

1 Problem Definition

What	Problem(s)	Titanic sank, ship hit iceberg, weak rivets
When	Date	April 14th, 1912
Where	Geographic location	North Atlantic
	Equipment, area	RMS Titanic, starboard (right side) bow, hull
	Work process, task	Transporting passengers from UK to USA

Impact to the Goals

Safety	Loss of 1500+ lives (705 survivors)	
Property	Lost entire ship	\$ 7,500,000
Frequency	1x	



TITANIC Cause Map™

Cause Mapping is a visual, systems approach that provides a clear explanation of the cause-and-effect relationships that produced a particular issue.

Cause Mapping®

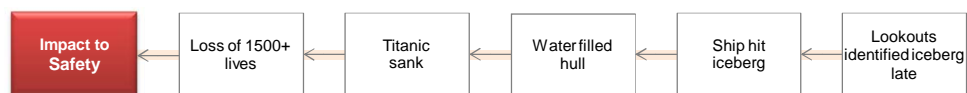
Problem Solving • Incident Investigation • Root Cause Analysis • Risk Mitigation



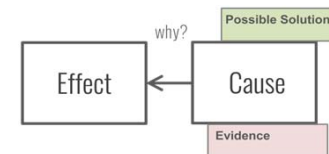
2 Analysis

5-Why Cause Map

Simple start with just a few *Why* questions.



The analysis can start with one goal that was affected. The incident is then broken into parts by asking a series of *Why* questions. A Cause Map begins as a simple line of cause-and-effect relationships.

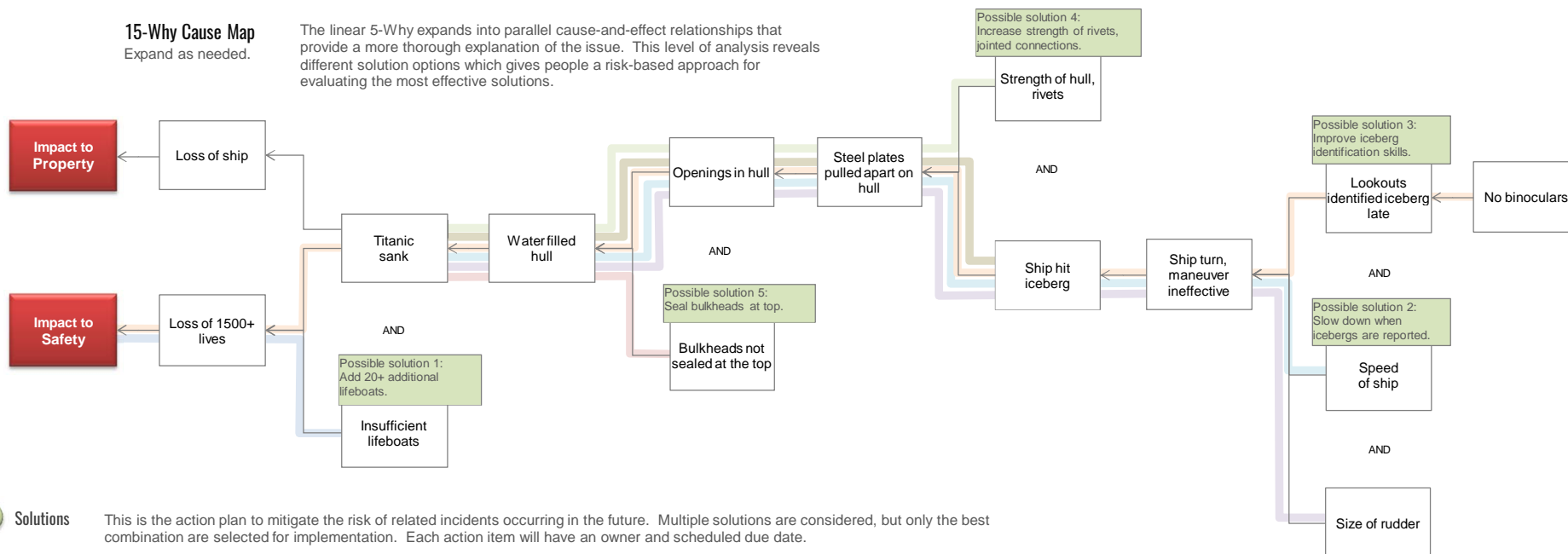


Cause Map Building Block

15-Why Cause Map

Expand as needed.

The linear 5-Why expands into parallel cause-and-effect relationships that provide a more thorough explanation of the issue. This level of analysis reveals different solution options which gives people a risk-based approach for evaluating the most effective solutions.



3 Solutions

This is the action plan to mitigate the risk of related incidents occurring in the future. Multiple solutions are considered, but only the best combination are selected for implementation. Each action item will have an owner and scheduled due date.

