Hvidvaskning med rejsekort
Carbon dioxide – a potentially explosive smoldering silo fire suppressant
As counter-intuitive as it may sound, there are explosion hazards associated with releasing liquid carbon dioxide (CO₂) into environments where an ignitable atmosphere may exist. For instance when attempting to suppress a smouldering fire in a pellet silo. A recent paper by Dr Frank Huess Hedlund, Risk Expert at Danish engineering consultants Cowi and External Associate Professor at the Technical University of Denmark (DTU), explains why CO₂ is a safe inert purge gas but may be unsafe for inerting.

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Journal: Bioenergy International
Issue number: Pellets Special 4
Original language: English
Electronic versions: 2018_Potentially_explosive_fire Suppressant_Bioenergy_International_Pellet_Special_4_CO2.pdf
Research output: Communication → Journal article → Annual report year: 2018

Carbon dioxide not suitable for extinguishment of smouldering silo fires: static electricity may cause silo explosion
Smouldering fires in wood pellet silos are not uncommon. The fires are often difficult to deal with and extinguishment is a lengthy process. Injection of inert gasses to prevent oxygen from reaching the smouldering fire zone and suppress combustion is a new firefighting strategy. This article argues that injection of inert carbon dioxide into the silo headspace is unsafe. Carbon dioxide is generally available as a liquid under high pressure. When discharged, small particles of dry ice are formed. The rapid flow of particles can generate considerable amounts of static electricity, which can act as a source of ignition if ignitable pyrolysis gasses are present. This article discusses a serious wood pellet smouldering fire and silo explosion in Norway in 2010, which took place when firefighters discharged portable CO2 fire extinguishers into the headspace. The attempt to suppress the fire may have ignited pyrolysis gasses. The article examines selected guidelines, standards, popular wood pellet handbooks and other literature and argues that the electrostatic hazard is widely under-appreciated. In the past, major explosions have been attributed to electrostatic ignition of flammable vapours during the release of CO2 for fire prevention purposes. There is evidence to suggest that those early lessons learned have at least partly passed out of sight.

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Contributors: Hedlund, F. H.
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Publication information
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Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4 SJR 1.235 SNIP 1.436
Web of Science (2017): Impact factor 3.358
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Dangers of releasing CO₂ to fight fires in the cargo hold of seagoing bulk carriers

On seagoing general cargo vessels, the cargo is stored in bulk in the holds. Fire protection for cargo holds comprises detection and firefighting capability. Detection normally incorporates a smoke sampling system that continuously draws air from each cargo hold and passes it to a smoke detector cabinet. The fire can be fought by flooding the cargo hold with inert carbon dioxide. The carbon dioxide is stored in its liquid form at pressures in excess of 50 bar and kept in multiple vertical steel cylinders arranged in a battery. For firefighting to be effective, SOLAS regulations require that a large fraction (80-90 percent) of the gas is delivered to the space of the cargo hold over a few minutes. When discharged, the liquid carbon dioxide undergoes a change of phase to a mixture of gas and solid ("dry ice"). The sliding action of particles of dry ice can produce electrostatic discharges with sufficient energy to ignite flammable fuel/air mixtures. Because no vaporizer is present, considerable generation of static electricity is likely upon activation of the CO₂ extinguishment system and the large flow rate. Certain biological materials carried in bulk, in particular wood pellets, can self-ignite and burn as an oxygen-deficient smoldering fire. Such fires produce flammable pyrolysis gases that can travel, accumulate and enter the explosive range. If carbon dioxide is released at this stage, a gas explosion in the cargo hold may result. NFPA 12 on carbon dioxide extinguishing systems endorses the application of CO₂ to deep-seated fires involving solids subject to smoldering, but without identifying or alerting the reader to the potential presence of explosive pyrolysis gases. NFPA 12 appears to presume that electrostatic discharges will dissipate safety if metal nozzles are used and the entire system is grounded to earth. Lessons learned from past serious explosions appear to contraindicate this expectation. In conclusion, the application of carbon dioxide is excellent for extinguishing a fire with flames but unsuitable for quenching a deep-seated smoldering fire without flame. If detection of fire in a cargo hold is based merely on presence of smoke, not detection of fire with flames, an activation of the CO₂ system may lead to explosion.

Dangers of using CO₂ to quench wood pellet silo fires

General information
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Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, Danish Maritime Accident Investigation Board (DMAIB)
Contributors: Hedlund, F. H., Jarleivson Hilduberg, Ø.
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Event: Abstract from 8th International Symposium on Energy, Aberdeen, United Kingdom.
Keywords: Bulk carrier, Wood pellets, Fire protection, CO₂, Static electricity, Explosion
Electronic versions:
Abstract_Hedlund_Hilduberg_Dangers_of_releasing_CO_to_fight_fires_in_the_cargo_hold_of_seagoing_bulk_carriers.pdf
Source: PublicationPreSubmission
Source-ID: 147354209
Research output: Research - peer-review ▶ Conference abstract for conference – Annual report year: 2018

Publication information
Media of output: Canadian biomass
Year: 2018
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URLs:
https://www.canadianbiomassmagazine.ca/pellets/hazards-of-using-co2-to-quench-silo-fires-6715

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Last modified: 12/02/2018
Do Not Release Carbon Dioxide If Flammable Vapors Are Present – Static Electricity May Lead To Explosion

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Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
Publication date: 2018

**Publication information**
Media of output: Sciencetrends.com
Year: 2018
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Do_Not_Release_Carbon_Dioxide_If_Flammable_Vapors_Are_Present_Static_Electricity_May_Lead_To_Explosion_Science_Trends.pdf

**Bibliographical note**
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Source-ID: 145968616
Research output: Communication › Net publication - Internet publication – Annual report year: 2018

