SAFETY DELTA NEDERLAND

vinden, verbinden, vernieuwen in veiligheid

Improving safety through structural cooperation

Webinar EC Joint Research Center Major Accident Hazard Bureau

The Role of Authorities in Promoting Lessons Learned

2 March 2023

SAFETY
DELTA
NEDERLAND

Find, connect, innovate in safety

Knowledge centre

Connect

Innovation centre

Structural cooperation between government, industry, science

Knowledge centre

Connect

Innovation centre

SAFETY DELTA NEDERLAND

Find, connect, innovate in safety

Ambition

*Dutch Seveso companies will be the **safest** in the world **by 2030**, hold an internationally valued and recognised **leading** position in the development and **implementation** of safety concepts related to the handling of hazardous substances.*

Themes / Knowledge collections

Find

in Safety

Risk | Control | Assurance

Internal / External Oversight

Cyber Safety

Leadership and safety culture

Safety culture

Safety perception

Safety training

Monitoring, Learning from incidents

Measuring safety performance

Learning from incidents

Asset Integrity – Process Safety Management

Ageing

Corrosion Under Isolation

Connect

Projects

in Safety

SAFETY DELTA NEDERLAND

Find, connect, innovate in safety

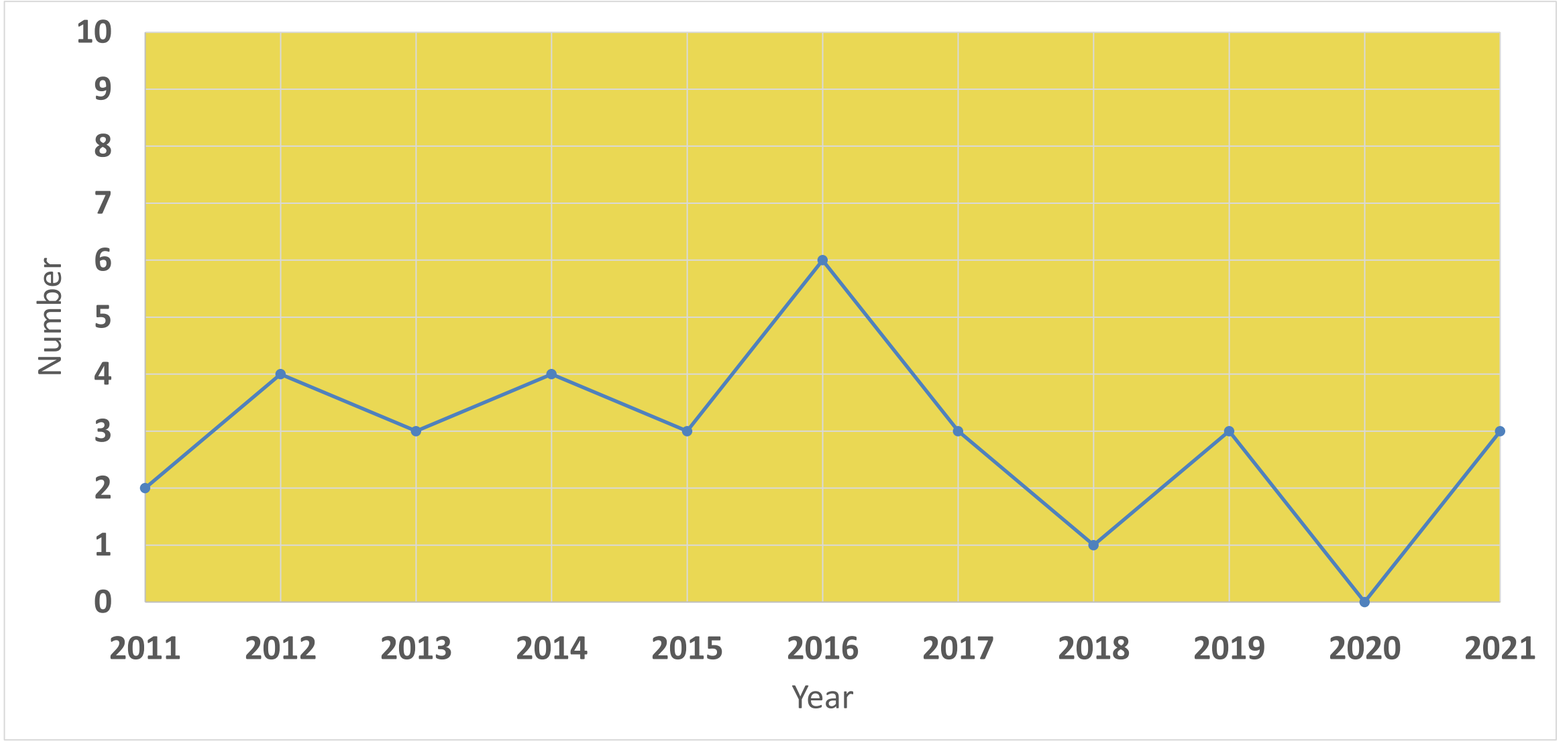
Example 1: **joint learning from safety performance data and regulatory inspection data**

