

# APOLLO 1 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?

### 1 Problem

<b>What</b>	Problem(s)	Flash fire, astronauts killed
	Crew	White, Grissom, Chaffee
<b>When</b>	Date	January 27, 1967
	Time	~6:30 pm EST
	Different, unusual, unique	1st piloted flight, hatch difficult to open
<b>Where</b>	Facility, Site	Cape Canaveral
	Equipment	Apollo 1/Saturn space vehicle
	Task being performed	Launch pad test

### Fire during launch pad test kills 3 astronauts

Launch pad testing on the Apollo 1 Saturn space vehicle turned deadly when a fire began within the command module. Rescue of the astronauts proved difficult as the hatch had been designed to prevent accidental opening.

"No single person bears all the responsibility for the Apollo 204 accident. It happened because many people made the mistake of failing to recognize a hazardous situation."  
- Senate report on the accident

### Impact to the Goals

<b>Safety</b>	Three astronauts killed
<b>Vehicle</b>	Rupture of Command Module
<b>Mission</b>	Delay in mission
<b>Property, Equip, Mtls</b>	Rupture of Command Module
<b>Labor, Time</b>	Rescue efforts

Apollo 1 Crew, L to R: Edward White, Gus Grissom, Roger Chaffee

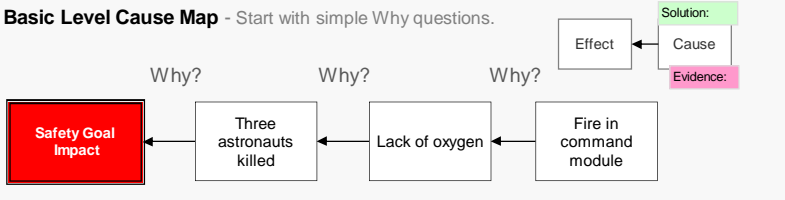


### More Detailed Cause Map

Add detail as information becomes available.

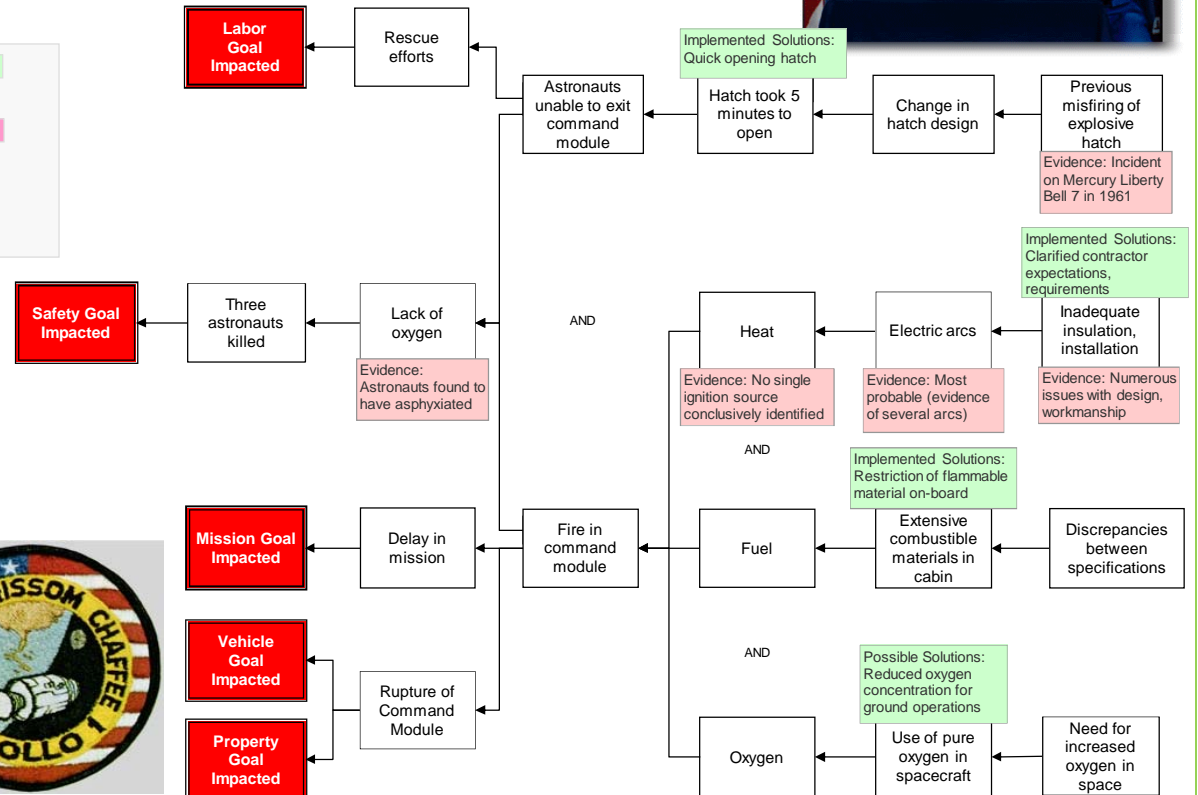
### 2 Analysis

Basic Level Cause Map - Start with simple Why questions.



### 3 Solutions

No.	Action Item	Cause
1	Quick opening hatch	Hatch took 5 minutes to open
2	Clarified contractor expectations, requirements	Insulation defeated
3	Restriction of flammable material on-board	Extensive combustible materials in cabin
4	Reduced oxygen concentration for ground operations	Use of pure oxygen in spacecraft



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

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