Fighting pellet silo fires

**General information**
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, Industrial Fire Prevention LLC
Contributors: Hedlund, F. H., Nichols, J.
Pages: 9
Publication date: 2018
Peer-reviewed: Yes

**Publication information**
Journal: Pellet Mill Magazine
Volume: 8
Issue number: 1
Original language: English
Electronic versions:
2018_Fighting_pellet_silo_fires_Pellet_Mill_Magazine_8_1_9.pdf
Source: PublicationPreSubmission
Source-ID: 148956771
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Finanskrise

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State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
Number of pages: 1
Pages: 15
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Peer-reviewed: Unknown

**Publication information**
Incomplete understanding of biogas chemical hazards – Serious gas poisoning accident while unloading food waste at biogas plant

At a biogas plant, a truck driver was overcome by toxic fumes while unloading food waste slurry collected at sites that operate a shredder and tank system. Trucks unload their cargo into a feedstock pit. While unloading, hydrogen sulfide, carbon dioxide and possibly other toxic gases were released. Ventilation systems were overwhelmed. The driver narrowly escaped death. Several would-be rescuers collapsed. Under marginally different conditions, this accident could have led to five fatalities. The case offers a rich account of the actions of fellow workers who with stubborn determination sought to extract the unconscious driver. Even after having collapsed themselves, been extracted and recovered, they re-entered the building - amazingly still without realizing the gas danger. The article argues that long retention time in the logistics chain may alter the hazard profile of food waste slurry. This emerging risk appears overlooked and under-studied. The case exposes insufficient attention to safety in the rapidly expanding biogas sector. The biogas plant was unprepared. The investigation was quick, superficial and woefully inadequate. Root causes were not identified. Broad information sharing is limited or non-existent.

Kuldioxid er uegnet til kvælning af glødebrande

Kuldioxid er uegnet til kvælning af glødebrande
Land-use planning risk estimates for a chemical industrial park in China - A longitudinal study

A chemical industrial park (CIP) can centralize the management of companies and facilitate mutual communication between different businesses. Due to these advantages, an increasing number of chemical companies are forced into CIP, especially in developing countries such as China. Thus, the land-use planning of CIP associated with safety becomes an important issue. To illustrate the importance of the continuous risk supervision and give more experiences to other similar changing CIP, we apply a simplified quantitative risk assessment procedure to estimate the risk to a Chinese chemical industrial park (19 x 10 km²) near a rather densely populated off-site region for the years 2014 and 2017. Estimated levels of individual risk and societal risk are compared with Chinese risk acceptance criteria for land-use planning. Off-site risk levels have increased significantly from 2014 to 2017. While off-site risk levels are still low and within the acceptable region, the study concludes that the authorities should review carefully and monitor the risk level in case of future development activities around and within the chemical industrial park, e.g. preserving a buffer zone should be considered. For future chemical park design, it is highly recommended to proactively include QRA analysis especially to deal with risk in an efficient way.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, Department of Chemical and Biochemical Engineering, PROSYS - Process and Systems Engineering Centre, China University of Mining And Technology, COWI AS, China Academy of Safety Science and Technology
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Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Process Safety Progress
Volume: 37
Issue number: 2
ISSN (Print): 1066-8527
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Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 0.85 SJR 0.623 SNIP 0.831
Web of Science (2017): Impact factor 0.732
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 0.9 SJR 0.464 SNIP 0.8
Web of Science (2016): Impact factor 0.812
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 0.75 SJR 0.409 SNIP 0.73
Web of Science (2015): Impact factor 0.516
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 0.59 SJR 0.409 SNIP 0.91
Web of Science (2014): Impact factor 0.464
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 0.81 SJR 0.604 SNIP 2.027
Web of Science (2013): Impact factor 0.593
Säkerhetsutmaningar med väte som energibärare
Många spår att väte får en viktig roll i framtidens energisystem. Det är inte ofarligt eftersom luft-väteblandningar är ytterst lättantändliga och explosionsfarliga.

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State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
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Publication information
Journal: Kemivärlden Biotech med Kemisk Tidsskrift
Issue number: 4
ISSN (Print): 1650-0725
Original language: Swedish
Electronic versions: 2018_06_KB_V_te_s_kerhetsutmaningar.pdf
Source: PublicationPreSubmission
Source-ID: 151964126
Research output: Research - peer-review › Journal article – Annual report year: 2018
Silo response and safety: The dangers of using carbon dioxide to quench silo fires
The dangers of using carbon dioxide to quench silo fires.

**General information**
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, Industrial Fire Prevention LLC
Contributors: Hedlund, F. H., Nichols, J.
Pages: 50-54
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Volume: 62
Issue number: 3
ISSN (Print): 0015-2595
Original language: English
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2018_05_Dangers_CO2_Fire_Fighting_in_Canada_3p.pdf
Source: PublicationPreSubmission
Source-ID: 152013858
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Silo response - The dangers of using carbon dioxide to quench silo fires

**General information**
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, Industrial Fire Prevention LLC
Contributors: Hedlund, F. H., Nichols, J.
Pages: 16-17
Publication date: 2018
Peer-reviewed: Unknown

**Publication information**
Journal: Canadian Biomass
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ISSN (Print): 2290-3097
Original language: English
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2018_Canadian_Biomass_Silo_response_The_dangers_of_using_carbon_dioxide_to_quench_silo_fires.pdf
Source: PublicationPreSubmission
Source-ID: 145756029
Research output: Communication › Journal article – Annual report year: 2018

Stort udslib af giftig gas ved aflæsning af madaffald (Major release of toxic gas while unloading food waste at biogas plant)

**General information**
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
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Peer-reviewed: Unknown

**Publication information**
Journal: Dansk Kemi
Svovlbrinte stinker, men dræber uden lugt

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
Publication date: 2018

Svovlbrinte stinker, men dræber uden lugt
Den stank af rådne æg, som svovlbrinte har, forsvinder ved store mængder. Fra Danmark til Kina har man eksempler på, at mennesker er døde i gasulykker, helt uden at have 'lugtet lunten'.
Svovlsyre fortyndingsvarme


