Start With a 5-Why A quick and simple way to start a problem analysis.

5-Why Cause Map[™] Diagram Effect Cause Basic - Linear - One Path (31 words) Welding Robot Stopped Basic Cause-and-Effect Relationshin Toyota Example 1-Whv 2-Whv 3-Whv 4-Whv 5-Whv **Conventional 5Whys** Circuit Bearings Oil pump not Pump intake Sentences written down the page. (81 words) Welding robot locked up, overloaded, circulating clogged with No filter on pump causing the fuse insufficient stopped sufficient oil metal shavings lubrication to blow 1. "Why did the robot stop?" The circuit was overloaded, causing a fuse to blow. 2. "Why is the circuit overloaded?" There was insufficient lubrication on the bearings, so they locked up. 3. "Why was there insufficient lubrication on the bearings?" The oil pump on the robot is not circulating sufficient oil. ...Then Expand It. 7-Why Cause Map[™] Diagram 4. "Why is the pump not circulating sufficient oil?" The pump intake is clogged with metal shavings Basic - Linear - One Path (31 words) A thorough analysis reveals better solutions. 5. "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 Oil pump not Pump intake Insufficient Welding robot Fuse blown Circuit Bearings clogged with No filter on pump bearing circulating stopped on robot overloaded locked up sufficient oil lubrication metal shavings The answer to the Why question "circuit The answer to the second Why question also 17-Why Cause Map[™] Diagram overloaded, causing a fuse to blow," contains a contains a cause-and-effect relationship that cause-and-effect relationship that should be should be separated Mid-Level Analysis with Parallel Cause-and-Effect Relationships - Four Causal Paths (70 words) separated Production Production Welding of Unaware of low Oil flow, pressure Welding robot Fuse blew on Circuit oil circulation not monitored Goal stopped components stopped robot overloaded (? hours, \$?) Impacted stopped 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? The bearings locking up produced two separate effects: Insufficient the circuit overloaded, which caused downtime of the Bearings AND Bearing damage bearing welding robot affecting the production goal. AND the locked up began lubrication bearings had to be repaired because they locked up, affecting the equipment goal. Filter missed No filter on nump during design Lesson: There are solutions in the 17-Why that are unavailable in the 5-Why. Limiting the analysis limits your ability to mitigate risk. The bearing damage was caused by insufficient Oil pump not Pump intake bearing lubrication, but it happened over a period of circulating clogged with AND time. The pump was not circulating enough oil, and sufficient oil metal shavings Equipmen Repair of personnel were unaware of the low circulation, so Goal bearings no action was taken to mitigate the effect. Another important question to ask is, "Why didn't we know Impacte when the oil flow was low? letal shavings in ? oil system For information on how to develop and refine problem analysis skills in your company, contact our office or visit our website.



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