

Using Petri Net method for assessing safety barriers performance Case study: Oil and Gas Industry

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Abstract

Oil and gas industries has for a long time been faced with an increase of accident. For that, enormous efforts are maximized to reduce them by improving the safety systems performances of these processes. Safety instrumented systems (SISs) are practically considered important elements to avoid dangerous situations. Their availability to respond to these situations need to be guaranteed by experts and specialists. This paper presents an overview of different methods and used to estimate the unavailability of a safety instrumented systems in any process plant. The case study focused on a high integrity pressure protection system (HIPPS) that exists in most process industries and requiring high levels of availability for effective safety. First, the system is modelled as reliability block diagram, a method often used in the reliability analysis of safety systems. In fact, each part of a system considered to be available to make the whole system available and effective while considering the simultaneous failure of each part due to common-cause failures. Then, the safety system is modeled as a Petri process, using Petri nets approach. A quantitative and numerical evaluation of this model allows assessing better the availability in terms of probability of failure on demand (PFD).

Keywords

Availability modeling, reliability block diagram, Petri net, Safety system performance.

Biographies

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