Measuring and Evaluating Safeguard Effectiveness

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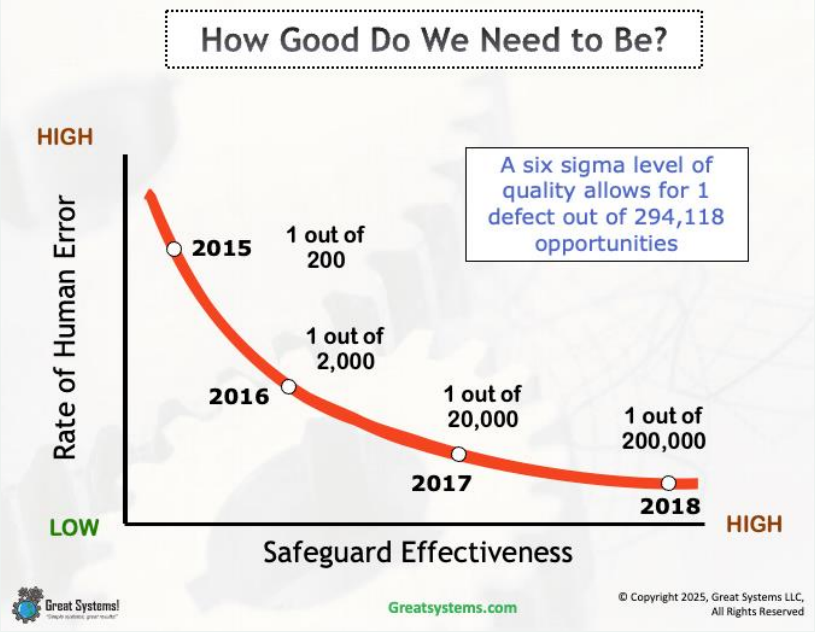
How Effective are Your Error Prevention Safeguards?

Unfortunately, few organizations have systematic processes in place for measuring and evaluating workplace safeguard effectiveness.



Safeguard effectiveness is the key to minimizing daily errors and failures. This has been one of my key learnings over the past 20+ years as a contract instructor for the **TapRooT® root cause analysis process**.

How effective are the safeguards that you use to prevent human error and equipment failure? Do your root cause analysis efforts typically lead to a safeguard-focused fix versus a person-focused (weak) fix?

The Safeguard Effectiveness curve I share in this post illustrates this key relationship. Daily human error rates and failures directly relate to safeguard effectiveness primarily, and safeguard number secondarily.

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Please note that I just said 'safeguard effectiveness' there, not just NUMBER OF! Layers of protection matter. However, for a given package of safeguards to work, it is best to optimize the effectiveness of each layer.

One safeguard with an 'engineered fix' focus probably reduces a given error rate as much as four or five weaker fixes such as a sign, a monthly training class, or the daily supervisor reminder. **Our biggest problem is we fail all too often to question, let alone measure and trend, safeguard effectiveness.**

Evaluating Safeguard Effectiveness versus Safeguard Number

Recently, I worked with a company that had an impressive set of safety systems in place – fourteen to be exact.

On a daily, weekly, and/or monthly basis, they use a variety of audits, inspections, briefings, work plans and permits, JHAs and FLRAs, orientations and meetings, and training to minimize goofs. Sounds impressive, doesn't it?

Unfortunately, evaluating safeguard effectiveness was not a focus at this location. The number of times each safeguard was used was being tracked.

Measures for evaluating safeguard effectiveness had not been defined. Big problems were being captured, and some daily near miss errors were being snagged.

However, safeguard strengths and opportunities for improvement were not evident. Limited opportunities for improvement or learning could be identified. How much value does each type of safeguard REALLY return?

How do you measure the effectiveness of your key safeguards? For example, how effectively does each of your supervisors spend their thirty minutes or so of job preparation time each day? How effectively does each employee spend his or her twenty hours of computer-based learning each year?