No.	Cause	Solution (Action Item)	Work Process, Task	Owner	Due Date
1	Insufficient lifeboats	Add 20+ additional lifeboats.	Emergency, ship evacuation		
2	Speed of ship	Slow down when icebergs are reported.	Operations, hazard identification		
3	Saw iceberg late	Improve iceberg identification skills	Operations, hazard identification		
4	Strength of rivets, joints	Increase strength of rivets, jointed connections.	Design (hull)		
5	Bulkheads not sealed	Seal bulkheads at top.	Design (hull)		



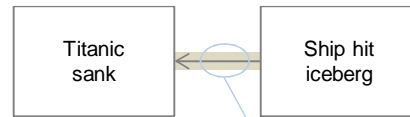
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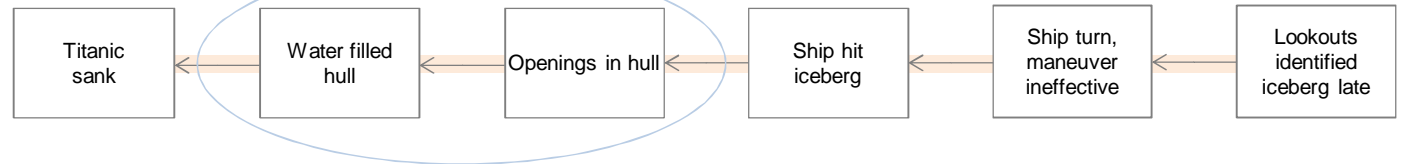
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Each of the 5-Whys on this page is accurate. Combining them into a 15-Why provides a more comprehensive explanation of the issue.

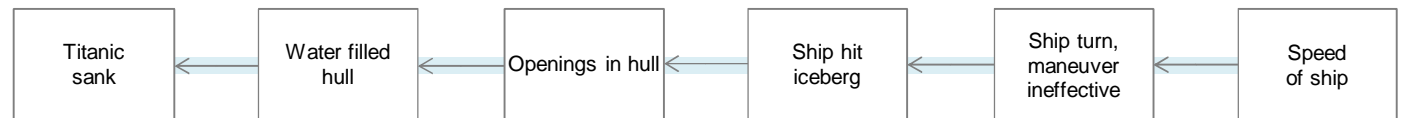
1-Why **Ship Hit Iceberg**



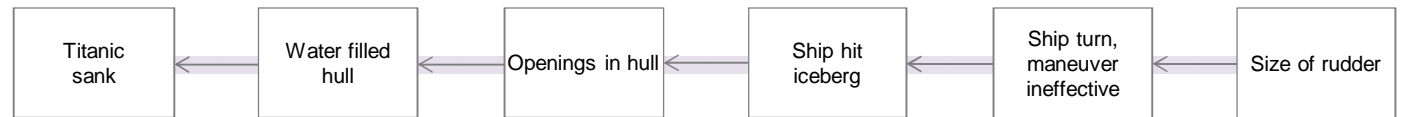
5-Why **Lookouts**



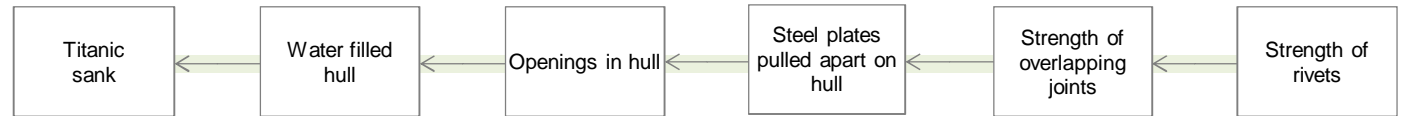
5-Why **Speed**



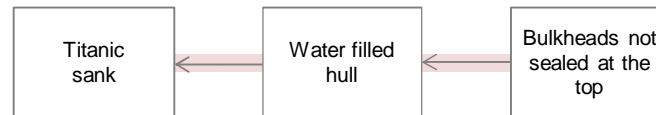
5-Why **Size of Rudder**



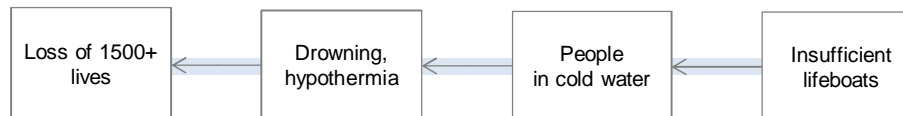
5-Why **Strength of Rivets**



2-Why **Bulkheads Open at Top**



3-Why **Not Enough Lifeboats**



One Complete Analysis.

A common criticism of 5-Why is that it's not repeatable, but 5-Why is not supposed to be repeatable. Different people can explain different causal paths without contradicting each other.

The Cause Map of the Titanic disaster is the same regardless of which 5-Why a person starts with. Keep communication in your company simple. Complex doesn't have to be confusing.