Welding Robot Stopped

Conventional 5-Whys
Sentences written down the page. (81 words)

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.

4. "Why is the pump not circulating sufficient oil?"
The pump intake is clogged with metal shavings.

5. "Why is the intake clogged with metal shavings?"
Because there is no filter on the pump.

Cause Map 5-Why
Basic - Linear (31 words)

1-Why 2-Why 3-Why 4-Why 5-Why

Welding robot stopped → Circuit overloaded, causing the fuse to blow → Bearings locked up, insufficient lubrication → Oil pump not circulating sufficient oil → Pump intake clogged with metal shavings → No filter on pump

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Cause Map 17-Why
Four causal paths
Mid-level Analysis with Parallel Cause-and-Effect Relationships (70 words)

Production Goal Impacted → Production stopped (7 hours, $?) → Welding of components stopped → Welding robot stopped → Fuse blew on robot → Circuit overloaded → 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.

Equipment Goal Impacted → Repair of bearings

The bearing damage was caused by insufficient bearing lubrication - but it happened over a period of time. Not only was the pump not circulating enough oil, but personnel were unaware of the low circulation, so no action was taken to mitigate the effect. Another important question 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 is "Why were there metal shavings in the oil system? Where are they coming from?"