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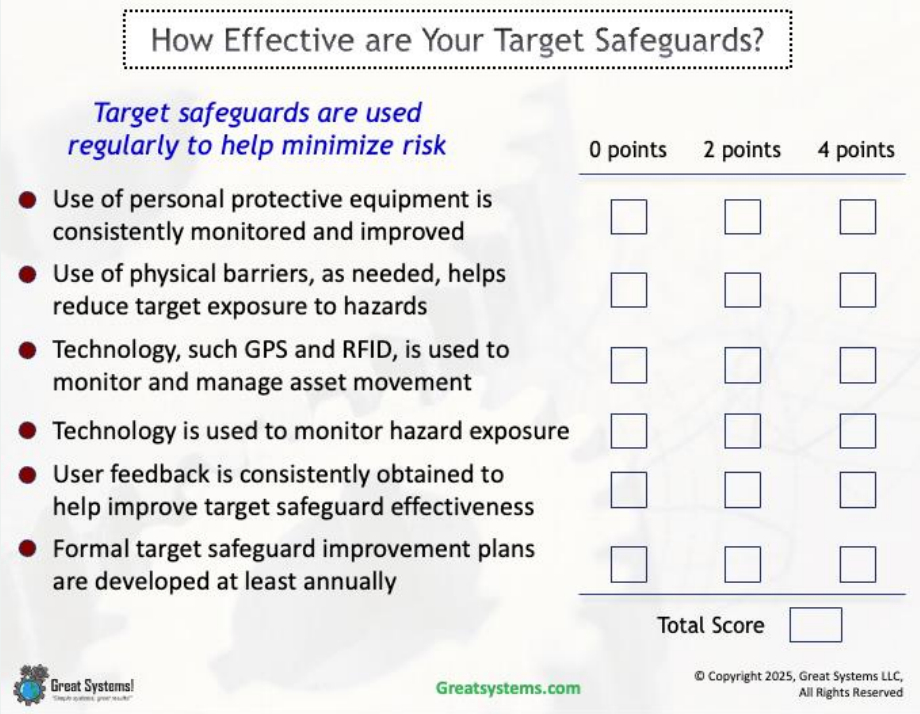
How effective is the 40 or so hours you invest in process audits annually? Many people have not thought about how to evaluate their safeguards in this manner, despite the monies we invest.

Are Your Safeguards Process or Target Guards?

Some safeguards, like tailboard meetings, walk throughs, audits, training, orientations, and the investigation effort itself are repeatable processes. All processes produce outcomes.



We just need to find the vital signs of effective process performance. To what degree can you define the outcomes for each of your key process safeguards that you use?

For example, it takes a certain amount of time to conduct a tailboard meeting. Whenever someone spends time, they also spend money. Tailboard meeting attendees are customers of that process. In turn, you can track their satisfaction.

Finally, all processes contain some level of errors and/or defects that you can count. Plus, you can trend these errors and defects over time in rate form (defects or error per meeting).

Other safeguards, like personal protective equipment, equipment guards, and other types of 'target guarding' rely less on humans doing the right thing. This latter safeguard type is not a process. Still, one can always survey user satisfaction with target guard effectiveness.

Plus, we can use observation to measure target guard effectiveness. As you know, humans can find a way to defeat target guard effectiveness. How often do the humans you supervise defeat their 'target guards'? Have you tried to trend such percentages over time?

Measuring Safeguard Effectiveness - Target Guards

I will start with the non-process, or target guarding, safeguards, as their effectiveness is relatively easier to measure than the process-based safeguards. Basically, your behavior-

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based observation / near miss / 'at risk' behavior monitoring processes should detect those hopefully rare occasions when people bypass, or fail to use, target guards.

Engage and properly train most of your work team members to support such auditing efforts. If you do, you should be able to get a pretty good read on the relative effectiveness of your key target safeguard types.

What is the likelihood that people might try to bypass or compromise a given target guard? What reasons do they give you for acting in this manner?

Plus, we can evaluate the design of the target guards themselves. Best practice designs are out there and in use, whether we are aware of them or not. For example, there are multiple ways to barricade an open hole, protect one's hands or eyes, and provide effective fall restraint.

How well do you design your target guards? To what degree do you use best in class target guards? What target guard improvements might your work team members suggest?

Three Ways to Measure Process Safeguard Effectiveness

The process-based safeguards are not that much harder to measure. The problem is that we are simply not that familiar with how to measure the effectiveness of management-level work systems.

All too often, we fail to even see these repeatable efforts as processes that we can measure with each cycle that occurs. Fortunately, there are three simple ways to regularly monitor these repeatable types of safeguards:

- Ask your internal and external customers to evaluate safeguard effectiveness via survey
- Trend the cost and time ratios for each safeguard process
- Capture and trend major defects and errors that occur with each process cycle

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Measurement Option #1: Ask your internal and external customers via survey

This is the best way to gauge process safeguard effectiveness IF your culture is open and honest enough. Similarly, you can use surveys to gauge target guard effectiveness.

