No-Fault Problem-Solving

A focus on learning creates many more solutions by repeatedly and systematically asking, “Why?” instead of “Who?”

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Variances, What Variances?

It seems we can never have enough problem-solving skills. Problems arise constantly on our projects and in our lives. While there are numerous approaches to solving problems, often the problems don't stay solved. We don't learn. Our projects don't get easier through time.

On every design and construction project, we get results we don’t expect. Details are overlooked; parts are mis-installed; work is done out of sequence; people are delayed waiting for materials or each other; and people are hurt or almost injured in near misses.

How do we react when these variances occur? Typically, one of three things happens:
We fix the situation and move on, only to encounter the same variance at another point in the project or on another project down the road.

We look for someone to blame and then punish them. The punishment may be a stream of verbal abuse, a financial penalty, or even a firing.

We hide the problem. A person who has made an honest mistake hides it in order to save face or avoid punishment. Covering up the variance appears to be in the person’s best interest.

There is an alternative to this approach. We can turn these variances into opportunities for deeper learning and improvements, higher safety, better quality, better relationships, better production and lower cost.

How do we do it?

We apply a deep learning technique called the 5-why approach, which is used successfully and routinely in organizations like Toyota in manufacturing and leading design and construction companies. What is different about this approach? It requires changes in both attitudes and habits.

First, we have to see how easy it is to fall into a mood of blame when something goes wrong. This habit is so pervasive that we may not even notice it. What is the alternative to this mood? A mood of inquiry and learning. Instead of an immediate reaction of “Isn’t this terrible?” we shift the question to “Isn’t this interesting – I wonder why it happened? What can I learn from this?” When we ask questions like these, we invite people around us to help with the investigation.

Second, we have to develop a culture where our workers know it is not only okay to point out a variance, but it is expected as soon...
as it is noticed. We need people to understand that we want to learn, grow and improve from these opportunities. The moods of inquiry and learning are critical to achieve this shift. People will not learn to speak up about variances and want to swarm the situation if we are in a mood of blame!

When we ask, “Why?” sometimes we see an immediate answer. The answer may seem so obvious that everyone agrees with it. Here is the point where we need to overcome our habit of jumping to a conclusion. We need to control our impulse to act immediately to fix the problem and ask why again. Often times we will find that there is more than one cause to a variance or an unexpected situation. We need to question the answer we get and question the explanation. If we do so, we may find out that our underlying assumptions are not so solid after all. This new way of thinking shifts importance from heroic fire-fighting to engaging project team members in a standard process to prevent fires.

In an ordinary 5-why, the point is to ask why the variance happened, then take the answer and ask why again. We repeat this process until we’ve asked, “Why?” five times (or more if necessary) to uncover the apparent root cause. The limitation of this linear 5-why approach is that it may lead us to overlook important factors in situations that have multiple causes and introduce countermeasures that do not completely solve the problem.

When we do a Good 5-Why™, we don’t look for just one answer to why the variance occurred. We look for many plausible causes for the variance. Then we continue to ask “why” to each of those causes, again looking for multiple plausible causes. Utilizing this tool will help us learn about the primary root cause, the secondary root cause, and all of the other causes along the way. This can lead us to making 10-15 (or even more) improvements around the variance situation.
**Linear 5-Why**

Let’s look at how these work. We’ll use a hypothetical example that has been popularized by Jeffrey Liker in *The Toyota Way* (page 253).

The variance is: There is a puddle of oil on the shop floor.

**Linear 5-Why:**

1. Why is there a puddle of oil on the shop floor?  
   *Because the machine is leaking oil.*

2. Why is the machine leaking oil?  
   *Because the gasket has deteriorated.*

3. Why did the gasket deteriorate?  
   *Because we bought gaskets made of inferior material.*

4. Why did we buy gaskets made of inferior material?  
   *Because we got a good deal (price) on the gaskets.*

5. Why did we buy gaskets based on “a good deal?”  
   *Because the purchasing agent gets evaluated on short-term cost savings.*

**Summary:**

Now we’ve gotten to the point where we can come up with some countermeasures to help prevent this variance from recurring. The countermeasures which correspond to the 5-whys above could be:

1. **Clean up the oil**
2. **Replace the gasket**
3. Change gasket specifications

4. Change purchasing policies

5. Change the evaluation policy for the purchasing agents.

The primary difference with a Good 5-Why is that we’ll look for multiple causes and countermeasures along the way. To do this, we’ll explore man, machine, method, material, management, metrics and the environment.