[English summary] Although sulfuric acid is one of the most fundamentally important heavy industrial chemicals and produced in very large quantities, there is little practical guidance in open sources on how to estimate the heat of dilution. This article provides a simple method to estimate the increase in temperature upon diluting sulfuric acid with water. Simple method to estimate the increase in temperature upon diluting sulfuric acid with water.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, Department of Chemical and Biochemical Engineering, PROSYS - Process and Systems Engineering Centre
Contributors: Hedlund, F. H., Frutiger, J., Sin, G.
Pages: 16-20
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Peer-reviewed: Unknown

Un tanque de levadura excedente falla con consecuencias catastróficas

Un gran tanque de levadura excedente voló por los aires, y solo quedó la placa de base y el contenido del tanque. Aunque el tanque no había sido concebido para sobrepresión, se mantenía a "una sobrepresión muy ligera" para evitar la formación de espuma no deseada. La cervecería no conocía los riesgos relacionados con el aire comprimido.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, COWI AS
Contributors: Hedlund, F. H., Selig, R. S.
Pages: 76-79
Publication date: 2018
Peer-reviewed: No
Är sprängplattan vänd åt rätt håll?
Sprängplattor används för att skydda mot övertryck. Hur tillförlitliga de är beror helt och hållet på om sprängplattan är vänd åt rätt håll.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
Pages: 22-23
Publication date: 2017
Peer-reviewed: No

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Issue number: 3
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Electronic versions:
2017_05_KB_Ar_sprangplattan_vand_at_ratt_hall.pdf
Source: PublicationPreSubmission
Source-ID: 152013174
Research output: Research › Journal article – Annual report year: 2018

Beskedent overtryk gav spektakulære følger
For at undertrykke generende opskumning blev en tank sat under et såkaldt "meget beskedent overtryk". Pludselig svigtede samlingen i bunden. Tanken nåede en højde på 30 m og faldt ned og knuste en varevogn. Uheldet viser, at et stort volumen af gas under lavt tryk indeholder en ikke uvæsentlig mængde energi.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
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Publication date: 2017
Peer-reviewed: Unknown

Publication information
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Volume: 77
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ISSN (Print): 0023-1983
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ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish

Bibliographical note
Artikkelen er tidligere trykket i Dansk Kemi 97, nr. 4, 2016
Source: PublicationPreSubmission
Source-ID: 130116512
Research output: Communication › Journal article – Annual report year: 2017
Biomass accident investigations – missed opportunities for learning and accident prevention

The past decade has seen a major increase in the production of energy from biomass. The growth has been mirrored in an increase of serious biomass related accidents involving fires, gas explosions, combustible dust explosions and the release of toxic gasses. There are indications that the number of bioenergy related accidents is growing faster than the energy production. This paper argues that biomass accidents, if properly investigated and lessons shared widely, provide ample opportunities for improving general hazard awareness and safety performance of the biomass industry. The paper examines selected serious accidents involving biogas and wood pellets in Denmark and argues that such opportunities for learning were missed because accident investigations were superficial, follow-up incomplete and information sharing absent. In one particularly distressing case, a facility saw a repeat accident, this time with fatal outcome, still without any learning taking place. The paper presents some information on other biomass accidents in Denmark, mostly involving biogas from anaerobic digestion. Details are lacking however, precisely because the accidents were insufficiently investigated and results not communicated. The biomass industry needs to pay more attention to safety. Utmost care should be taken to avoid so-called mediashifting i.e. that the resolution of a problem within one domain, the environmental, creates a new problem in another, the workplace safety domain.

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State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
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Publication date: 2017

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Electronic versions:
Biomass_Accident_Investigations_Missed_Opportunities_for_Learning_and_Accident_Prevention.pdf
DOIs: 10.5071/25thEUBCE2017-4AV.2.45
Source: PublicationPreSubmission
Source-ID: 131996622
Research output: Research - peer-review › Article in proceedings – Annual report year: 2017

Er sprængpladen vendt korrekt?
Sprængplader anvendes til overtryksbeskyttelse. Pålideligheden er helt afhængig af, om sprængpladen er vendt rigtigt.

Sprængpladen vendt korrekt?
Explosion i rötkammare med biogas
En biogasreaktor exploderade 1990 på Vejle Centrala reningsverk. Nu, 24 år senare, när biogas är populära än någonsin, har händelsen helt försvunnit från tillgängliga, öppna källor

Fighting Smoldering Fires in Silos – A Cautionary Note on Using Carbon Dioxide to Inert
This communication seeks to draw attention to the hazards of releasing liquid carbon dioxide into environments where an ignitable atmosphere may exist. Static discharges have sufficient energy to ignite flammable vapors and an internal explosion may result when fighting smoldering fires using this approach. A recent article in Biomass and Bioenergy examines an explosion in a Norwegian wood pellet silo when attempting to suppress a smoldering fire with CO₂. The article argues that the electrostatic hazard of CO₂ is widely under-appreciated and incidents like this are avoidable.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science , Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
Publication date: 2017
Risici ved midlertidige oplag af farligt gods.


