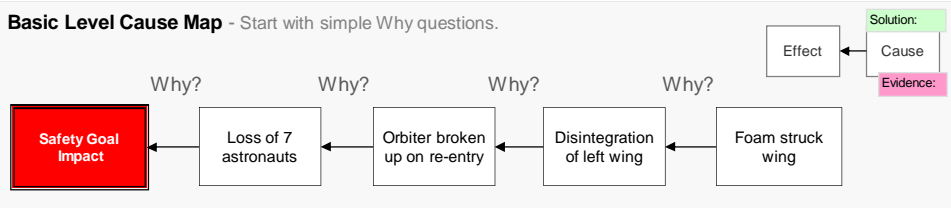


# 1 Problem

What When	Problem(s)	Lost Columbia/ crew, foam struck wing	
	Date	February 1, 2003	
	Time	-8:59 AM EST	
Where	Different, unusual, unique	Foam strike on ascent	
	State, city	Cape Canaveral	
	Facility, site	Columbia (ST-107)	
	Task being performed	Disintegration upon re-entry	
Impact to the Goals	Safety	Loss of 7 astronauts (entire crew)	\$3,000,000,000
	Vehicle	Total loss of shuttle	
	Mission	Major impact to shuttle flight schedule	\$400,000,000
	Equipment	Damage from foam strike	
	Labor, Time	Investigation, clean up	
	Frequency	2nd loss of crew & orbiter	

# 2 Analysis

Basic Level Cause Map - Start with simple Why questions.



Columbia Crew:  
Standing, L to R: David Brown, Laurel Clark, Michael Anderson, Ilan Ramon  
Seated, L to R: Rick Husband, Kalpana Chawla, William McCool



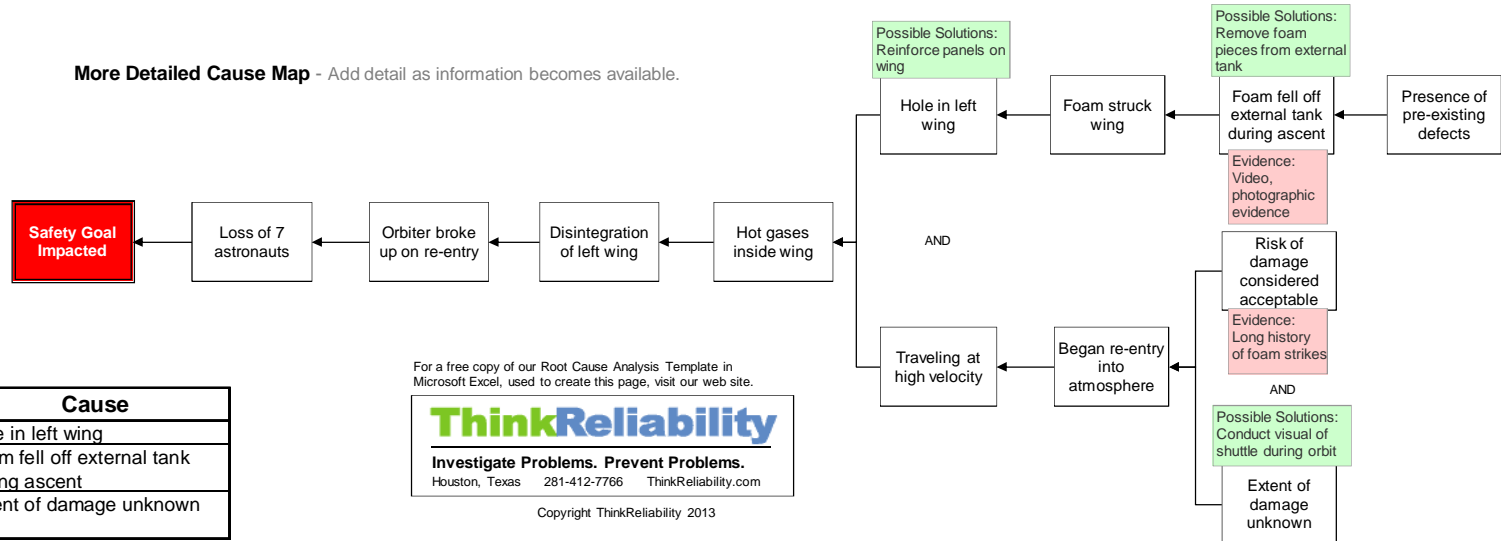
Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

## 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?

More Detailed Cause Map - Add detail as information becomes available.



# 3 Solutions

No.	Action Item	Cause
1	Reinforce panels on wing	Hole in left wing
2	Remove foam pieces from external tank	Foam fell off external tank during ascent
3	Conduct visual of shuttle during orbit	Extent of damage unknown

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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