**Good 5-Why**

Now, let’s do a Good 5-Why and see what we can learn about the same situation mentioned above. When we gather to do this, we want to gather not only all of the people that were there when the oil dripped onto the floor, but anyone with additional expertise, experience or insight into the variance.

We will start off with the same variance, but we will explore more than one answer for each question ‘Why?’ and look for countermeasures along the way.

The variance is: There is a puddle of oil on the shop floor. The initial countermeasure we would take is to clean up the oil.

**First Round of Why**

*Why is there a puddle of oil on the floor?*

   Because the machine is leaking oil.

Before we move on, we evaluate if there are other reasons the machine is leaking oil. Since we’re standing at the place of variance, we look at the machine and see the oil dripping from the bottom. Then we look for a realistic countermeasure we can take. Looking at the answer, we could clean up the oil.
GO TOUGH ON THE ISSUE

When doing a Good 5-Why, we want to be rigorous when investigating an issue. Explore all 6Ms + E to learn about anything that impacts the issue to find any areas that have room to be improved.

Look for answers that are seemingly reasonable or probable. Encourage participants to share any causes they may think contribute to the issue. The group can talk about them to decide if they are likely. Make sure people don’t hold back because they think their idea isn’t good.

Don’t work around the problem – talk about the elephant in the room.

Second Round of Why

Why is the machine leaking oil?

Because the gasket has deteriorated.
Because the bolt is loose.
Because the oil overflowed.

Before we move onto the next round of questioning, we look for countermeasures that would be realistic to take. The countermeasures from this round of questions include:

“The gasket has deteriorated” > Replace the gasket
“The bolt is loose” > Tighten the bolt
“The oil overflowed” > Drain excess oil

Third Round of Why

Moving onto the third round of questioning, we are going to use a few different words other than “Why?” The meaning will still be the same, as you will see. But sometimes there are different or better ways to ask the question.

What are the reasons the gasket deteriorated?
We didn’t follow a regular maintenance plan.
> Follow a maintenance plan.
We bought gaskets made of inferior material.
> Change gasket specifications.

Why is the bolt loose?
Not enough torque was used when assembling the machine.
> Use a torque wrench.
Bolt is cross-threaded.
> Replace the bolt.

What caused the oil to overflow?

Worker put too much oil into the machine.
> Establish a visual indicator.

Fourth Round of Why

Going forward, we’ll move onto the fourth round of questioning and get:

Why don’t we follow a regular maintenance plan?

We didn’t know we needed to follow a maintenance plan.
> Read manuals when installing new machines and post the requirements.

What made us purchase gaskets that were made of an inferior material?

Because we got a good price on the gaskets.
> Change the purchasing policies.

What caused incorrect torque when assembling the machine?

We assembled the machine by hand using a standard wrench.
> Use a torque wrench in the future.

How did the bolt get cross-threaded?

The bolt was likely installed at an angle instead of straight.
> Retrain on bolt installation and use a torque wrench.

Why did the worker put too much oil in the machine?

Worker didn’t know how much oil to put in the machine.
> Post the specs on the machine.
Let’s evaluate these answers. Notice the answer the question, “How did the bolt get cross-threaded?” includes the word “likely.” We can’t disprove that, since the bolt is indeed stripped. So we want to take action on that to prevent the bolt from stripping again, whether or not it truly was installed at an angle.

Fifth Round of Why

As you’ll see, moving into our fifth round of questioning we will stop going down some of the chains, as they are sufficiently resolved or no longer actionable:

Why did we buy gaskets based on the pricing?

Because the purchasing agents get evaluated on short-term cost savings.
> Change evaluation policy for purchasing agents.

Why wasn’t the amount of oil to be used evident to the worker?

Because there is no standard measuring tool for the oil in this machine.
> Create a standard measuring tool/cup and tie it to the machine.

Plan Follow-Up Action

Now that we’ve gone both wide and deep in our questioning and countermeasures, we select the countermeasures that we are going to take, who is responsible for them, when they will be completed, and how we are going to verify that the changes are meeting our new expectations.

We’re not simply talking about a traditional action item list. Of course, that is needed. But just as important, we need to consider the “Study” and “Act” portion of PDSA (Plan-Do-Study-Act). We’ve done our “planning” and the action item list gives us the
“do.” We need to decide, “How do we know the improvements we have made are meeting our expectation?” Let’s put the following “studies” in place:

John will set up a follow-up meeting one month after changing the purchasing agents’ evaluation policy to evaluate the situation and see if it’s resulting in the purchasing of better gaskets.

After supplying and training workers with the new torque wrenches, Steve will inspect to make sure the bolts are indeed tight and straight.

Chris will post the oil fill specs, locate and tie the measuring tool to the machine. After the next oil change, Chris will check the machines to make sure they are filled to the correct amount.