[English summary] Following a major fireworks accident in Seest (2004), the statutory order implementing the EU Seveso directive in Denmark was enlarged in 2005 to cover also temporary storage of dangerous substances at transportation hubs such as marine terminals and railway yards. The rationale is quite sensible – the risk posed to nearby communities can be permanent even though the individual cargo is present temporarily only. The enlargement of order was ill conceived however, and implementation of the new measures has been troubled, in particular because transportation companies only have information on dangerous goods as provided in ADR/RID/IMO transportation documents, and the nature of this information is incompatible with the Seveso legislation's definition of dangerous substances. The paper provides a critical commentary on the rule-making and subsequent consultation processes and examines the dismal implementation status 12 years later (2017).
Svigt af inertgas purge medførte eksplosion i beholder

General information
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Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
Pages: 12-15
Publication date: 2017
Peer-reviewed: Unknown

Publication information
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Volume: 98
Issue number: 1/2
ISSN (Print): 0011-6335
Ratings:
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ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Web of Science (2007): Indexed yes
Web of Science (2004): Indexed yes
Original language: Danish
Electronic versions:
2017_01_DKemi_Svigt_af_inertgas_purge.pdf
Source: PublicationPreSubmission
Source-ID: 128742996
Research output: Communication › Journal article – Annual report year: 2017

Tank für Überschusshefe versagt – mit katastrophalen Folgen

剩余酵母罐出现故障-灾难性的后果
建议慎重：一个盛放剩余酵母的大罐子飞向空中，只剩下底板和罐子中的内容物质，虽然罐子不是针对过压设计的，但它也处于“非常低的过压”下，以防形成过多的泡沫。啤酒厂不清楚压缩空气的危害，本文描述的事故应该告诉人们，如果原本针对大气压力设计的罐子改用在轻微过压环境中，必须特别谨慎。

Beskedent overtryk gav spektakulære følger

Beskedent overtryk gav spektakulære følger

Beskedent overtryk gav spektakulære følger

Beskedent overtryk gav spektakulære følger
Fatal Accidents During Marine Transport of Wood Pellets Due to Off-gassing – Experiences from Denmark

The atmosphere in unventilated wood pellet storage confinements, such as the cargo hold of marine vessels transporting pellets in solid bulk, can be severely oxygen deficient and contain deadly concentrations of harmful gasses, of which the most feared is the poisonous and odour-less carbon monoxide. The hazard has been known for over a decade and has been responsible for many accidents. We examine three fatal accidents on marine vessels in or near Danish waters and argue that they share strikingly similar aetiologies, if not repetitive patterns. It is generally recognized that accidents should be thoroughly investigated and lessons learned shared widely in order to minimize the number of times the same lessons have to be learned. The three Danish cases suggest that this learning process is deeply troubled for the solid biomass segment. The International Maritime Organization IMO/SOLAS has recently revised its guidance on entering enclosed spaces aboard ships in response to the ongoing problem of confined space incidents. We argue that the interpretation of the concept of an “enclosed space” is of utmost importance because accidents take place in rooms that are not considered enclosed by the crew.
Har tanken et svagt tag?

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, COWI AS
Contributors: Hedlund, F. H., Eisfeld Linde, B.
Pages: 20-21
Publication date: 2016
Peer-reviewed: No

Publication information
Journal: Dansk Kemi
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ISSN (Print): 0011-6335
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Web of Science (2007): Indexed yes
Web of Science (2004): Indexed yes
Original language: Danish
Electronic versions:
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URLs:
http://ipaper.ipapercms.dk/TechMedia/DanskKemi/2016/1/

Bibliographical note
Source: PublicationPreSubmission
Source-ID: 120861561
Research output: Research › Journal article – Annual report year: 2016

Kronik: Virksomheder med elitesmile flyver under radaren

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
Pages: 6
Publication date: 2016
Peer-reviewed: No

Publication information
Large Steel Tank Fails and Rockets to Height of 30 meters - Rupture Disc Installed Incorrectly

At a brewery, the base plate-to-shell weld seam of a 90-m³ vertical cylindrical steel tank failed catastrophically. The 4 ton tank "took off" like a rocket leaving its contents behind, and landed on a van, crushing it. The top of the tank reached a height of 30 m. The internal overpressure responsible for the failure was an estimated 60 kPa. A rupture disc rated at <50 kPa provided overpressure protection and thus prevented the tank from being covered by the European Pressure Equipment Directive. This safeguard failed and it was later discovered that the rupture disc had been installed upside down. The organizational root cause of this incident may be a fundamental lack of appreciation of the hazards of large volumes of low-pressure compressed air or gas. A contributing factor may be that the standard piping and instrumentation diagram (P&ID) symbol for a rupture disc may confuse and lead to incorrect installation. Compressed air systems are ubiquitous. The medium is not toxic or flammable. Such systems however, when operated at "slight overpressure" can store a great deal of energy and thus constitute a hazard that ought to be addressed by safety managers.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, COWI AS
Contributors: Hedlund, F. H., Selig, R. S., Kragh, E. K.
Pages: 130-137
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Safety and Health at Work
Volume: 7
Issue number: 2
ISSN (Print): 2093-7911
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Scopus rating (2017): CiteScore 1.56 SJR 0.461 SNIP 1.179
Web of Science (2017): Indexed yes
Scopus rating (2016): CiteScore 1.8 SJR 0.531 SNIP 1.655
Scopus rating (2015): CiteScore 1.6 SJR 0.559 SNIP 1.039
Scopus rating (2014): CiteScore 1.12 SJR 0.418 SNIP 0.856
Scopus rating (2013): CiteScore 0.61 SJR 0.212 SNIP 0.44
Scopus rating (2012): SJR 0.181 SNIP 0.405
Scopus rating (2011): SJR 0.128 SNIP 0.131
Original language: English
Keywords: Catastrophic tank failure, Isentropic exergy, Pressure relief device failure
Electronic versions:
1_s2.0_S2093791115001080_main.pdf
1_s2.0_S2093791115001080_main.pdf
Vertical_cylindrical_90_m3_steel_tank_operated_at_slight_overpressure_rocks_to_height_of_30_m_draft_pre_print.pdf
DOIs:
10.1016/j.shaw.2015.11.004
Surplus yeast tank failing catastrophically
GOOD REASON FOR CAUTION I A large surplus yeast tank shot into the air leaving the floor plate and the contents behind. Although not designed for overpressure, the tank was kept at “very slight overpressure” to suppress nuisance foaming. The brewery was unaware of the hazards of compressed air. The accident described in this article serves to illustrate that care should be taken if a tank originally designed for atmospheric pressure is modified to operate at slight overpressure.