Connect

in Safety

How safe are we?

Serious incidents Dutch Seveso companies (~400) - reportable under Seveso III Directive



Pilot Performance Indicators

Improvements in data collection and analysis across the sector

Summary

Goal: further improvements in personal and process safety for companies dealing with hazardous substances and that are subject to Seveso regulations.

How:

1. Identify improvement opportunities through systematic, consistent review of data for industry segments.

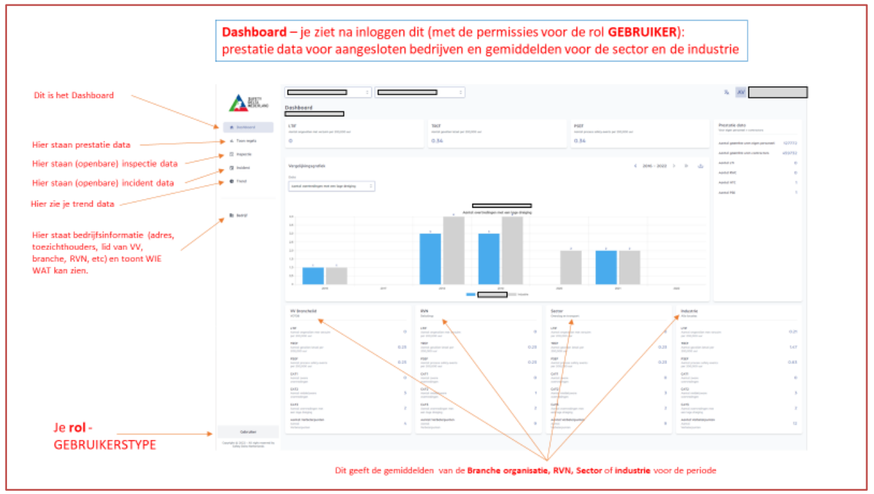
2. Share knowledge and available tools to support the implementation of jointly agreed improvement programs.

Example DCT - Screenshots

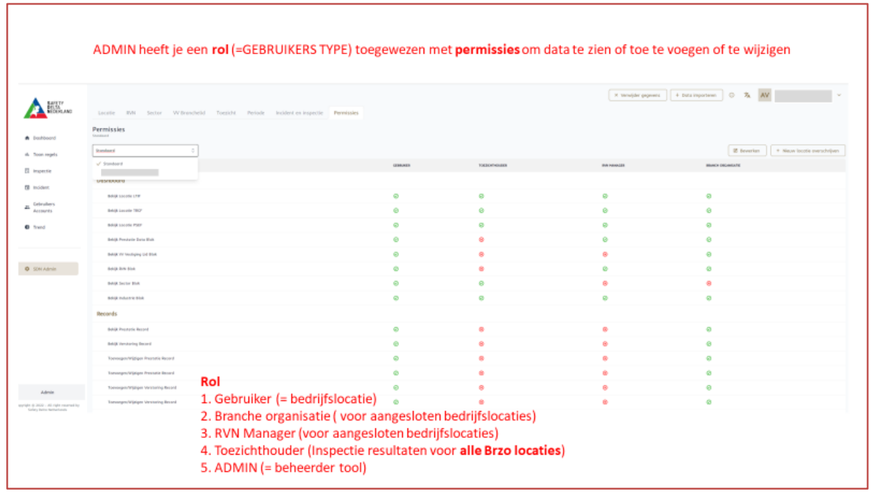
https://www.safetydelta.nl/projecten/expertise-netwerk-pi/