High performance companies survey both customer types on at least an annual basis to help determine how well their key management systems, including their different key safeguards, work. How do you measure key work system effectiveness?

For example, it is not uncommon to have one or more annual employee survey statements that focus on the effectiveness of regular workgroup meetings or training sessions that take place. With today's technology, it is easy to also do spot check surveys.

One common method is to ask each employee to complete a short 3-5 question 'pop up box' survey each time they log onto the system for their messages each day. We also always have the option to use 'old school' paper assessments.

Measurement Option #2: Trend the cost and time ratios for each process

All processes expend time and money as they cycle, whether we measure such values or not. In turn, we can calculate and trend the cost and time spent per cycle in terms of calendar hours, or cumulative people hours, over time.

I am amazed that more managers are not required to use lean six sigma methodologies to reduce these time and cost ratios given the enormous costs associated with team meetings, training, and town hall meetings.

All work is a process, and all processes have an owner and vital signs. Why isn't every process owner manager working to optimize the measures and processes they own?

Measurement Option #3: Capture and trend major errors that occur with each process cycle

Do you track meeting defects for each meeting? Do you look at how often a leader fails to engage the team effectively when they talk to them prior to work? How often do you measure daily work package quality relative to accurate, complete, and easy-to-use information?

All processes should have a defined set of steps and specifications for effective execution. When we deviate from such standards, a defect occurs.

What are the key performance expectations that process owners must manage as they execute their process-based safeguards on a daily, weekly, or monthly basis?

Also, all processes produce both outcome and in-process measures. The problem is we often don't capture and trend them. It is not enough to simply track the number of process cycles.

One needs cost, customer satisfaction, and quality measures to understand the overall effectiveness of our process cycles. When it comes to process measurement, we must start

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somewhere. The above three areas, coupled with general 'at risk' behavior tracking with good findings/day flows, are great places to start.

Evaluating Safeguard Effectiveness Reduces Risk Levels and Error Rates

A strong relationship exists between safeguard effectiveness and human error rates exists. In fact, you should explore the relative strength of your existing safeguards.

You might find some patterns and systemic reasons that help explain why certain problems keep coming back. **Effective safeguards reduce human error rates!**

We often fall into an organizational trance where we think that our investments in rule enforcement, training, process improvement, and leadership development keep us error free. However, a lack of tracking daily errors does not mean that one is error free.

Where is the proof? Which safeguards provide more value than others? Which safeguards need improvement?

If we don't measure daily process errors, how do we really know? Safeguard absence and failure leads to process errors, but few process owners track such errors.

We track and analyze the big problems, but we pay little attention to the small, daily errors that are the precursors to the big ones. If you want to find failed safeguards, identify and track the leading indicators – the daily errors – that contribute to safeguard failure.

Go out and look for them! One might argue that this is the purpose of audits, and I would agree. However, sampling is not enough if we want to stop daily goofs for good.

How Error Free Do You Truly Want to Be?

One can evaluate safeguard effectiveness via surveys of many types, criteria-based human performance observation ala **Toastmasters**, and sound root cause analysis of human error. Remember, most people do not measure the effectiveness of their existing safeguards.

