



Let's Get Practical – How to Use a Safety Standard for Start and Restart

Once a safeguarded space is defined by a risk assessment it's time to determine where the start and restart should be located – and when it can be safely activated. There is no canned one-size-fits-all answer to this issue. Standards define the requirement and act as a guide, but the path you take is based on your application – and the particular solution must be driven by the Performance Level (PL) generated via a risk assessment.

Why We Get Frustrated with Safety Standards

Complexity in the details often gets in the way of making a fast, simple component choice and configuration for a safety system.

I received a D+ on the first essay I wrote for my college English class. I couldn't understand why. The grammar was correct with nouns, verbs and prepositions all in their proper place, there were no spelling mistakes, and I used precise details to defend my position. When I asked why, the professor said I was not persuasive. Hmm What did he mean by that? It was logically stated, just like a homework problem would be for a numerical analysis math class. So, I started to capture his words during the lectures, and then I discovered the secret. He wanted me to express my thought in a way he understood, which ended up being loaded with analogies brimming like Pooh Bear's dream honey jar. The rest of my papers were inspired by whatever was on T.V. and my grades soared up faster than a plane anxious to leave O'Hare airport.

Maybe this experience is why I think math classes are so much easier than English. While an English composition may be structurally correct, the outcome is subjective to the reader's style and opinion. With math there is only one correct answer, but there are different ways you can achieve it. Math is similar to safety and I am here to ignite your interest in how to apply safety standards to your project design.

Safety Standards Guide Your Start and Restart Design

Let's assume the safeguarded space has been defined by the risk assessment. Now it is time to determine where the start and restart should be located and when it can be safely activated. Opening up section 5.6.3.4 of the robotics' standard, ANSI/RIA 15.06-2012, it says personnel inside the safeguarded space shall be protected from start and restart.

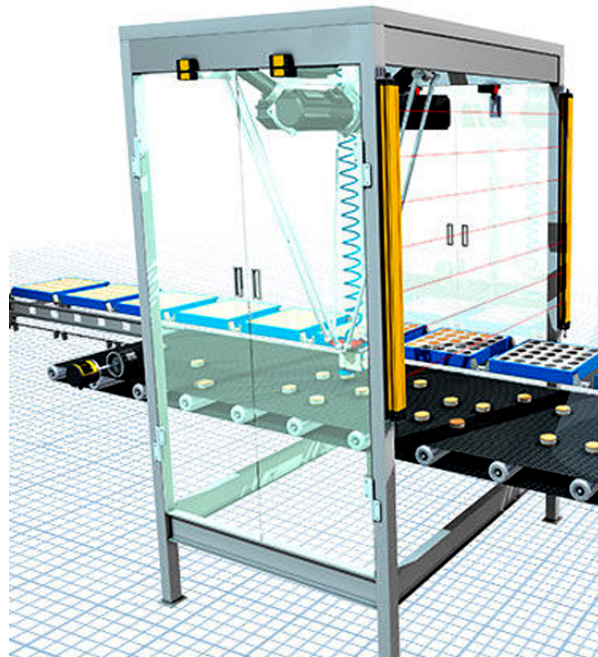
Don't quit reading this article just yet if you don't have robots since the same intent it is also found in many other standards. You can find a list of recommended standards for different machine types through <http://industrial.omron.us/en/services-and-support/resource-center/ansi-standards>. ANSI B11.19 (Performance Criteria for Safeguarding) is a recommended standard for any application that doesn't have a specific standard and for complementary equipment.

When you continue reading, the standard gives you direction to help you select the safety devices you might use, but it never comes out and tells you exactly what safety device you have to use. It keeps the options available so you can use the result of the risk assessment to determine what works the best for your application. After all, your system might be completely unique and implementing a predefined solution could create additional hazards.

Smaller systems where access into the hazardous area is limited could use a visual method before the start and restart is activated. It follows the part of the standard requiring, “the operator shall be able to ensure that no-one is in the safeguarded space.”

Where to Place Start and Restart Controls

So now the question is where to put the start and restart. Read a little further into the standard to find the answer. “The location of start and reset actuating controls should allow a clear and unobstructed view of the safeguarded space.” While you don’t see it in this image, there is an operator panel on the other side of the robot. The operator panel has a start pushbutton, along with the emergency stop button, reset pushbutton, and an HMI for the motion controls and troubleshooting. I read the standard multiple times and have yet to find information telling me I had to put the start and reset button on a control panel. The decision was based on the risk assessment and knowing where the operators would be located when the function was needed.



In this application the robot is handling cookies. But how could the situation change if this same system was used to mix different chemical combinations into vials for a company that is searching for new medications? The risk assessment could show that it is safer to restart a system from a remote area. In that case a start and restart on a control panel next to the system may not work. However, a video camera mounted inside the system with feedback to the operator could be a possible solution.