General information
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Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
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Publication date: 2016
Peer-reviewed: No

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Volume: 34
Issue number: 5
ISSN (Print): 0934-9340
Original language: English
URLs:
Source: PublicationPreSubmission
Source-ID: 127189177
Research output: Research › Journal article – Annual report year: 2016

Syrebrist och ambulansfärdb av tårta

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, COWI AS
Contributors: Hedlund, F. H.
Pages: 24-26
Publication date: 2016
Peer-reviewed: No

Publication information
Journal: Kemivärlden Biotech med Kemisk Tidsskrift
Volume: 4
Issue number: June
ISSN (Print): 1650-0725
Original language: Swedish
Electronic versions:
Syrebrist_och_ambulansf_rd_av_t_rta.pdf

Bibliographical note
Source: PublicationPreSubmission
Source-ID: 125621890
Research output: Research › Journal article – Annual report year: 2016

Eksplosion i rådnetank med biogas

General information
An explosion of a lithium–thionyl-chloride (Li–SOCl₂) battery during production (assembly) leads to serious worker injury. The accident cell batch had been in a dry-air intermediate storage room for months before being readied with thionyl chloride electrolyte. Metallic lithium can react with atmospheric nitrogen to produce lithium nitride. Nodules of lithium nitride were found to be present on the lithium foil in other cells of the accident batch. The investigation attributed the...
explosion to the formation of porous lithium nitride during intermediate storage and a violent exothermal decomposition with the SOCl₂–LiAlCl₄ electrolyte triggered by welding. The literature is silent on hazards of explosion of Li–SOCl₂ cells associated with the presence of lithium nitride. The silence is intriguing. Possible causes may be that such explosions are very rare, that explosions go unpublished precisely as this case initially did, or a combination of the two.

**General information**

State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hennesø, E., Hedlund, F. H.
Pages: 600-603
Publication date: 2015
Peer-reviewed: Yes

**Publication information**

Journal: Journal of Failure Analysis and Prevention
Volume: 15
Issue number: 5
ISSN (Print): 1547-7029
Ratings:
Web of Science (2018): Indexed yes
Scopus rating (2017): CiteScore 0.66 SJR 0.315 SNIP 0.521
Web of Science (2017): Indexed yes
Scopus rating (2016): CiteScore 0.42 SJR 0.249 SNIP 0.525
Scopus rating (2015): CiteScore 0.41 SJR 0.258 SNIP 0.48
Scopus rating (2014): CiteScore 0.3 SJR 0.197 SNIP 0.595
Scopus rating (2013): CiteScore 0.39 SJR 0.246 SNIP 0.735
ISI indexed (2013): ISI indexed no
Scopus rating (2012): CiteScore 0.28 SJR 0.197 SNIP 0.642
ISI indexed (2012): ISI indexed no
Scopus rating (2011): CiteScore 0.35 SJR 0.31 SNIP 0.629
ISI indexed (2011): ISI indexed no
Scopus rating (2010): SJR 0.265 SNIP 0.605
Scopus rating (2009): SJR 0.188 SNIP 0.432
Scopus rating (2008): SJR 0.222 SNIP 0.299
Scopus rating (2007): SJR 0.178 SNIP 0.456
Scopus rating (2006): SJR 0.217 SNIP 0.37
Scopus rating (2005): SJR 0.22 SNIP 0.56
Scopus rating (2004): SJR 0.133 SNIP 0.208
Scopus rating (2003): SJR 0.142 SNIP 0.188
Scopus rating (2002): SJR 0.162 SNIP 0.522
Original language: English
Keywords: Explosion, Chemistry, Accident reconstruction, Contamination

Electronic versions:
Li_SOCl2_16_preprint.pdf

DOIs:
10.1007/s11668-015-0004-y

URLs:
http://rdcu.be/nPXm

Source: PublicationPreSubmission
Source-ID: 115388254
Research output: Research - peer-review ; Journal article – Annual report year: 2015

Kage årsag til iltmangel og indlæggelse på hospital
Ambulance bragte en 58-årig forretningsrejsende til akutmodtagelsen med åndenød, svimmelhed og kvalme. Denne og andre cases viser, at man skal have respekt for kulldioxid.

**General information**

State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis, COWI AS
Kraftig eksplosion efter sammenblanding af salpetersyre og 2-propanol

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Statistics and Data Analysis, COWI AS
Contributors: Hedlund, F. H.
Pages: 17-19
Publication date: 2015
Peer-reviewed: No

Publication information
Journal: Kjemi
Volume: 75
Issue number: 4
ISSN (Print): 0023-1983
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
URLs:
Source: PublicationPreSubmission
Source-ID: 118024850
Research output: Research › Journal article – Annual report year: 2015

Når kulidioxid koster liv

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Pages: 12-13
Publication date: 2015
Peer-reviewed: No

Publication information
Explosiv överraskning för bryggeri
Bör man känna till att vissa alkoholhaltiga rengöringsmedel som blandas med salpetersyra kan ge upphov till raketbränsle. På ett danskt bryggeri hade man ingen aning.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Pages: 29-30
Publication date: 2014
Peer-reviewed: No

Publication information
Journal: Kemivärlden Biotech med Kemisk Tidsskrift
Issue number: 12
Original language: Swedish
Electronic versions:
KB_2014_12_Explosiv_vernaskning_f_r_bryggeri.pdf
URLs:
http://ebook.mentorcommunications.se/KB_Nr_12_2014/index.html#/28/
Source: PublicationPreSubmission
Source-ID: 103606309
Research output: Research › Journal article – Annual report year: 2014

Inherent hazards, poor reporting and limited learning in the solid biomass energy sector: A case study of a wheel loader igniting wood dust, leading to fatal explosion at wood pellet manufacturer
Large loaders are commonly used when handling solid biomass fuels. A preventable accident took place in 2010, where the malfunction of a front-end wheel loader led to a dust explosion which killed the driver and destroyed the building. The case offers an opportunity to examine the hazards of solid biomass, the accident investigation and any learning that subsequently took place.

