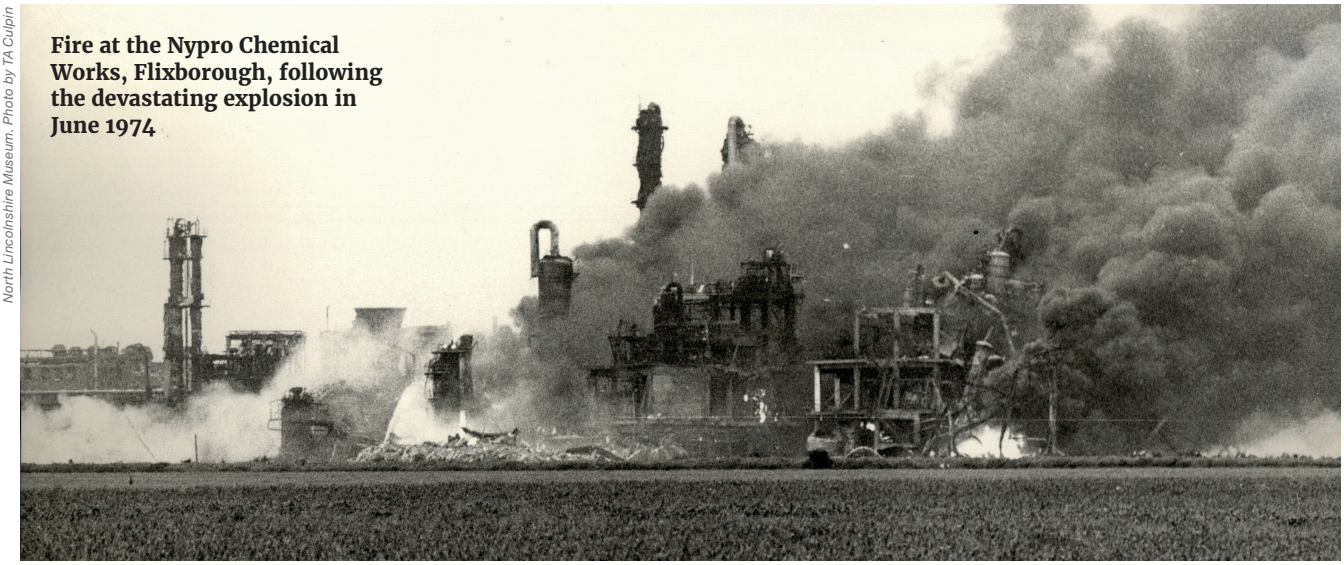

North Lincolnshire Museum. Photo by TA Culpin

Fire at the Nypro Chemical Works, Flixborough, following the devastating explosion in June 1974

# Remembering Flixborough:
## By Someone Who Wasn't Alive in 1974

*In the engineering industry, it is often asked if major incidents could ever happen again. Early-career engineer **Martin Wardrope** says it is important we still think they can*

**BEING a graduate engineer born well after the Flixborough disaster, I first learned of the tragic event in a lecture theatre.**

During a module dedicated to process safety at the University of Aberdeen, we learned of a number of major accidents across industries – analysing the failed layers of protection and step changes that followed. I remember being deeply shocked as we learned of the lives lost, families affected and widespread destruction caused due to the inadequate control of modifications, and poor management competence at the Nypro chemical plant. To us, as early-career engineers, it was initially challenging to picture an engineering world without some of the safety critical controls we now take as standard.

Learning of the 28 lives lost, and the ripple effect across families, communities, and industries, I felt a sense of duty, of the clear commitment I must make to process safety.

### RELEVANCE TODAY

Following my university studies, I started work at Harbour Energy in Aberdeen, the largest independent oil and gas production company in the UK. In my current role, I support the North Everest and Central Area Transmission System (CATS) Riser platform – an offshore production asset in the Central North Sea as the asset process engineer. I'm responsible for providing day-to-day operational assistance, alongside identifying, and implementing production optimisation and emission reduction scopes.

A key element of my role is identifying and managing process-related risk to the asset. As such, I regularly lead management of change (MOC) reviews and contribute to Hazard & Operability (HAZOP) studies. These changes can be across all our process systems, from pressure relief and blowdown, to separation and utilities.

