

Hindenburg Crash
May 6, 1937
Lakehurst Naval Base, NJ

Step 1. Outline

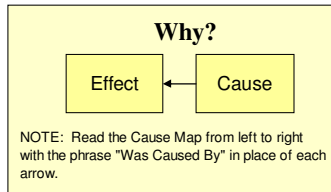
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|----------------------------|----------------------------|--|
| What | Problem(s) | Hindenburg Fire, Crash: 36 people killed |
| | When | Date: May 6, 1937 Time: 7:25 p.m. |
| Where | Differences | Hydrogen-fueled airship |
| | Physical Location | 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 |

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.

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.

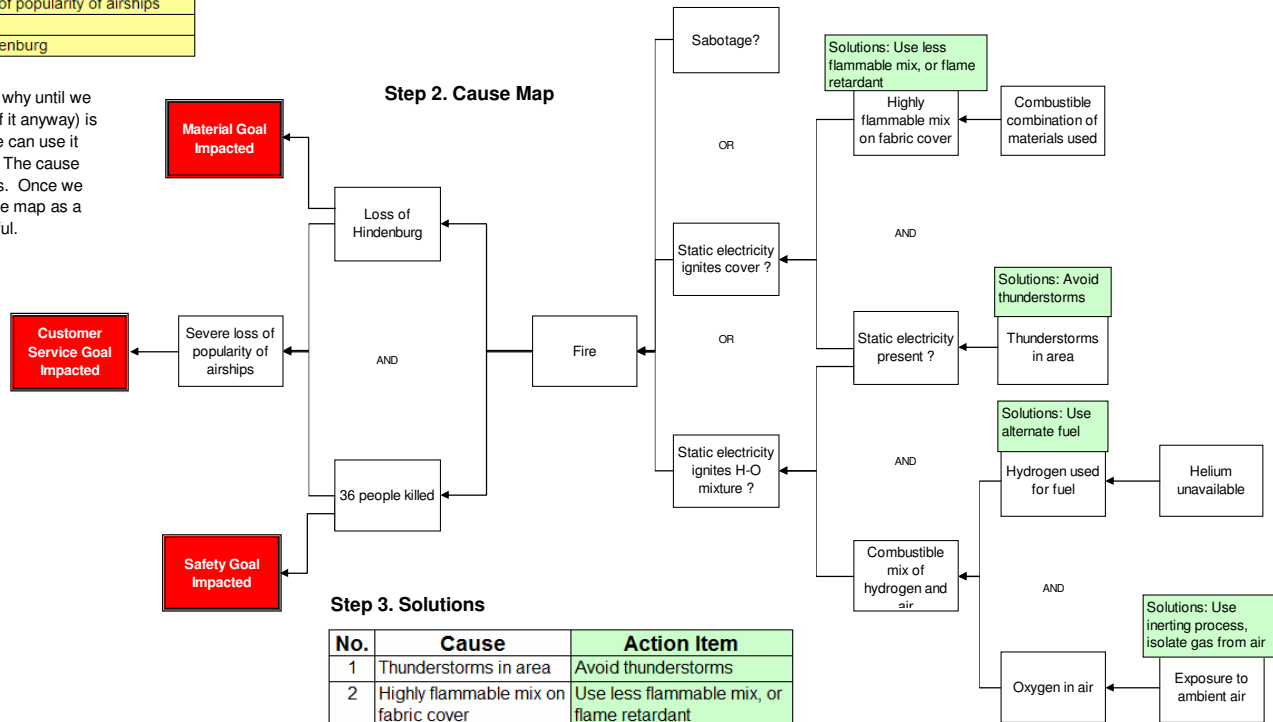


Cause Map
Detail Level



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Step 2. Cause Map



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 |