The paper argues that learning opportunities were missed repeatedly. Significant root causes were not identified; principles of inherent safety in design were ignored; the hazardous area classification was based on flawed reasoning; the ATEX assessment was inadequate as it dealt only with electrical installations, ignoring work operations; and powered industrial trucks had not been recognized as a source of ignition. Perhaps most importantly, guidelines for hazardous area classification for combustible dust are insufficiently developed and give ample room for potentially erroneous subjective individual judgment. It is a contributing factor that combustible dust, although with great hazard potential, is not classified as a dangerous substance. Accidents therefore fall outside the scope of systems designed to disseminate lessons learned and prevent future accidents.

More attention to safety is needed for the renewable energy and environmentally friendly biomass pellet industry also to become sustainable from a worker safety perspective.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Combustible Dust Policy Institute, Industrial Fire Prevention LLC
Contributors: Hedlund, F. H., Astad, J., Nichols, J.
Pages: 450–459
Kronik: Mystiske julebrande i Moirans-en-Montagne

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Number of pages: 3
Publication date: 2014
Peer-reviewed: Unknown

Publication information
Journal: Ingenioeren
ISSN (Print): 0105-6220
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Electronic versions:
Kronik_Mystiske_julebrande_i_Moirans_en_Montagne.pdf
URLs:
http://ing.dk/artikel/kronik-mystiske-julebrande-i-moirans-en-montagne-173081
Source: PublicationPreSubmission
Source-ID: 103962641
Research output: Communication › Journal article – Annual report year: 2014

Kronik: Sammenstyrtet motorvejsbro – igen.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Number of pages: 1
Publication date: 2014
Peer-reviewed: No

Publication information
Journal: Ingenioeren
ISSN (Print): 0105-6220
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Electronic versions:
Sammenstyrtet motorvejsbro igen Denne gang m vi tage ved lære.pdf

URLs:

Bibliographical note
Online kronik, publiceret 29. sep. 2014, kl. 09:04
Source: PublicationPreSubmission
Source-ID: 103224988
Research output: Research › Journal article – Annual report year: 2014

Leder: Spildte muligheder koster liv

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Pages: 4
Publication date: 2014
Peer-reviewed: No

Publication information
Journal: Dansk Kemi
Volume: 95
Issue number: 11
ISSN (Print): 0011-6335
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Web of Science (2007): Indexed yes
Web of Science (2004): Indexed yes
Original language: Danish
Electronic versions:
2014_11a_DKemi_11_4_Leder.pdf
Source: PublicationPreSubmission
Source-ID: 101358778
Research output: Research › Journal article – Annual report year: 2014

LNG safety – an emerging and ignored issue in the climate change debate

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Number of pages: 1
Publication date: 2014
Peer-reviewed: Unknown

Publication information
Journal: European Safety and Reliability Association Newsletter
Issue number: September
Original language: English
Electronic versions:
LNG_safety_an_emerging_and_ignored_issue_in_the_climate_change_debate_ESRA_Newsletter_Sept_2014_p2.pdf
Source: PublicationPreSubmission
Source-ID: 104132624
Research output: Communication › Journal article – Annual report year: 2014

Solid Biomass Climate Change Interventions Examined in a Context of Inherent Safety, Media Shifting and Emerging Risks
This paper examines recent evidence from Denmark and abroad regarding climate change projects that aim to reduce global carbon dioxide emissions by converting coal-fired thermal power plants to solid biomass fuel. The paper argues that projects appear to be pursued narrow-mindedly with insufficient attention paid to safety and points to evidence of
media shifting - that the 'resolution' of a problem within the environmental domain creates a new problem in the workplace safety domain. From the perspective of inherent safety the paper argues that the conversion is a step in the wrong direction as a low risk fuel is substituted for a less safe one. Because of rapid scale-up and handling of unprecedented quantities, solid biomass qualify as an emerging risk for which proper control strategies have yet to be developed. The paper finally argues that the tendency to prioritize environmental benefits over safety concerns seems to run deep and not confined to the realm of only solid biomass. Danish environmental ambitions are very high and the costs to society of introducing solid biomass fuels are breathtaking. In this setting, the general failure to address safety risks appears particularly disheartening.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS, Combustible Dust Policy Institute
Contributors: Hedlund, F. H., Astad, J.
Pages: 1410-1427
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Human and Ecological Risk Assessment
Volume: 21
Issue number: 5
ISSN (Print): 1080-7039
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.49 SJR 0.49 SNIP 0.715
Web of Science (2017): Impact factor 1.508
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.32 SJR 0.462 SNIP 0.678
Web of Science (2016): Impact factor 1.56
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.17 SJR 0.49 SNIP 0.641
Web of Science (2015): Impact factor 1.306
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 1.09 SJR 0.566 SNIP 0.65
Web of Science (2014): Impact factor 1.096
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 1.11 SJR 0.618 SNIP 0.779
Web of Science (2013): Impact factor 1.076
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 0.99 SJR 0.463 SNIP 0.737
Web of Science (2012): Impact factor 1.292
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 1.38 SJR 0.444 SNIP 0.595
Web of Science (2011): Impact factor 1.538
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.505 SNIP 0.655
Web of Science (2010): Impact factor 1.486
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.402 SNIP 0.628
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.365 SNIP 0.535
Støveksplosion ødelægger dansk træpillefabrik - igen

