Dynamic SIL Analysis

Prasad Goteti, P.Eng, TUV FS Expert, CFSE
Honeywell Process Solutions, Safety COE Americas, Houston, TX
prasad.goteti@honeywell.com

Abstract

INTRODUCTION

In a multipurpose plant, like the Pharmaceutical and Food and Beverage industry, the same plant may be used for processing different products at different times. How is Safety Integrity Level (SIL) analysis achieved in such plants? Should the most hazardous process be considered to design the Safety Instrumented System (SIS)?

In the case of continuous plants, like a Refinery, if the hazards change based on the properties of the Crude oil being processed, should the SIS be based on the worst case scenario?

TEXT

By determining the SIL based on the most hazardous process, the designed Safety Instrumented System (SIS) may be over instrumented for the rest of the applications! This may be not be the best option in terms of capital costs to buy the system and revenue costs to maintain the system. Is there a way out? Some of the options are:

1. Install an SIS of a lower SIL rating and consider non-SIS protection layers when the most hazardous process is online, especially if the frequency of operation of the most hazardous process is low.

2. Consider associated field instrumentation, already connected to the SIS as part of other Safety Instrumented Functions (SIF), for achieving the determined SIL for the most hazardous process. This makes the SIF “Dynamic” based on the running Process.

The intent of “Dynamic SIL analysis” is to modify the SIFs based on the Operating Process without compromising on Process Safety.

CONCLUSION

This paper intents to give some examples and scenarios indicating why the present SIL determination techniques do not adequately address the issues of over instrumentation which indirectly increase costs for the operating company for some applications.

This paper tries to give a direction to a new methodology, which I am calling “Dynamic SIL analysis”. This methodology will be illustrated by examples from the Process industry.