

Hindenburg Crash
May 6, 1937
Lakehurst Naval Base, NJ

On May 6th, 1937, the Hindenburg burst into flames over the Lakehurst, NJ Naval Base, after completing a successful trip across the Atlantic. 35 of the 97 passengers (and one of the ground crew) were killed. The Hindenburg itself was a total loss, and the popularity of airships never recovered after the accident. The loss of life is an impact to the safety goal, while the loss of the airship is an impact to the material goal. I'll consider the loss of popularity an impact to the customer service goal, because it involved public perception.

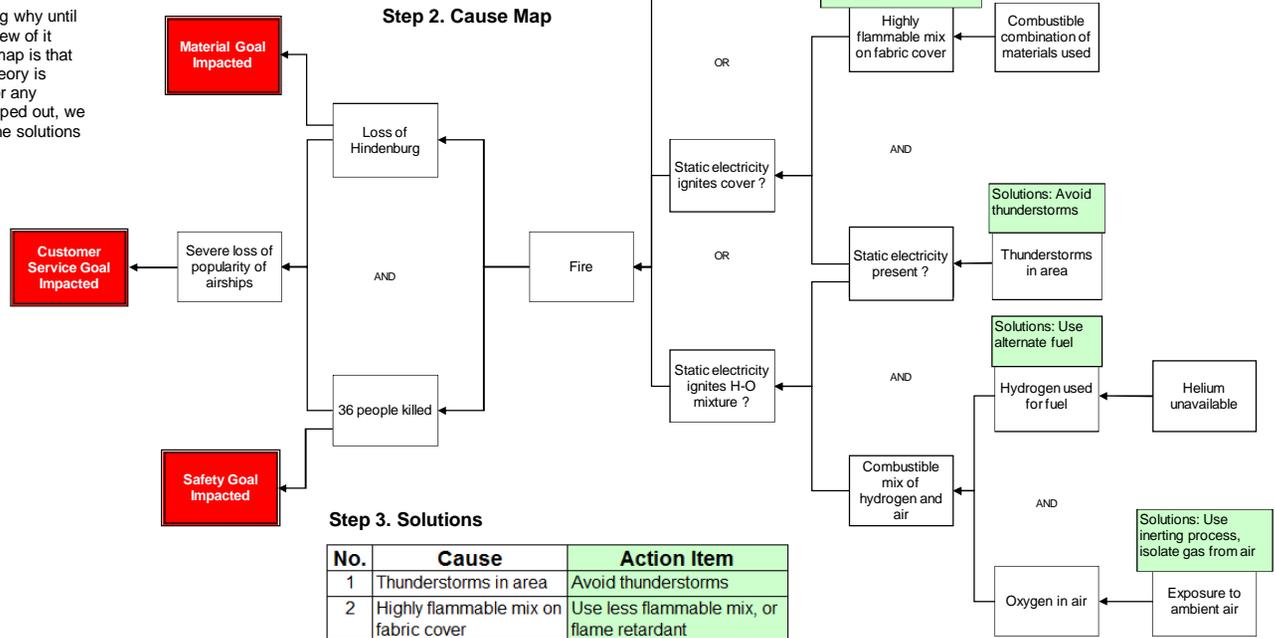
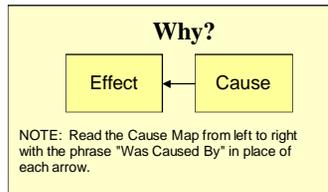
Step 1. Outline

What	Problem(s)	Hindenburg Fire, Crash; 36 people killed
When	Date	May 6, 1937
	Time	7:25 p.m.
	Differences	Hydrogen-fueled airship
Where	Physical Location	Lakehurst, NJ Naval Base
	Unit/Process/Equipment	Airship
	Work/Task Being Done	Dropping anchor ropes/landing
Impact to the Goals		
	Safety	36 people killed
	Environmental	?
	Cust. Service	Severe loss of popularity of airships
	Production-Schedule	?
	Materials, Labor	Loss of Hindenburg

Now we will record all the causes of the accident on a cause map. A thorough root cause analysis built as a Cause Map can capture all of the causes in a simple, intuitive format that fits on one page. We'll start with the loss of 36 lives and the loss of the Hindenburg, both of which were caused by the fire aboard. The loss of popularity of airships was caused by both the loss of the Hindenburg, and by the loss of lives. The next question is "Why did the fire occur?"

For the Hindenburg, this is where things start to get interesting. There are three separate theories about why the fire started. One theory is that the fire started from sabotage. Another theory is that the fire began when static electricity ignited the flammable cover of the airship. The other theory is that static electricity ignited a flammable hydrogen-oxygen mixture. For either of these two theories, static electricity is required to be present. (There were thunderstorms in the area, which could have produced static electricity.) Note the use of "OR" to show competing theories. Also note that we're not espousing a theory - we are just recording all of the possibilities.

We can continue on each of these branches by asking why until we run out of answers. What we have (a mid-level view of it anyway) is shown above. The beauty of the cause map is that we can use it even if we haven't determined which theory is correct. The cause map allows us to find solutions for any potential causes. Once we have all the theories mapped out, we can use the cause map as a resource to determine the solutions that are most helpful.



Step 3. Solutions

No.	Cause	Action Item
1	Thunderstorms in area	Avoid thunderstorms
2	Highly flammable mix on fabric cover	Use less flammable mix, or flame retardant
3	Hydrogen used for fuel	Use alternate fuel
4	Exposure to ambient air	Use inerting process, isolate gas from air

Cause Map
 Detail Level

Houston Office 281-489-2904
 www.ThinkReliability.com