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Pages: 14-16
Publication date: 2014
Peer-reviewed: No

Publication information
Journal: Dansk Kemi
Volume: 95
Issue number: 10
ISSN (Print): 0011-6335
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Web of Science (2007): Indexed yes
Web of Science (2004): Indexed yes
Original language: Danish
Electronic versions:
2014_10_DKemi_Tr_piller.pdf
Source: PublicationPreSubmission
Source-ID: 100482602
Research output: Research – Journal article – Annual report year: 2014

Støveksplosion ødelægger dansk træpillefabrik - igen


General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Pages: 44-47
Publication date: 2014
The relationship between the implementation of voluntary Five-Star occupational health and safety management system and the incidence of fatal and permanently disabling injury

This paper examines two properties of the South African NOSA 5-Star System, a voluntary occupational health and safety (OHS) management system. The first property is the association between system implementation and final OHS outcomes measured as incidence rates of fatal and permanently disabling injury. The second is the association between the Star audit rating and rates of serious occupational injury.

Although there are many uncertainties involved the paper argues that companies committed to the NOSA system experienced fewer fatal and permanently disabling injuries than the general manufacturing sector. The paper also examines an inverse correlation between the Star rating and the injury incidence rate. It is concluded that the Star rating is a sound although imperfect predictor of injury rates. The fact that auditing is an entirely voluntary activity likely distorts the Star rating to some extent. It is speculated that some (unsafe) companies may abandon or pause auditing if they experience too many injuries. There is also some evidence to suggest that companies with poor safety attitudes are able to successfully deceive auditors.

The paper suggests that voluntary OHS audit systems are embedded in structural problems that set limits to what they can reasonably be expected to accomplish. The fundamental issues are about naivety and the intrinsic viability of self-regulation. In a broader view however, the adoption of such systems might well be endorsed by policymakers because of their positive impact on OHS. It is clear though, that such systems cannot substitute authority enforcement activities.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science
Contributors: Hedlund, F. H.
Pages: 94–103
Publication date: 2014
Peer-reviewed: Yes
Original language: English

Keywords: Voluntary occupational health and safety (OHS) management system, Audit score, Effectiveness, Final OHS outcome

Electronic versions:

PrePrint_Relationship_implementation_voluntary_5_Star_OHSMS_and_fatal_and_permanently_disabling_injury.pdf

DOIs:

10.1016/j.ssci.2013.10.025

Research output: Research - peer-review › Journal article – Annual report year: 2014
Violent explosion after inadvertent mixing of nitric acid and isopropanol – Review 15 years later finds basic accident data corrupted, no evidence of broad learning

At a brewery in 1997, an operator confused filling nozzles for two commonly used acid cleaning agents and transferred nitric acid into a tank with P3, a proprietary phosphoric acid based cleaner that also contained 5–15% isopropanol. 10–15 min later the mixture exploded violently. The stainless steel tank disintegrated with such force that fragments lodged in walls of concrete. The explosion ravaged the cellar, destroyed equipment, blew out a masonry wall and released large amounts of nitrous oxide fumes. Likely, 62% nitric acid (CAS 7697-37-2) and isopropanol (2-propanol, CAS 67-63-0) reacted to produce isopropyl nitrate (nitric acid 1-methylethyl ester, CAS 1712-64-7), a rocket propellant. It is argued that the accident has broad learning potential because of the widespread usage of the two chemicals across industries, the innocent nature of the human error and the severity of the consequence.

A review 15 years later of lessons learned finds that information dissemination has followed a tradition of informal meetings in small industry sector associations but impact is unclear. There is no useful mention of the accident in open sources. Although the Danish Working Environment Authority took the brewery to court for negligence, they did not report or investigate the accident, or attempt to disseminate information available to them. Today, the general literature is silent on the explosion hazards of mixing the two chemicals.

The paper argues that without institutional support, learning opportunities are missed and broader cross-sector learning is limited or non-existent.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Danish Emergency Management Agency, COWI AS
Contributors: Hedlund, F. H., Folmer Nielsen, M., Hagen Mikkelsen, S., Kragh, E. K.
Pages: 255-261
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Safety Science
Volume: 70
ISSN (Print): 0925-7535
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 3.22 SJR 1.113 SNIP 2.004
Web of Science (2017): Impact factor 2.835
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.81 SJR 1.097 SNIP 1.99
Web of Science (2016): Impact factor 2.246
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 2.73 SJR 0.969 SNIP 1.932
Web of Science (2015): Impact factor 2.157
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 2.69 SJR 0.973 SNIP 2.264
Web of Science (2014): Impact factor 1.831
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 2.25 SJR 0.847 SNIP 2.195
Web of Science (2013): Impact factor 1.672
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 2.04 SJR 0.883 SNIP 1.911
Web of Science (2012): Impact factor 1.359
Voldsom eksplosion på fyrværkerivirksomhed

Violent explosion at fireworks depot. Two years after the 2004 Seest accident in Denmark, the accident repeated itself in the UK, Festival Fireworks, Marlie Farm, East Sussex, 2006 explosion. Emergency responders were badly prepared and had insufficient knowledge of earlier mass explosion accidents in fireworks depots/containers. Miss Fortuna played an important role in the Danish accident, not so in the UK. Multiple investigations were carried out in Denmark. Nevertheless, the quality of the single UK investigation of the Marlie Farm accident released three years later exceeds all the Danish investigations combined.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Pages: 12-15
Publication date: 2014
Peer-reviewed: No

Publication information
Journal: Dansk Kemi
Volume: 95
Issue number: 11
ISSN (Print): 0011-6335
Ratings:
ISI indexed (2013): ISI indexed no

Original language: English
Keywords: Clean-in-place (CIP), Nitric acid, Chemical incompatibility, Explosion, Learning from past accidents