It is important to verify the plans that have been made and executed are giving the intended results. Sometimes they will result in unintended consequences. The key here is to learn from your expectation and what actually occurred. It is a failure only if the learning is ignored.

This expanded Good 5-Why gives us a total of fourteen realistic improvements to make, many of which will fix systemic problems!

Did you have trouble following along through all of this? Most people do. This is why the use of the Good 5-Why template is strongly recommended – especially as you are beginning. Visit [www.good5why.com/oil-example/](http://www.good5why.com/oil-example/) to view the same example as above, but put on the A3 template rather than written out. Filling out this template on paper or a white board while the exercise is being done is a simple way to keep track and capture everything.
Summary:

The use of exactly five whys is arbitrary. You may find you reach your initial causes in fewer steps or many more steps. The objective is to reach a point that allows you to take action to eliminate all of the causes. See how much more there is to learn about the situation? Now we can take action on multiple countermeasures, making many improvements very quickly! There are many more branches to this situation than you will discover with a linear 5-why.

Take Action...Again and Again!

Good 5-Why analysis is not the end game. The underlying issues must be addressed after they are identified. As a manager, how can you facilitate the follow through?

Assign each action to a single person. Set a mutually agreed-upon deadline for accomplishing that action.

Offer help to make that action successful. This is especially important when working on new issues and with people who are new to the Good 5-Why approach.

Don’t wait for a perfect solution. Get in the habit of adopting an 80% solution which will be followed by another 80% solution. That will get you 96% of the way there! [80% + (80%*20%) = 96%] For that matter, adopt back-to-back 70% solutions. Two of those will get you to 91%. Three 70% solutions will eliminate 98% of the variation!

Don’t let the absence of data get in the way of creating something that you can test. Learn from contained experiments, and then move to broader implementation. Collect just the data you need to give you confidence you are pursuing an approach that is likely to work.
HABIT-MAKING PRACTICES

Building the habit to develop an organizational shift in the perspective of seeing and resolving problems:

- **Start with yourself.** Make a daily commitment for 30 days to build the habit – put a reminder on your calendar.

- **Get a buddy to join you.** Peer coach each other.

- **Offer positive feedback** for surfacing problems and doing Good 5-Why analysis, limit negative feedback.

- **Allow for mistakes and flaws** – understand that success does NOT equal perfection. Remember to learn from them.

- **Be aware of the pros** (learning, development, resolving systemic issues) and the cons (will take extra time, some people may be cynical, etc).

Decide how and when you will check – not just to make sure the actions are complete, but to ensure that the results of the actions taken are giving you the outcome you expected. If the outcome is different from what you expected, learn from understanding why – then make adjustments.

Propagate solutions throughout the company. The key action is to write down your Good 5-Why analysis and follow with a written description of the changes you’ve adopted. Then share those two reports with others.

**Making Good 5-Whys a Habit**

Exploring variances is a collective activity. Your results will be better if everyone participates and contributes. Implementing this kind of change takes leadership and training. What can you do to introduce this new approach to your organization?

Start with yourself – begin to notice your own attitudes towards variances and problems. Practice shifting into a mood of inquiry and learning. Shift from “who is to blame?” to “how did this happen?” Lead by example.

Supervisors, team leaders and management are the people that can make this a habit. A focused effort is needed to counteract the three typical responses workers have when encountering a variance.

Get some training for your people. Lean Project Consulting has a 10-hour training course called Good 5-Why™.

Consider hiring a coach – sometimes to change our habits and develop a new skill, we need a personal trainer. They can help us perfect our golf swing, our jump shot, or our learning skills.
About the Authors

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Other Resources

**Good 5-Why A3 template**

Visit our site [www.good5why.com](http://www.good5why.com) to download the template and to see more examples. The Good 5-Why™ A3 Template is available under a Creative Commons License. You are free to make copies of the template. You are not free to make changes to it. Please reference [www.good5why.com](http://www.good5why.com) as the source of the document when writing about the Good 5-Why approach. Thank you. Good 5-Why is a trademark of Lean Project Consulting, Inc.

**Leading Good 5-Why Sessions**

Lean Project Consulting offers a 10-hour course to teach supervisory and professional staff on how to lead and facilitate A Good 5-Why learning and improving session. The course is in the style of the Training Within Industry J-programs. There are only 10 students in the course. This gives each student the opportunity to practice and get individualized coaching from peers and the instructor. Lean Project Consulting also offers a train-the-trainer for people who want to deliver the 10-hour program. Contact us to explore this for your organization, 303-665-8385.