

Brightsite

Transforming industry

GUIDELINE BLIC vooruit

Practical guideline to promote process safety with AI

Chemelot aims to be Europe's safest and most sustainable chemical site by 2025. New types of data-driven technology, such as AI, show promise for promoting safety by identifying dangers or hidden patterns in Big Data. Early detection of such patterns allows for intervention to prevent incidents. Within Brightsite's project 'BLIC vooruit', together with a 'Community of Practice', the first steps are being taken to develop a predictive model for process safety. This has led to a Guideline with which factories can get started right away.

Proud partners

Sitech
TNO
Maastricht University
Brightlands Chemelot Campus



Companies at a chemical site like Chemelot have a lot of data at their disposal, but only a small part of it is used for safety purposes. Preventing incidents is currently mainly focused on explaining afterwards why and how an incident could have occurred, but little research is being done into predictive models.

“The rise of artificial intelligence (AI) led to thoughts of whether it is possible to extract information from all this factory data with the help of AI. And how this data could then be used to optimize process safety”, says Johan van Middelaar, involved from Brightsite partner TNO. “In an earlier, smaller-scale project on process safety – with one data source from one company and using one AI technique – we succeeded in identifying weak signals (hidden patterns) in safety datasets using AI. Patterns that are not seen by people. This was the impetus to move forward with this within this Safety Deal ‘BLIC vooruit’ with multiple companies, multiple types of data and multiple AI techniques. BLIC vooruit stands for Better Learning from Information in Chemistry by looking ahead and is an initiative of Brightsite that focuses on extracting information from plant data to eventually develop a predictive model for process safety”, adds Esta de Goede, involved from Brightsite partner, Sitech.

Learning from each other in Community of Practice

To implement BLIC vooruit, a Community of Practice (CoP), has been established at Chemelot. This CoP, named the Early Warning Coalition (EWC) consists of ten parties: SABIC, Envalior, AnQore, USG, Sitech, TNO, Chemelot Site Permit (CSP), Maastricht University, TU Delft and Safety Delta Nederland. “Collaboration in a CoP can accelerate the learning process because companies learn directly from each other and it is not a case of each company has to go through each step and process on their own. Together we try to move from learning from the past to preventing incidents in the future. We do this by experimenting with different types of data (sources) and using different types of advanced data analysis techniques to find learning potential and weak signals. This takes into account, from the start, the people who will ultimately work with the systems, such as process operators in the factories. That is why it is thought about from the shop floor, so it is useful and usable in practice”, Esta de Goede explains.

Step-by-step plan

The activities in this Guideline are summarised in the step-by-step plan below. The roadmap helps to identify weak signals and learning potential using modern analysis techniques. This offers opportunities to intervene earlier and more effectively in processes that are at risk of going wrong, so that incidents can be prevented.

1	Setting up and establishing a community of practice	<ul style="list-style-type: none"> a. Define purpose, scope, conditions and roadblocks b. Identify coordinator and participants c. Start, promote and evaluate regularly
2	Select data sources with learning potential	<ul style="list-style-type: none"> a. Define goal b. Identify and classify data sources c. Assess learning potential of data sources
3	Select appropriate and effective analysis techniques	<ul style="list-style-type: none"> a. Define goal b. Choose from available analysis techniques c. Assess suitability and effectiveness
4	Identify weak signals in Big Data	<ul style="list-style-type: none"> a. Collect and process data b. Analyze and interpret data c. Present and visualize data
5	Establish learning potential	<ul style="list-style-type: none"> a. Draw conclusions from the analysis b. Formulate concrete and measurable actions c. Consultation with colleagues, experts or partners
6	Share and communicate learning potential within the community of practice	<ul style="list-style-type: none"> a. Define target audience, message and purpose b. Choose suitable platforms, channels and tools c. Share learning potential and context

Helping businesses with a step-by-step plan

“Now that AI modeling has been shown to offer opportunities to improve safety in the chemical industry, the time has come for accelerating. This is why we started working with several parties within BLIC vooruit. And we are not just doing that for Chemelot, the goal of BLIC vooruit is to create a manual with a step-by-step plan with which other parties can get started right away”, Johan van Middelaar emphasizes.

The roadmap can be used to identify weak signals and learning potential, including modern analysis techniques that can help. Think of better and faster insight into the origins and course of deviations in (complex) processes. This offers opportunities to intervene earlier and more effectively in processes that are at risk of going wrong, so that incidents can be prevented. The roadmap begins with the

creation and establishment of a community of practice (step 1), including the conditions and possible roadblocks. This is followed by the steps that companies take individually (steps 2 to 5), such as inventorying and analyzing their own (confidential) data. The resulting insights and learning potential, for example, anomalies or weak signals that preceded unusual occurrences, are shared in the CoP (step 6). This allows companies to also learn from information/data that is not available within their own company. Setting up a CoP is not a prerequisite – only of added value – for the application of advanced data analysis technology to improve process safety. Individual companies can also get started with the Guideline (via steps 2 through 5).

The Guideline also describes the initial experiences of the participants in the CoP at Chemelot. Each step in the roadmap has a chapter devoted to describing ‘What is it all about?’ (preparation), ‘How do you handle it?’ (implementation) and finally the result is shared; ‘How did it go at Chemelot?’.

Transforming industry towards a sustainable future

Brightsite boosts the development and commercial application of technologies that enable the chemical industry to achieve its sustainability, safety and human capital objectives, in line with the climate challenge and energy transition.

Would you like to know more about the content of this Guide?
If so, please contact the authors:

Esta de Goede
esta.goede-de@sitech.nl

Johan van Middelaar
johan.vanmiddelaar@tno.nl

We hope you will use this guideline to get started to further improve the safety of your processes.

[Download the guideline](#)

This Safety Deal has been financially supported from the Subsidy Scheme Strengthening Environmental Safety of the Dutch Ministry of Infrastructure and Water Management, implemented by the Rijksdienst voor Ondernemend Nederland (Dutch Authority for Enterprise) and contributions from the participating parties.

Brightsite
Transforming industry

brightsitecenter.com