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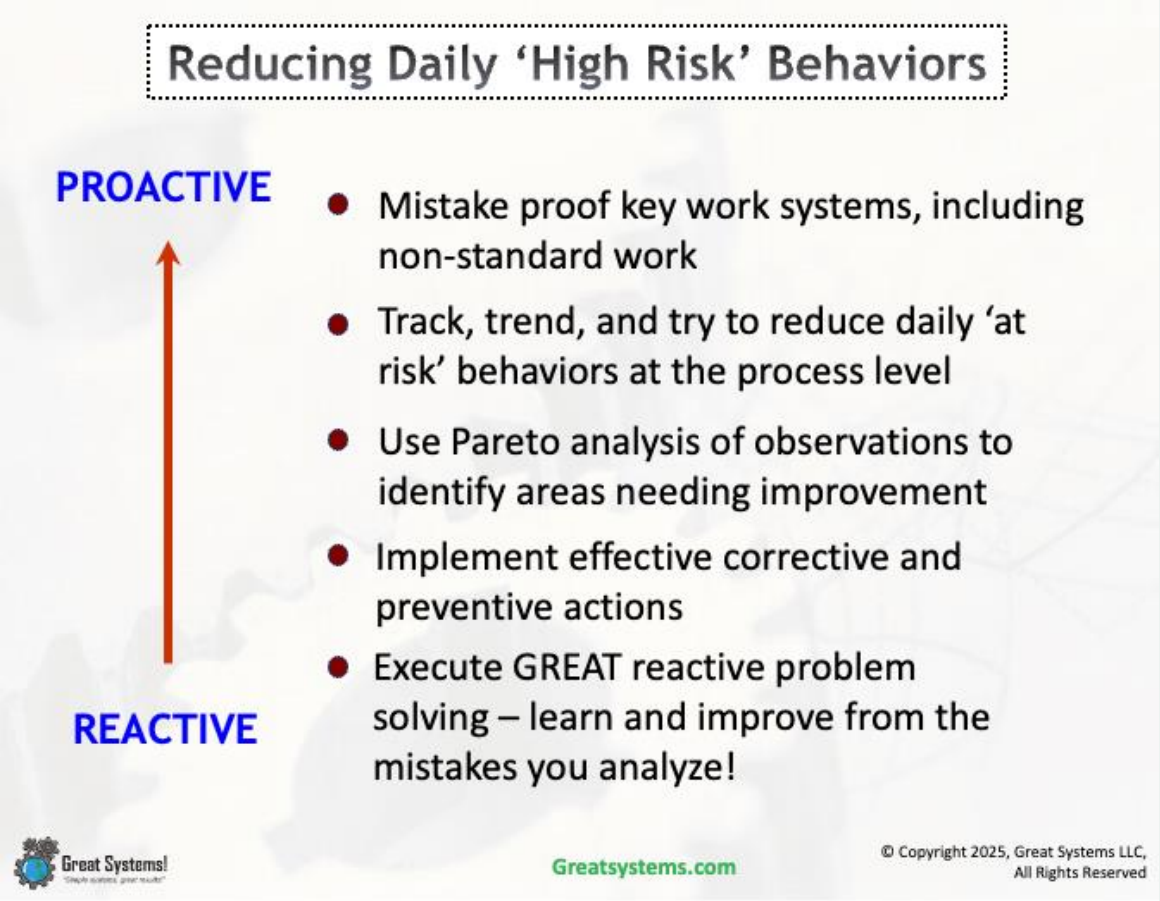
"The first step on the road to high performance begins with a choice."

How much do you resemble the company that uses fourteen different safeguards to keep people safe, but doesn't measure the effectiveness of any of them directly?

How error-free do you really want to be? **Could you become even more error free, at a lower cost, if you improve the effectiveness of your existing safeguards?**



Follow these links for more content related to proactive process and human performance improvement in the workplace:

- **How to Write Effective Corrective Actions**
- **Ideas for Measuring Incident Investigator Competency PDF**
- **Be Proactive with Process Improvement**
- **Workplace Safety Best Practices**
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- **Corrective Action Tactics and Mistake Proofing Workshop Overview PDF**
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About the author

As Chief Excellence Officer of Great Systems LLC, Kevin McManus provides virtual coaching and content to help people use proven best practices to enhance and optimize their daily work systems.

Over forty years of work experience in roles such as Industrial Engineer, Training Manager, Production Manager, Plant Manager, and Director of Quality give Kevin a 'real life work' perspective relative to daily work process optimization, work team engagement and empowerment, and sustainable operational excellence.

As a contract trainer for the TapRooT® root cause analysis process, Kevin has taught over 450 courses and further enhanced his ability to help leaders proactively minimize risk, reduce errors, and improve reliability. Kevin holds an undergraduate degree in Industrial Engineering and an MBA. He served as a national Malcolm Baldrige Performance Excellence Award Examiner for twenty years, including a three-year term on the national Judge's Panel.

Kevin has authored the monthly performance improvement column for Industrial and Systems Engineer magazine for over 20 years, is an Institute of Industrial and Systems Engineering Fellow and has been a member of IISE for over forty years. His newest book, "Different Company – How the Best Build Great Organizations", will be published in late 2025.

If you would like more information about the improvement tools and systems I have to offer, please send me an e-mail at **kevin@greatsystems.com.**

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"The first step on the road to high performance begins with a choice."

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"Simple systems, great results!"

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- Over 100 proven techniques to help minimize the risk and error potential associated with daily job completion

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- 162 pages of examples, strategies and dialogue questions to help you stop daily goofs for good
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- Two assessments to help you gauge the degree of support your lean efforts require and how much progress you make

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