

NZSSE Newsletter September 2021



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A word from Joe.

Hi everyone, and welcome to the latest edition of the NZSSE newsletter.

The last few months have been challenging for members throughout the country, and especially so for our Auckland colleagues who are still in a level 4 lockdown. Lockdown itself is bad enough, with the attendant challenges of working from home, childcare and generally managing the stress associated with a pandemic. It gets worse for engineers though – I haven't spoken to anyone who's been taking it easy, we were mostly too busy already, and our workloads if anything seemed to increase during the delta outbreak.

I hope our Auckland-based members are managing through these times, and that our members elsewhere in the country are getting back up to speed under level 2. Auckland is doing the heavy lifting on containing this outbreak, and I think many in the rest of the country do appreciate it – although I don't think it will put an end to inter-regional rivalries!

It's been a busy few months for the society. The committee has been at work on formalising some of the society's operating procedures, contributing to discussions around MBIE's proposal for occupational licensing of engineers, and supporting the delivery of a number of webinars.

Over the upcoming months we have more webinars, including a number of incident case studies. We'll be trying something new with these, which should be fun - we'll be using Zoom as a forum to summarise an incident, have a group discussion about the root causes and learnings, and then summarising the actual investigation results to see how they match the group conclusions. Basically we'll do a mock investigation, and see what happens.

We also have a number of presentations in the works from various parts of Worksafe – watch this space for further notifications.

Regards,

Joe Bain

From the editor

Its been a while!

Again I have to apologise for the delay, things have been a bit nuts as you will all agree.

Ok on a lighter note it's only 3 months till Christmas! (is that a groan I hear?).

Functional Safety lesson – HMI panels

A little bit of theory here for those that have a functional safety background.

Question: Can a safety-related stop function, for example, be reset via a graphical object representing a reset button on an HMI?

The short answer: No. Read on if you'd like to know more.

AS/NZS4024.1503 states...

- The manual reset function shall:
 - *Be provided through a **separate and manually operated device** within the SRP/CS;*
 - *Only be achieved if all safety functions and safeguards are operative;*
 - *Not initiate motion or hazardous situation by itself;*
 - *Be by deliberate action;*
 - *Enable the control system for accepting a separate start command;*
 - *Only be accepted by **disengaging the actuator from its energized (on) position**.*

Is the HMI touchscreen display a separate item – yes it is. Can the output signal be processed to look for a falling edge – yes. So why can it not be used for reset function?

From the same paragraph of 1503...

The performance level of safety-related parts providing the manual reset function shall be selected so that the ***inclusion of the manual reset function does not diminish the safety*** required of the relevant safety function.

Now we get into a little bit of theory on performance level calculation.

When there are multiple devices comprising the Safety Related Parts of the Control System (SRP/CS), the default rating of the performance level is defined by the lowest rated component in the system.

Ahh now we are getting to the meat and bones of the matter.

From the definition of Category 1....

SRP/CS of category 1 shall be designed and constructed using well-tried components and well-tried safety principles (see ISO 13849-2).

A “well-tried component” for a safety-related application is a component which has been either

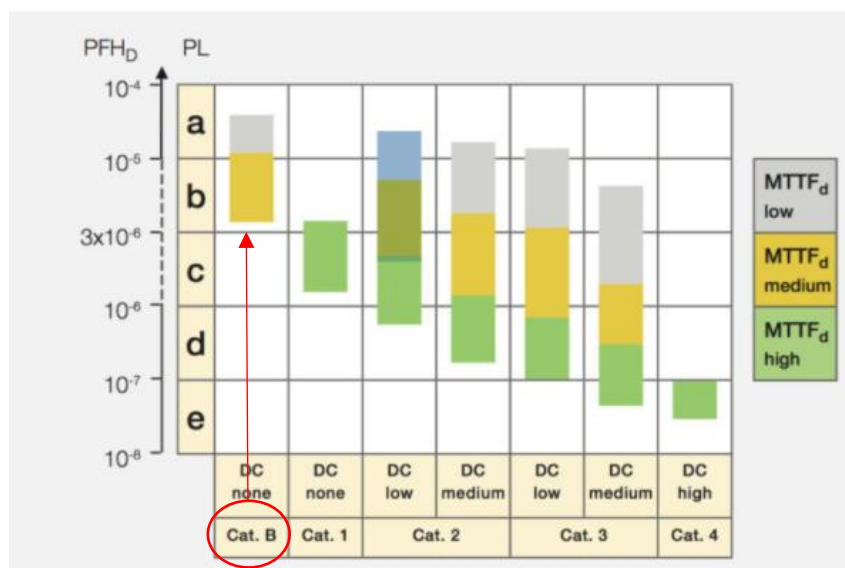
- a) widely used in the past with successful results in similar applications, or
- b) made and verified using principles which demonstrate its suitability and reliability for safety-related applications.

