

Collapse of the Tay Bridge Dundee, Scotland December 28, 1879

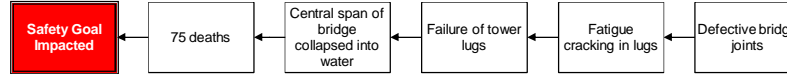
Step 1. Outline

What When	Problem(s)	Bridge collapse
	Date	12/28/1879
	Time	7:20 p.m.
	Different, unusual, unique	Longest bridge in the world at the time; strong gale
Where	Geographical location	Scotland
	Unit, area, equipment	High girders of 2-mile long bridge
	Task being performed	Spanning Tay estuary

Impact to the Goals

Safety	75 deaths
Environmental	None
Cust. Service	Loss of train route
Production-Schedule	Loss of bridge
Property, Equip, Mtls	Investigation
Labor, Time	

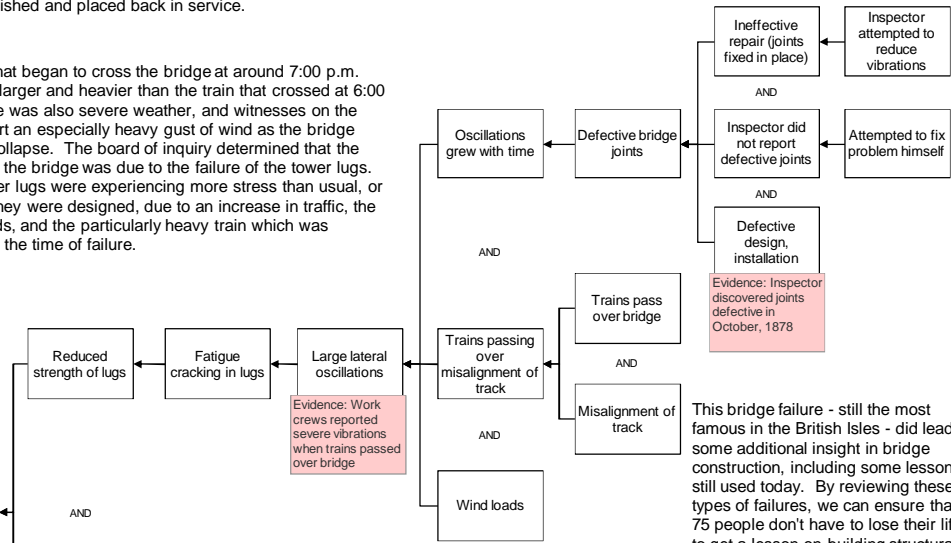
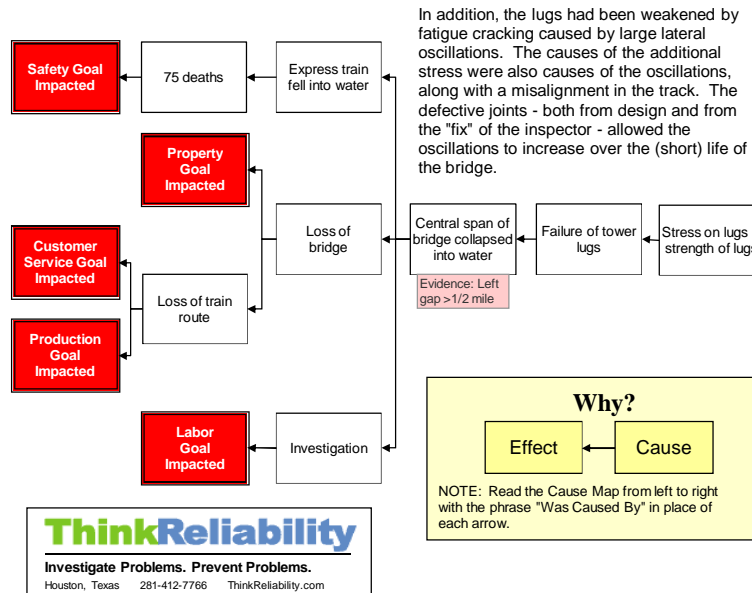
Step 2. Cause Map 5-Whys



On December 28, 1879, the Tay Bridge in Dundee, Scotland collapsed as an express train was traveling across. All 75 people on board were killed. The bridge had been tested and approved by the Board of Trade only 19 months prior and opened to traffic just over 2 years before the collapse. The failure of the bridge also resulted in the loss of the bridge (it was rebuilt nearby) and the temporary loss of a train route. Surprisingly, there was very little damage to the train, which was refurbished and placed back in service.

The train that began to cross the bridge at around 7:00 p.m. was much larger and heavier than the train that crossed at 6:00 p.m. There was also severe weather, and witnesses on the shore report an especially heavy gust of wind as the bridge began to collapse. The board of inquiry determined that the collapse of the bridge was due to the failure of the tower lugs. These tower lugs were experiencing more stress than usual, or for which they were designed, due to an increase in traffic, the heavy winds, and the particularly heavy train which was crossing at the time of failure.

Step 2. Cause Map Detail Level



This bridge failure - still the most famous in the British Isles - did lead to some additional insight in bridge construction, including some lessons still used today. By reviewing these types of failures, we can ensure that 75 people don't have to lose their life to get a lesson on building structurally sound bridges.

Timeline

Date	Time	Description
September 1877		Bridge open to traffic
February 1878		Train tested by Board of Trade
October 1878		Inspector discovers some joints defective; remedies them himself
Summer 1879		Crew painting structure reports severe vibrations
12/28/1879	6:15 p.m.	Train crosses the bridge; has trouble
	7:13 p.m.	Second train begins crossing bridge
	7:20 p.m.	Bridge collapses from center
6/30/1880		Final report on incident complete



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