Developed
Data
Collection
Tool

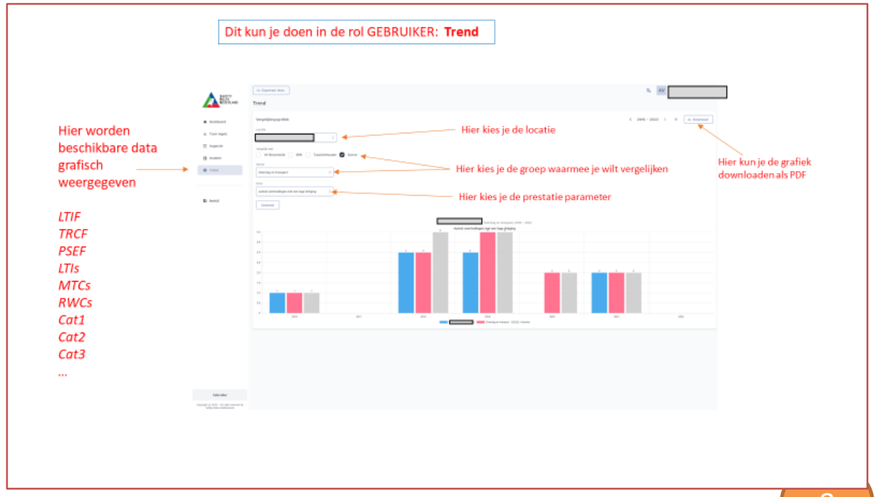
Trust: only for registered users, with 2-way verification of identity



