

We would love to hear from you....

Please do contact Helen Conlin, Newsletter Editor at specialinterestgroups@icheme.org about contributing articles or providing feedback and comment on: Good practice, previous SIG events, outreach (e.g. support to Universities, other institutions), or anything else that you think our readers would find interesting.

Introduction

Welcome to the August 2024 edition of the S&LP SIG newsletter.

Please use specialinterestgroups@icheme.org to contact anyone associated with the S&LP SIG.

Thank you to all the readers who responded to the February 2024 Newsletter request for ICI training course historical information, it is much appreciated.

This issue includes articles on [Revised S&LP SIG Focus Areas](#), [EPSC Process Safety Congress](#), [Hazards 34](#) and the [S&LP SIG Committee](#).

Revised S&LP SIG Focus Areas, Sean O'Sullivan, S&LP SIG Chair

The S&LP SIG committee meets bi-monthly to discuss how we can best represent members and produce and share information on relevant process safety topics.

For example, during 2024 several S&LP SIG committee members were key contributors to IChemE's activities to commemorate the 50th Anniversary of Flixborough, collaborating with other volunteers and IChemE staff. This included a series of TCE articles, an [LPB special edition](#) and an excellent panel session with Robin Turney, Trish Kerin, Ken Rivers and Ramin Abhari on 30 May 2024 (a recording of the webinar is available to IChemE members [here](#)). I encourage you to read these articles, reflect on lessons that have been and can be learned and to discuss the legacy from Flixborough with your colleagues.

Also during 2024 the committee has spent time reflecting and discussing fundamental aspects such as:

- ❖ How well the S&LP SIG represents the whole IChemE membership?
- ❖ How well the committee represents the S&LP SIG?
- ❖ What should the committee be focussed on?

We are realistic – we are all volunteers and do not have unlimited time or expertise. However, we would like to clearly define what we are doing and what we are not doing. Refreshing and revising the S&LP SIG's focus areas should enable us to continue to deliver useful content and activities for our membership. The new focus list for ongoing activity is:

- ❖ **Learning Lessons from Past Histories** – linked to a Major Hazards Committee Project
- ❖ **Safety and Zero Carbon Climate Change** – New and changed process safety threats
- ❖ **Flixborough at 50 years** – commemoration and revisiting lessons and improvements
- ❖ **Webinars** – an ongoing schedule

This short list recognises that we are an integral part of the Major Hazards Committee (MHC), along with LPB, IChemE Safety Centre, Hazards and PSEP. Through the MHC, we are actively engaged in projects to review and improve:

- ❖ How IChemE supports Lessons Learned from safety and environmental events.

- ❖ IChemE's arrangements for supporting and enabling the development and assurance of process safety competence requirements for chemical engineers, process safety professionals and organisations throughout careers and lifecycles.

Additionally, although we are not currently working on these topics, we have active arrangements to monitor and contribute to:

- ❖ Revitalisation of the [Professional Process Safety Engineer](#) qualification, and transition from the IChemE Register of Safety and Loss Prevention Professionals.
- ❖ Impact and ways to use new technologies in Digitalisation – via IChemE's Digitalisation Committee ([DigiCom](#)).

A few topics have been merged or retired for a range of reasons, however the topic list remains open to new suggestions and **all** S&LP SIG members are welcome to contribute existing topics or suggest new ones.

Finally, I'd like to thank and emphasise the importance of and benefit provided by our collaborators and contributors including: webinar speakers, regional representatives, sector representatives and representatives in allied and subject groups. The S&LP SIG committee thrives on strong networking links to be able to represent members and we welcome input from **all**. Involvement can be tailored to suit you, inside or outside the committee.

If you would like to discuss any of the above further and /or get involved in S&LP SIG activities then please contact us at specialinterestgroups@icheme.org.

EPSC Process Safety Congress, Peter Marsh

On 15 May 2024, I attended the European Process Safety Centre (EPSC) [Process Safety Congress](#) in Dordrecht, Netherlands (more details including all presentations are available at the above link). It was a well-organised event with approx. 250+ attendees and exhibitors. There were many interesting presentations on a diverse range of topics organised in three parallel sessions and several opportunities for visiting exhibitor stands and networking with colleagues.