NOTE 1 Complex electronic components (e.g. PLC, microprocessor, application-specific integrated circuit) cannot be considered as equivalent to “well tried”

And in that note lies the reason.

At this stage there are no known safety rated HMI displays. An HMI has internals similar to a Process PLC (single processor and non-safe inputs/outputs) and in fact some can even have ladder logic programmed into the HMI to perform simple process functions.

So what do we have if you cannot achieve a Category 1 component? You have a category B component. How far will this get you in terms of performance level rating?



This chart shows the relationship between Category, Diagnostic Coverage, and Mean Time to Dangerous Failure for PL levels under EN/ISO 13849-1. Note also the correlation with probability of dangerous failure per hour (PFH_d) rates.

Image credit: ABB

Is this allowable on even a simple single channel emergency stop? ISO 13850:2015 states that the e-stop function must achieve a minimum of PLc. The answer is a resounding NO.

Quiz

1. A hazard is an activity, arrangement, circumstance, event, occurrence...that is an actual or possible source of harm. Hazards can be:

- A. Actual and/or Behavioural
- B. Potential
- C. Physical
- D. Biological
- E. All of the above

2. Which of the following is a potential hazard?

- A. Working when very tired/Working while under the influence of drugs or alcohol
- B. Working on a wet floor
- C. Breathing in toxic fumes
- D. Manual tasks that strain the body
- E. All of the above

3. What is the leading cause of death on construction sites?

- A. Struck by object
- B. Falls
- C. Caught-in or -between
- D. Electrocutions

4. Which of the following is not a chemical-related health hazard?

- A. Carcinogenicity
- B. Reactivity
- C. Corrosivity
- D. Toxicity

5. If you wanted to convey the most severe type of hazard, which word would you use?

- A. Warning
- B. Notice
- C. Danger
- D. Caution

6. Ammonia becomes an immediate danger to your life and health when it is present at the following level or greater:

- A. 10 ppm
- B. 30 ppm
- C. 300 ppm
- D. 1000 ppm

7. If you are working near a flammable substance, you should always use iron or steel hand tools.

- A. True
- B. False

1 (E), 2 (E), 3 (B), 4 (A), 5 (C), 6 (C), 7 (B).

Answers

Member Profile

Warren Wagener – Editor.



I started out in the workforce in the late 70's by joining the RNZAF (Air Force) and was lucky enough to get a great grounding in engineering both mechanical and electrical. My specialty was Avionics and I was based at Ohakea working on the Skyhawk fighter jets.

The avionics training has served me well over the years with future jobs working for a company that made sensing aids for the visually impaired, this company at the time were right on the leading edge of some great technologies that we now accept are everyday things. Through many years I worked in the appliance repair industry repairing anything from high end audio amps to cow pregnancy testers.

The company I was working for at the time were approached to quote for a safety solution installation, specifically the electrical system. While none of us knew a heck of a lot about safety at that stage, it piqued my interest, that hey, here is something that is a specialty field, technically challenging and interested me. So my journey to becoming a safety engineer begun. Many years later I find myself being more of a tutor to industry as I am constantly striking clients who want to progress their level on knowledge and turn to specialty service providers for answers.

I still enjoy the challenge of getting a design project where we have to basically start from scratch and guide clients through the process of what constitutes a correctly implemented safety solution.

On a personal note: I enjoy motorcycling (I raced competitively up until 2012 and retired and a good note having placed 5th in the club champs and due to rule changes the following year this would have been 2nd – one place behind my son. We were up against machine with 50% more capacity that placed 1st, 2nd and 3rd. I still ride on the road and own two bikes, a 1997 Suzuki TL1000s (1000cc V twin) that has been dubbed the widowmaker by the press (have a read), a 2015 Ducati Multistrada (1200cc V twin). My wife rides a smaller Ducati Monster (659cc) and my son and his wife also have bikes. I enjoy competitive archery and was lucky enough to partake in the World Masters Games (didn't do great).

As I approach that magic age where some might want to stop work, I am torn between being able to spend more time on the bikes, with the grandchildren and how to pay for it all. So I guess you will see me kicking around in the safety arena for a while.

All the best.

Someone else needs to send in a profile for the next newsletter, don't be shy.