

Triple Tragedies in 2021

I was shocked when a contact in Medan, Indonesia told me about a biodiesel factory fire on the island of Sumatra. Shocked not because it happened in the palm oil industry and that it was associated with downstream operations. What really saddened me is that there were two very similar accidents in the first half of this year.

I have gathered the information I am sharing with you from available news reports and from those in the industry on condition of anonymity.

Tragedy 1

On January 16 in Johor, Malaysia at a biodiesel plant there was a small explosion when welding works were carried out on a storage tank at a height of 15 meters. The impact caused the welder to fall to his death while another two were injured.



<https://www.thestar.com.my/news/nation/2021/01/16/explosion-at-pasir-gudang-factory-kills-one-two-injured>

Tragedy 2

On May 1 in Selangor, Malaysia at a fatty alcohol plant, a man doing welding on a storage tank at height of 10 meters fell to the ground when the tank exploded. The man died while three others were injured.



<https://www.nst.com.my/news/nation/2021/05/687028/one-dead-telok-panglima-garang-oil-tank-blaze>

Tragedy 3

On June 16 in Sumatra, Indonesia at a biodiesel factory that was just commissioned in March, contractors were carry out welding on top of a tank when there was an explosion. The contractors were seriously burnt and two of them died. A 3000 tonne methanol storage was on fire.



<https://www.halloriau.com/read-dumai-148494-2021-06-16-dua-pekerja-dikabarkan-tewas-akibat-kebakaran-pabrik-pt-sari-dumai-oleo.html>

I have received many photos and videos but I am only using those published in news reports.

The common factor – methanol

There are two gateways to oleochemical processing which is the freeing of the three fatty acid molecules from the glycerol backbone in the triglyceride. One is by

hydrolysis (or splitting) and the other is by transesterification with methanol.

Transesterification is often the starting point for fatty alcohol production. From around the year 2000 in South East Asia biodiesel is produced through transesterification in a very big way as its production volumes is now more than twice that of other oleochemicals.

Methanol is extremely toxic to humans if ingested or if vapors are inhaled. Methanol is also a major hazardous substance due to its being extremely flammable. When mixed with air it can burn in the open or explode in confined space conditions. Methanol-water mixtures containing as little as 21% by volume are also inflammable liquids. Stringent control measures are required for hot work activities and activities performed in confined spaces.

From the limited information available on the three incidents, I believe that methanol was involved. As such when welding work is to be undertaken a Hot Work Permit would have been required as it will examine the associated hazards and the controls required including the right people authorizing the planned work. If a Hot Work Permit was in place the hazards associated with methanol would be have been clearly identified and mitigation measures put in place to manage the presence of methanol in the work environment.

The reality



Fig. 1 The location of the 3 accidents

How could such similar accidents happen within 6 months and only 400 kilometers of each other? The news reports were published on the day or the next day after the accidents and unfortunately no further news thereafter so these untoward events are easily forgotten. There have been no alerts from the authorities in Malaysia such as the Department of Occupational Safety and Health (DOSH) in Malaysia. In Indonesia the relevant authority would be The Ministry of Manpower (Kemnaker). If there was any investigation that was done, the findings were not published nor shared.

DOSH and Kemnaker focus more on personal safety than on process safety. Process safety addresses major hazards that are more likely to result in major incidents with big consequences; occupational safety addresses incidents involving personal safety at an individual level with small consequences. At the same time the industry in Asia, not just from the palm oil sector, is very reluctant to share information.

Dame Judith Hackitt former president of IChemE and former chair of the HSE (Health and Safety Executive UK) once said, "There are no new accidents. Rather there are old accidents repeated by new people." If there is no sharing how can there be any learning?

At a process safety training that I arranged some years back in ASEAN, participants were not satisfied with learning from case studies on Piper Alpha, Bhopal and more recently Buncefield. They asked for local case studies which are relevant to their industry, which at that time were unfortunately not available.

At the Hazards Asia Pacific Symposium 2015, I recalled that right after my presentation a paper by The Japan Chemical Industry Association (JCIA) discussed how their industry players shared best practices in process safety incidents formally through publications as well as animation videos. This example should be seriously considered by the industries in Malaysia and Indonesia.

What can be done

DOSH and Kemnaker can emulate the example set by the HSE UK that encourages employers to carry out their own investigation on incidents at their facility while the UK HSE UK investigate the more serious work-related incidents. An example of this is the Buncefield incident of 2005 which is a widely used case study in many aspects of process safety and environment.

DOSH and Kemnaker can call upon the many process safety professionals in industry to assist with the investigations but the key is to make public their findings. In the Buncefield incident after the investigation UK HSE UK secured convictions against five companies, who were ordered to pay almost £10m in combined fines and costs.

This a long journey but these steps need to be taken to ensure that process safety awareness continues to improve through learning and sharing that will help avoid the pain and tragedy of another serious accident.

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