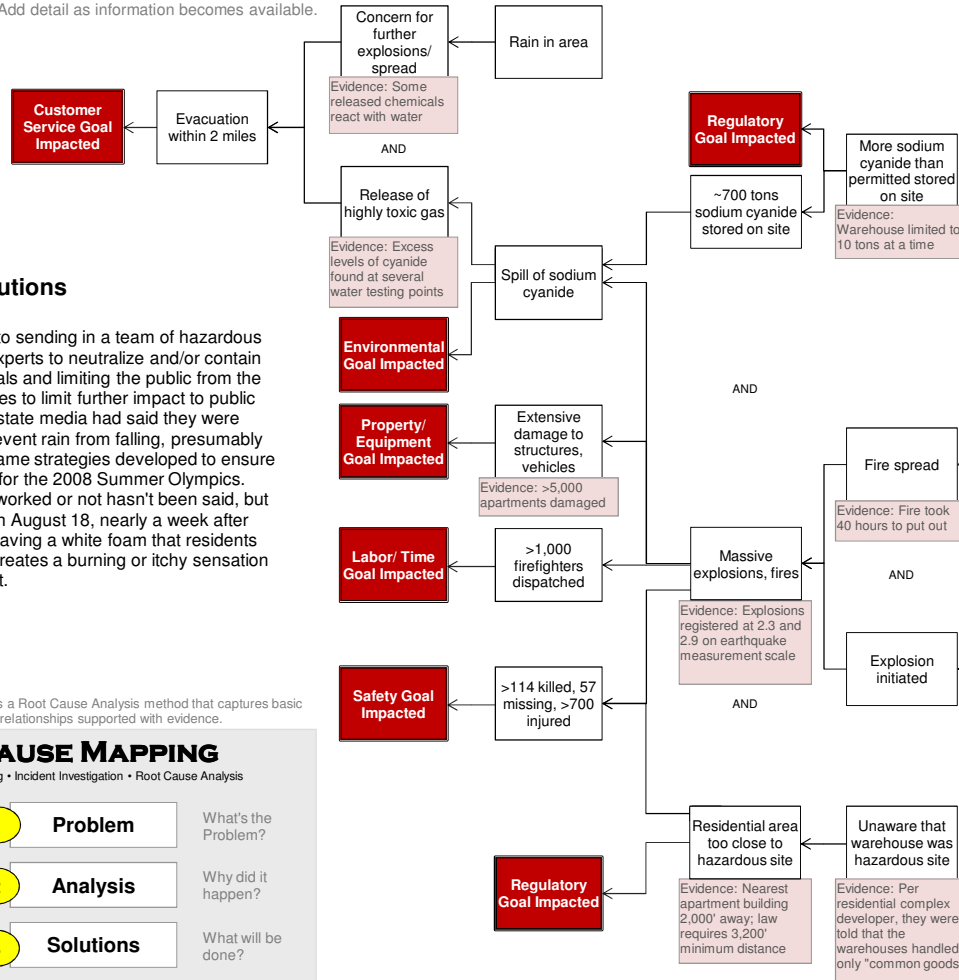
Problem(s)	Massive fire, explosions
Date	August 12, 2015
Time	First explosion at 11:30 PM
Different, unusual, unique	Regulations not followed
Facility, site	Tianjin, China
Unit, area, equipment	Warehouse
Task being performed	Handling dangerous materials including sodium cyanide, ammonium nitrate, potassium nitrate and calcium carbide

Impact to the Goals

Safety	At least 114 killed, 57 missing, >700 injured
Environmental	Spill of sodium cyanide
Customer Service	Evacuation within 2 miles
Regulatory	Residential area too close to hazardous site More sodium cyanide than permitted stored on site
Property/ Equipment	Extensive damage to structures, vehicles in area
Labor/ Time	>1,000 firefighters dispatched

2 Analysis

Cause Map - Add detail as information becomes available.



3 Solutions

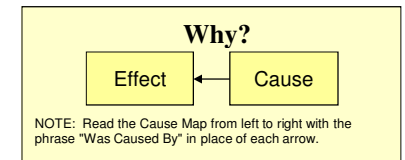
In addition to sending in a team of hazardous materials experts to neutralize and/or contain the chemicals and limiting the public from the area in hopes to limit further impact to public safety, the state media had said they were trying to prevent rain from falling, presumably using the same strategies developed to ensure clear skies for the 2008 Summer Olympics. Whether it worked or not hasn't been said, but it did rain on August 18, nearly a week after the blast, leaving a white foam that residents have said creates a burning or itchy sensation with contact.

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?



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