Learn: dashboard



Trust: user-specific permissions for data access



Learn: simple on-line benchmarking

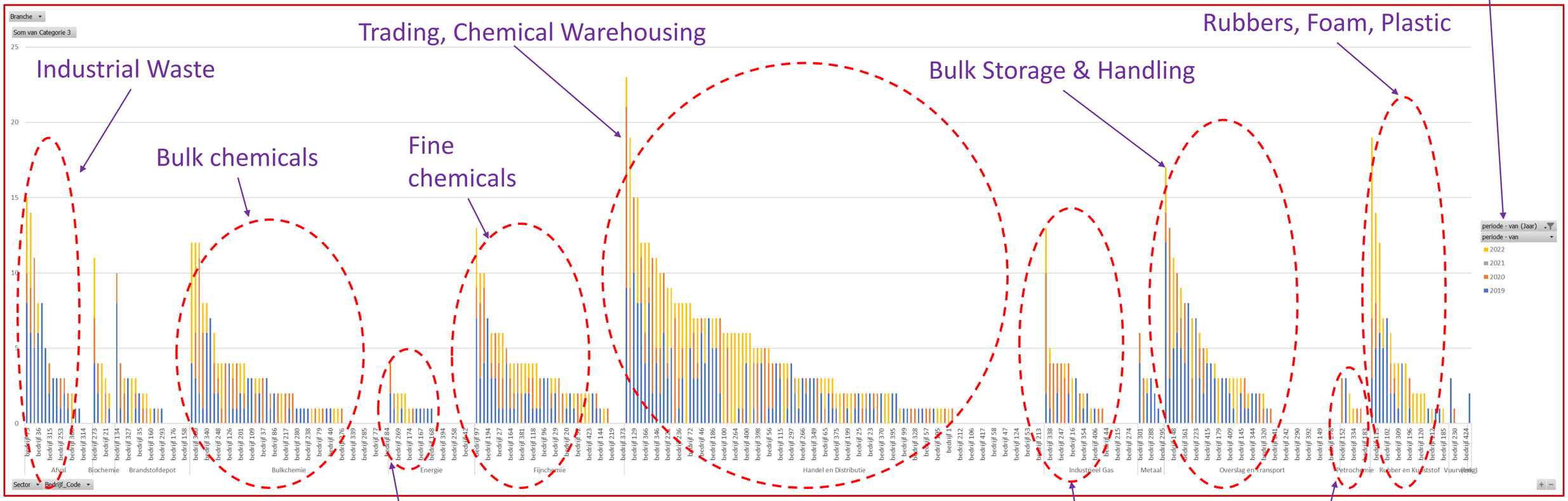
Example DCT output

Sector – all

public information

Parameter: violations Categorie 3 (=very limited threat of a serious incident)

Years:
2019, 2020, 2021, 2022



Energy, Power

Industrial Gas

Refineries

All Dutch Seveso companies, by industry segment

Pilot Performance Indicators

Improvements in data collection and analysis for the sector

Challenges

1. Fear of unforeseen consequences when sharing data

2. Poor data quality
   - limited data recording in some industry segments
   - use of different definitions for safety performance indicators
   - description of findings in regulatory inspection reports

Connect

Projects

in Safety

SAFETY DELTA NEDERLAND

Find, connect, innovate in safety

Example 2: **tools for self-assurance**

Self-Assessment Questionnaire

are your controls in place?

Goal: Further improvements in personal and process safety for companies dealing with hazardous substances and that are subject to Seveso regulations.

Summary

How:

1. companies do integral, systematic self-assessment of their
   - safety management system,
   - safety culture, and
   - technical installations

2. make use of the simple tools provided to develop a well-prioritised safety improvement plan, and

3. monitor its implementation.

Self-Assessment Questionnaire (SAQ)

are your controls in place?

Challenges

1. Motivating companies to deploy this tool (or an equivalent methodology) in an environment of competing priorities

2. Gaining trust between parties for sharing information about ‘pain points’ and lessons learned on how to effectively implement risk controls