The first presentation in the plenary session was an overview of the 18 June 2023 [Titan \(Submersible\) Disaster](#) by Frederik Niederstadt (an inspection engineer in the marine sector). The loss of Titan resulted in five fatalities.

Although the investigation is not yet concluded, it appears that many of the root causes were typical of those precipitating major process safety incidents including: inadequate design, inadequate testing, failure to follow good practice, inadequate risk assessment, normalisation of deviance, inadequate communication and emergency response, poor safety culture (production /profit over safety).

Perhaps the most shocking aspect of this tragic incident was the inappropriate material selection [inadequate design and inadequate testing].

Figure 1 below shows that the pressure envelope containing the crew was constructed from two hemispherical titanium heads and a layered carbon fibre main cylinder section. Apparently, it is well known in the marine exploration (submersibles) industry that carbon fibre is not a suitable material for withstanding a 400bar compressive load because delamination can seriously affect its ability to withstand the compressive load and it is extremely difficult to detect in a thick multi-layer cylinder. At 400bar compressive load, any loss of strength in the carbon fibre main cylinder section would have a high probability of causing instantaneous and catastrophic implosion of the structure.



Figure 1 – Titan crew pressure envelope (OceanGate Expeditions)

Incredibly, Titan had not been certified by any professional body as being fit for purpose for the 4,000m underwater mission [failure to follow good practice and comply with statutory regulations]. Titan had successfully completed several other missions but none to such an extreme depth. A former employee (an engineer

and submersible pilot) had raised concerns about the design and absence of unmanned pressure testing of Titan's hull with the US Occupational Safety and Health Administration (OSHA) and alleges his employment with the company was terminated as a result [poor safety culture, profit over safety].

Titan was assisted by a dive support vessel (to provide emergency response) and three remote operated vehicles (to aid triangulation and communication). All communication with Titan was lost approx. 1 hour 45 minutes into the dive, however it appears that the dive support vessel made no contact with the coastguard until several hours later because loss of communication had occurred multiple times on previous missions [normalisation of deviance].

The noise from an implosion of a submersible such as Titan would be very distinctive and loud enough to be heard by underwater sonar thousands of miles away and would certainly be audible by human ear from a depth of <4000m underwater (and, if heard, should have immediately been recognised for what it was).

However, when the dive support vessel contacted the coastguard, it was only to alert them that contact had been lost [poor emergency response and inadequate communication]. Consequently, the coastguard initiated a huge international search and rescue mission, which potentially endangered the lives of many emergency responders.

When the Titan debris field was eventually found, the two titanium hemispherical heads of the hull were recovered fully intact while the carbon fibre cylinder section had completely disintegrated.

The Titan submersible catastrophic implosion was an avoidable incident and loss of life.

Note: Multiple media articles are available on the Titan incident including a [New York Times](#) article from 14 July 2023 [paywall] and a [Boat International](#) article from 14 June 2024, which provide some useful resources for discussing and sharing learning with colleagues.

Hazards 34

A reminder that [Hazards 34](#) will take place in Manchester, UK between 5 and 7 November 2024.

Multiple S&LP SIG members will be presenting and attending and it is always a fantastic opportunity to share learning and network.

S&LP SIG Committee

The S&LP SIG committee last met on 18 June 2024.

Planned future S&LP SIG committee meeting dates:

- ❖ 15 August 2024
- ❖ 14 October 2024
- ❖ 12 December 2024

If you have something for the committee to consider, please contact Sean O'Sullivan, Chair, at specialinterestgroups@icheme.org.

We are grateful to those who take the time to contribute to the S&LP SIG Newsletter. Please note that content and opinions are those of the contributor(s) (or in resources accessed online) and do not necessarily reflect the views of the Safety & Loss Prevention Special Interest Group Committee or the Institution of Chemical Engineers.