While the MOC process is now a mature tool that is well utilised across sectors, this preventative barrier was not widely

implemented prior to Flixborough. The Court of Inquiry following the event recommended that "any modifications should be designed, constructed, tested and maintained to the same standards as the original plant". Continual evolution and improvement have led to the widely adopted change management procedures in use today. The importance of robust MOC procedures remains paramount and their non-observation can often have dire impacts – the 2005 Texas City refinery explosion, and Deepwater Horizon oil spill in 2010 both identified inadequate MOC as a causal factor.

Like many engineers working across industries, contributing to MOCs and navigating change can be a daily task, but Flixborough is a sobering reminder of the importance of maintaining all our preventative and mitigative safety barriers – be that people, process, or plant.

## FLIXBOROUGH'S INFLUENCE ON PROCESS SAFETY

Despite fewer and fewer engineers recalling the disaster first-hand, the incident continues to shape the engineering processes and standards in use today. By understanding the consequences of missed, or impaired, mitigative and preventative barriers, we can recognise the importance of effective process safety tools. Learning about Flixborough and similar events continually drives me to ask questions, speak up, and raise concerns – even if I'm not sure they're important.

In my role, competence is key alongside effective management of change. For instance, before restarting a unit operation following planned maintenance, as a junior engineer I must receive written approval from senior engineers prior to operation and restart. This check allows for potential mistakes to be identified, ensuring qualified personnel are given the opportunity to review and control safety-critical tasks. The Court of Inquiry following the Flixborough disaster highlighted that, at the time of the plant modification which led to the incident, the important role of works engineer, previously held by a chartered mechanical engineer, was vacant. None of the senior Nypro personnel, who were chemical engineers, recognised the issue with the proposed modification. The court of inquiry emphasised an important lesson to be learned: "that when an important post is vacant special care should be exercised when decisions have to be taken which would normally be taken by or on the advice of the holder of the vacant post."

The inquiry highlighted that competent personnel, who are safety-focused, are critical to maintaining safe operations. Alongside competence, I believe an open and honest safety culture is the fabric for any organisation to thrive and operate safely. Numerous incident investigations have found that a weak safety culture was a critical factor to the major accident. Are you empowered to voice concerns and scrutinise safety-related decisions in your company? Fostering a process safety culture where people are comfortable raising concerns is fundamental – all queries and concerns should be valued, from early-career graduates to senior management. There are no stupid questions when it comes to ensuring the safety of your colleagues.

## A YOUNG ENGINEER'S PERSPECTIVE

Early career chemical engineers are equipped with a solid understanding of major incidents and the importance of process safety, through accredited degree programmes. However, I hope that across engineering disciplines, students and early career professionals remain well informed of the Flixborough disaster and subsequent step-changes across industries.

It's worth noting that the Flixborough Court of Inquiry recommended: "All engineers should therefore learn at least the elements of other branches of engineering than their own in both their academic and practical training."

Although engineers are typically dedicated to a specific field, there are clear advantages to learning elements of other branches and gaining multi-disciplinary understanding.

## A LASTING LEGACY

Looking ahead, it's important we continue to innovate and use modern technology to keep abreast of incidents and lessons to ensure future generations are well-versed in process safety incidents. To really understand events, IChemE's *Loss Prevention Bulletin* (*LPB*) is a great resource. *LPB* thoroughly explains an event's root cause, while breaking down often complex incidents to manageable segments, outlining causal factors and incident recommendations.

Short, animated videos can be a great tool to understand events and evaluate the steps that led to an incident. They create an effective overview, highlighting aggregation of errors in what, prior to the incident, seemed normal operations. The US Chemical Safety Board provides fantastic videos for major accidents through a free to access platform – allowing anyone to understand the dangers of poor process safety management within high-hazard industries.

## CONCLUSION

The legacy of Flixborough continues to leave an indelible mark on safety practices in use today. As we continue to innovate as an industry and navigate modern engineering complexities, we must remain conscious of historical events and continue to understand the "why" behind the "what". The Flixborough disaster is imprinted in chemical engineering history and serves as a stark reminder to us all, urging us to learn, share, and speak up about incidents and potential issues – we all have a part to play. ■

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