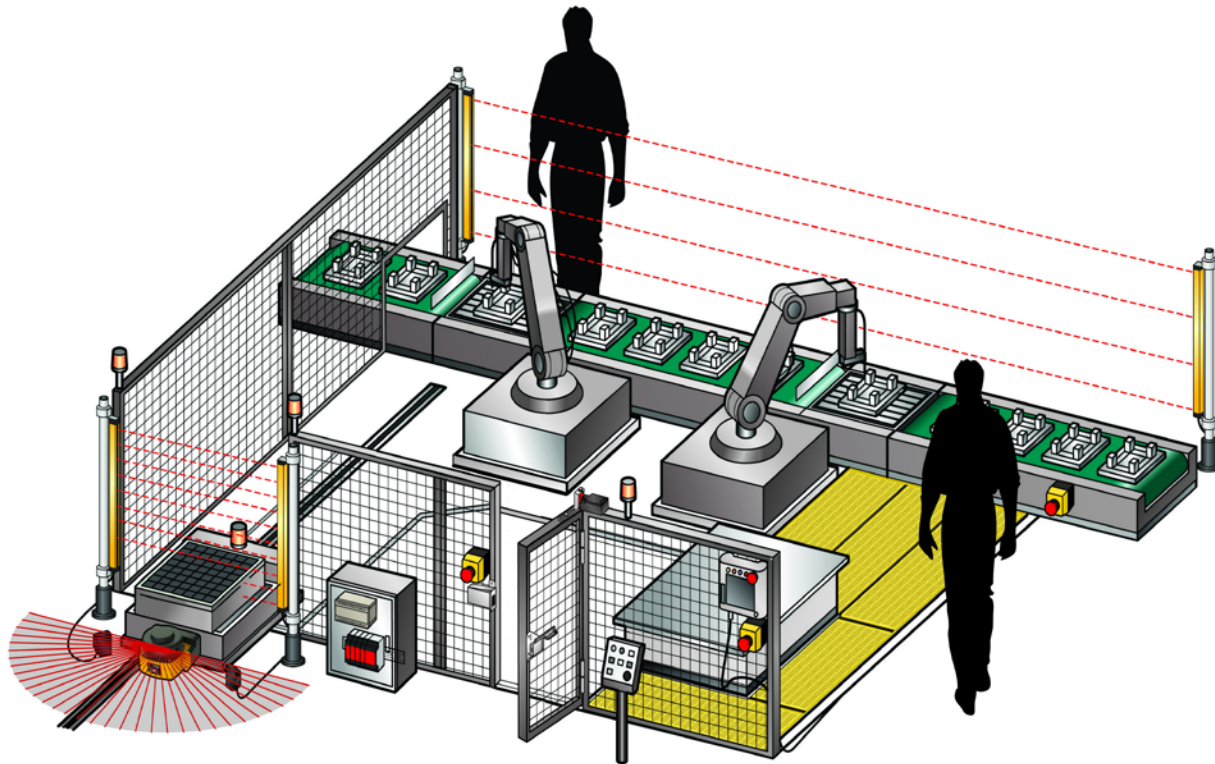


The next example removes part of the fencing and utilizes light curtains and safety mats to define the safeguarded space. Systems like this tend to have multiple operators and several access

points during maintenance. The standard says, “If (clear and unobstructed view) is not practical, presence sensing shall be provided to detect operators throughout the safeguarded space.” Here the safety mat is used to detect anyone in the area of the table. An electro-mechanical interlocking switch is used for the door, with most likely a lock out / tag out procedure in place.

If the risk assessment shows there is the potential of people being undetected, either extending the safety mats or adding a safety area scanner could be solutions. I personally would be inclined to select the safety area scanner. However, I know it is difficult to keep the area scanner window clean in a harsh environment. Floating particles create false tripping that shut down the machine. In those cases, I would use a safety mat due to its rugged durability.

Perhaps those solutions are not practical. So back to the standard where we find text about using a warning signal that can be seen or heard from within the safeguarded space and last long enough so everyone has enough time to get out. I once worked in an office that utilized a companywide intercom system. I got really good at blocking out all of the announcements and occasionally I missed one that was important to me. And guess what, the standards address this with a requirement to have easily accessible emergency stop devices within the safeguarded space. And notice, by using the word “devices” they leave the option up to you, whether it be a pushbutton, pull rope, or some other approved technology.



So let's sum this up.

The **problem** is the need to safely implement a start and restart.

The **path** you take is based on your application, with standards guiding you in a direction that steers you away from dangerous pitfalls.

The **solution** is determined by the PL (performance level) from your risk assessment. The technology of the safety devices selected is based on your application.

You can see how the standards have to be stringent enough to state the requirement, but flexible enough to be used in many applications. My examples are hypothetical and are not solutions for your application. Rather they are a starting point to help you think about different ways you can take to arrive at your "safe" answer.

Author

Tina Hull

Product Engineer - Safety
Direct 847 285-7267
Fax 847 285-8267
Mobile 847 239-2097
tina.hull@omron.com

Omron Automation and Safety
2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169