Connect

Projects

in Safety

SAFETY DELTA NEDERLAND

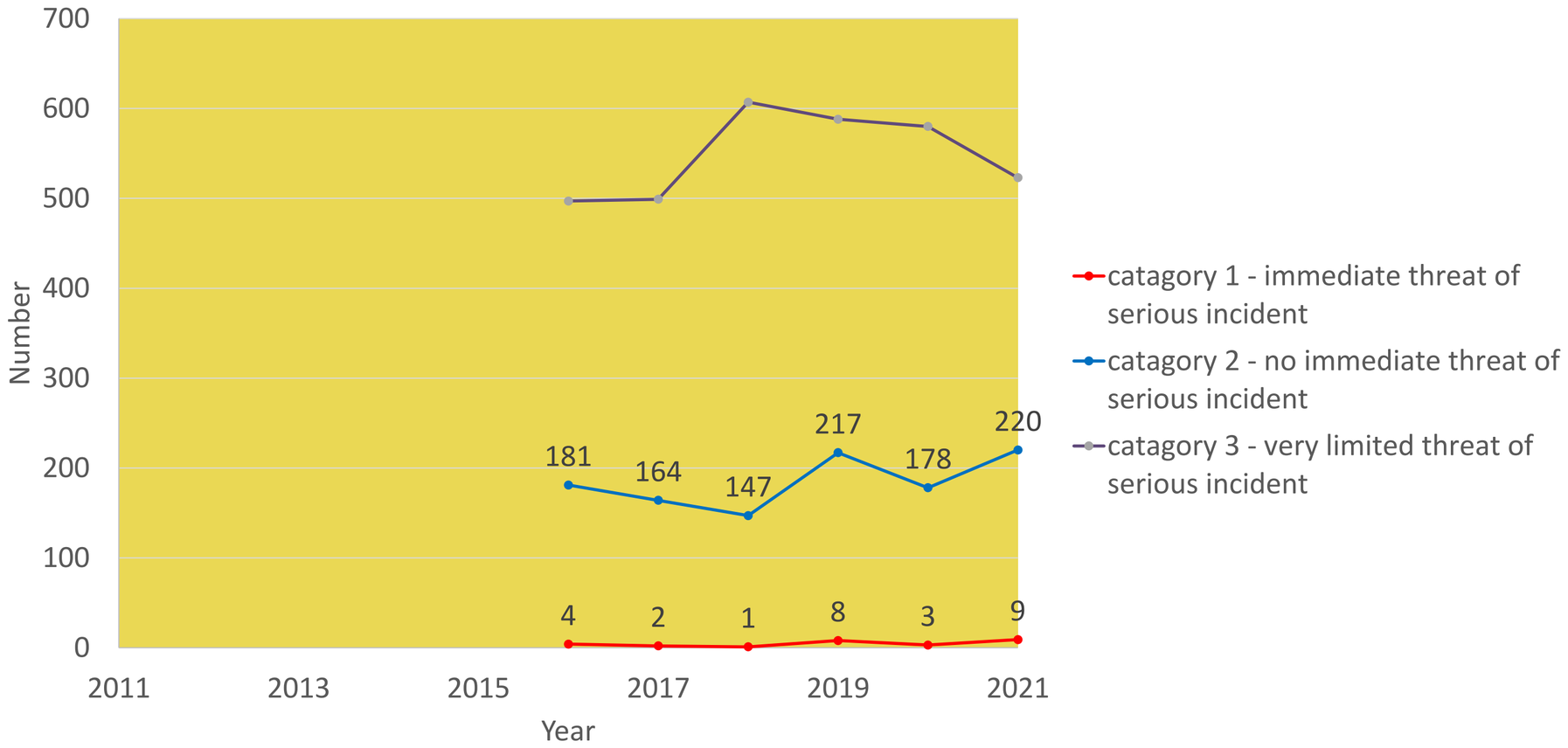
Find, connect, innovate in safety

Example 3: **exploring new ways of doing regulatory inspection at mature, high performing companies**

Connect

in Safety

Non-compliance with regulations - annual inspection of about 380 Dutch Seveso companies



Regulatory inspection

towards an assurance model

Summary

Goal: make a company accountable for delivering good safety performance (=outcome) and not just for managing risks well enough (=system). Stimulate this by a more effective and efficient way of regulatory inspection.

How: Introducing the concept of a ‘control framework’ with clear roles for the company and regulatory inspection:

1. addition to the current ‘static’ safety management system,
2. focus on the material risks, and
3. requires continuous evidence so that with a high degree of certainty it can be confirmed that control measures for managing these material risks are suitable and effective.

Regulatory inspection

towards an assurance model

We deal with ‘**criminal**’ organisations who deliberately try to break the law and will hide things.

We check them in great detail once or twice a year (=**photo**).

We will catch them out and fine them!

← ?? →

Two extreme belief sets…

We deal with ‘**gentleman**’ organisations, where sometimes things go wrong, despite their strong risk oversight.
We continuously have access to their information (=**film**) and jointly demonstrate with high degree of certainty that safety risks are effectively managed.
We have a joint opinion on safety performance.

Challenges

Approach:

1) develop methodology to **strengthen** a company’s **internal oversight**
2) explore a different **relationship model** between regulatory inspection and company

Connect

Projects

in Safety

SAFETY DELTA NEDERLAND

Find, connect, innovate in safety

Example 4: **the use of Artificial Intelligence for systematically picking up weak signals from operator reports and other ‘big data’ to prevent incidents taking place**

from **looking back and explain** (learning from incidents) to **looking forward and prevent** (learning from information)

Brightsite
Transforming industry

Learning from information

using big data and AI

Idea

… there is too much data. It is impossible for a human being to keep track of it.

