

Start With a 5-Why

A quick and simple way to start a problem analysis.

Cause Mapping® Method

Problem Solving • Root Cause Analysis

Welding Robot Stopped

Toyota Example

Conventional 5Whys

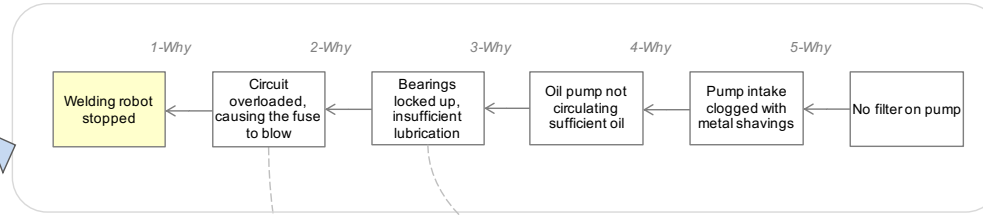
Sentences written down the page. (81 words)

- "Why did the robot stop?"**
The circuit was overloaded, causing a fuse to blow.
- "Why is the circuit overloaded?"**
There was insufficient lubrication on the bearings, so they locked up.
- "Why was there insufficient lubrication on the bearings?"**
The oil pump on the robot is not circulating sufficient oil.
- "Why is the pump not circulating sufficient oil?"**
The pump intake is clogged with metal shavings.
- "Why is the intake clogged with metal shavings?"**
Because there is no filter on the pump.

Source: Toyota Global website, <https://global.toyota/en/>, 2016. Toyota and the Toyota

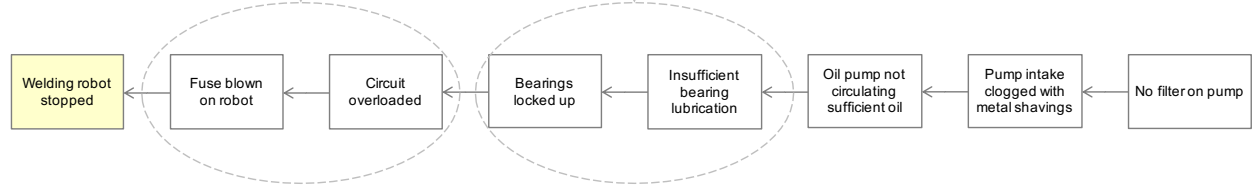
5-Why Cause Map™ Diagram

Basic - Linear - One Path (31 words)



7-Why Cause Map™ Diagram

Basic - Linear - One Path (31 words)



The answer to the Why question "circuit overloaded, causing a fuse to blow," contains a cause-and-effect relationship that should be separated.

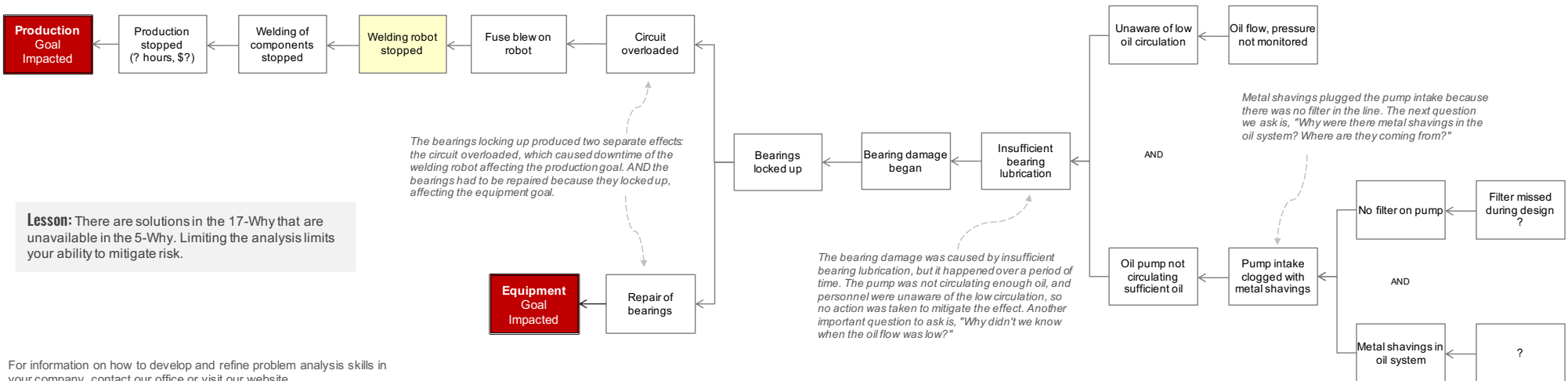
The answer to the second Why question also contains a cause-and-effect relationship that should be separated.

...Then Expand It.

A thorough analysis reveals better solutions.

17-Why Cause Map™ Diagram

Mid-Level Analysis with Parallel Cause-and-Effect Relationships - Four Causal Paths (70 words)



The bearings locking up produced two separate effects: the circuit overloaded, which caused downtime of the welding robot affecting the production goal. AND the bearings had to be repaired because they locked up, affecting the equipment goal.

The bearing damage was caused by insufficient bearing lubrication, but it happened over a period of time. The pump was not circulating enough oil, and personnel were unaware of the low circulation, so no action was taken to mitigate the effect. Another important question to ask is, "Why didn't we know when the oil flow was low?"

Metal shavings plugged the pump intake because there was no filter in the line. The next question we ask is, "Why were there metal shavings in the oil system? Where are they coming from?"

Lesson: There are solutions in the 17-Why that are unavailable in the 5-Why. Limiting the analysis limits your ability to mitigate risk.

For information on how to develop and refine problem analysis skills in your company, contact our office or visit our website.