… “Accidents do not occur in a chaotic fashion. Underlying patterns and trends do exist and can be captured”, Sarkar et al. 2019

… experiment with the application of Artificial Intelligence (AI) and Natural Language Processing (NLP) to detect patterns and trends faster and better

… learn how to use this to prevent incidents

Brightsite
Transforming industry

Learning from information

using big data and AI

Technical Sentiment Analysis

- Carried out an industrial scale pilot, using shift reports
- Developed a Safety lexicon, with about 400 technical terms related to process safety
- Gave every term a polarity (0 to 5, positive or negative) based on expert opinion
- Used amplifiers (‘a lot’, ‘many’) and negators (‘none’, ‘no’. ‘doesn’t ’)
- Called it Technical Sentiment Analysis (TSA)

TSA provides an absolute score of the ‘sentiment’ of a shift report and allows trending.

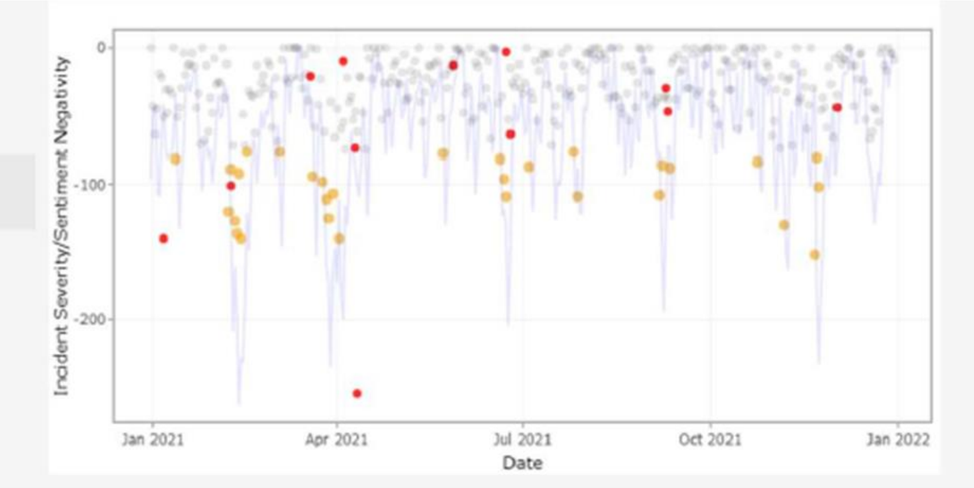
Brightsite
Transforming industry

Learning from information

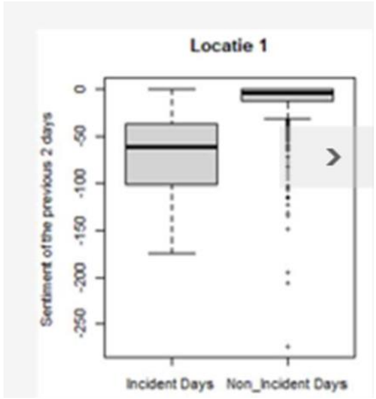
using big data and AI

Result

Technical Sentiment becomes more negative in the days prior to an incident
→demonstrated the potential of **TSA** as a **predictive tool**



Grey: TSA score of shift report
Yellow: shift report with high TSA score
Red: TSA score on the day of the incident
Line: sum of TS scores prior to an incident



Lower sentiment prior to incidents

Next: research into combining different ‘features’ involving different companies in different industry segments

Connect

in Safety

Needed for achieving the SDN ambition

1. strong company internal oversight of safety risks, the state of risk controls and the resulting safety performance

2. ‘deserved’ mutual trust between companies and regulatory inspection

3. safe space for experimenting

SAFETY
DELTA
NEDERLAND

Find, connect, innovate in safety

Thank you