Electronic versions:
Preprint

DOIs:
10.1016/j.ssci.2014.06.010

Research output: Research - peer-review ; Journal article – Annual report year: 2014
Voldsom eksplosion på fyrverkerivirksomhed
To år efter Seest gentog ulykken sig i England. Container eksploderede og dræbte to brandfolk.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, COWI AS
Contributors: Hedlund, F. H.
Pages: 32-33
Publication date: 2014
Peer-reviewed: No

Publication information
Journal: Brandvaesen
Volume: 12
Issue number: 9
ISSN (Print): 1603-0362
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Electronic versions:
BV_2014_09_november_32_33.pdf
Source: PublicationPreSubmission
Source-ID: 103225981
Research output: Research › Journal article – Annual report year: 2014

Texas’ laissez faire-mentalitet giver stof til eftertanke: Kronik

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science
Contributors: Hedlund, F. H.
Number of pages: 1
Pages: 17
Publication date: 14 Jun 2013
Peer-reviewed: Unknown

Publication information
Journal: Ingeniøren
ISSN (Print): 0105-6220
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Electronic versions:
2013_Ing_Kronik_Texas_laissez_faire_mentalitet_giver_stof_til_efftertanke_preprint.pdf
URLs:
http://ing.dk/artikel/kronik-texas-laissez-faire-mentalitet-giver-stof-til-efftertanke-159563
Glemt DDR-katastrofe viser faren ved transport af kuldioxid

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science
Contributors: Hedlund, F. H.
Pages: 18-19
Publication date: 7 Jun 2013
Peer-reviewed: Unknown

Publication information
Journal: Ingeniøren
ISSN (Print): 0105-6220
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
URLs:
http://ing.dk/artikel/glemt-ddr-katastrofe-viser-faren-ved-transport-af-kuldioxid-159407
Source: dtu
Source-ID: u::7672
Research output: Communication › Journal article – Annual report year: 2013

Challenges in risk assessment Insidious erosion of safety margins over time

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science
Contributors: Hedlund, F. H.
Publication date: 2013
Media of output: PowerPoint

Event information
Event: 2nd International Safety Conference in the North Sea Offshore Authorities Forum (NSOAF)
Location: Aberdeen, United Kingdom
Electronic versions: Presentation_on_NSOAF_safety_conference_2010_dtu_orbit.pdf
Research output: Research › Sound/Visual production (digital) – Annual report year: 2013

Emerging risks from fires and explosions in solid biofuels - some evidence from Denmark

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science
Contributors: Hedlund, F. H.
Publication date: 2013
Media of output: PowerPoint

Event information
Event: 5th iNTeg-Risk Conference
Location: Stuttgart, Germany
Electronic versions: Hedlund_Stuttgart_rev1
Research output: Research - peer-review › 2D/3D (physical products) – Annual report year: 2013
Past explosive outbursts of entrapped carbon dioxide in salt mines provide a new perspective on the hazards of carbon dioxide

This paper reports on a source of past carbon dioxide accidents which so far has only been sporadically mentioned in the literature. Violent and highly destructive outbursts of hundreds of tons of CO2 occurred regularly, if not routinely, in the now closed salt mines of the former DDR. The Menzengraben mine experienced an extreme outburst in 1953, possibly involving a several thousand tons of carbon dioxide. This source of accidents fills an important gap in the available carbon dioxide accident history and may provide a unique empirical perspective on the hazards of handling very large amounts of CO2.
Studies on occupational accident statistics in South Africa are few and far between, the most recent paper on the manufacturing sector was published in 1990. Accidents in South Africa are recorded in two systems: Exhaustive information is available from the insurance system under the Workmen’s Compensation Commissioner (WCC) but to access it on a timely basis is difficult. The legislative system under the Department of Labour (DOL) provides coarse but timely recordings. Interpretation is not simple however; both systems have seen changes to reporting formats and inclusion criteria over time, which hinder trend analysis. Also, the recordings of the two systems are not comparable due to major scope differences. This paper examines the relationship between the recordings in the two systems. Juxtaposing data from both systems the recordings of fatal accidents are found to be in agreement, somewhat less so for permanently disabling accidents/incidents. The paper examines if effects of the popular practice of replacing permanent workers with contract workers is visible in the WCC statistics – firm conclusions cannot be drawn however, due to data shortcomings. Data inaccuracies are reviewed and it is argued that WCC registrations may comprise industries outside the Standard Industrial Classification (SIC) scheme for manufacturing. The quality of accident reporting in official publications began to deteriorate by mid-1990s. The largest problem, however, is that reporting has come to a standstill, by mid-2012 the most recent WCC statistical publication covers 1999.

The paper examines recent evidence from Denmark and abroad with climate change projects that aim to reduce global carbon dioxide emissions by converting coal fired thermal power plants to solid biomass fuel. The paper argues that projects appear to be pursued narrow-mindedly with insufficient attention paid to safety and points to evidence of media-shifting—'the resolution' of a problem within the environmental domain creates a new problem in the workplace safety domain. The paper argues that biomass pellets qualify as an emerging risk for which proper control strategies have yet to be developed.

General Information
State: Published
Organisations: Department of Applied Mathematics and Computer Science
Contributors: Hedlund, F. H., Astad, J.
Pages: 263-268
Publication date: 2013

Host Publication Information
Publisher: CRC Press
Editors: Huang, C., Kahraman, C.
ISBN (Print): 9781138000193
(Communications in Cybernetics, Systems Science and Engineering – Proceedings).
URLs:
http://www.crcpress.com/product/isbn/9781138000193
Source: dtu
Do provisions to advance chemical facility safety also advance chemical facility security? - An analysis of possible synergies

The European Commission has launched a study on the applicability of existing chemical industry safety provisions to enhancing security of chemical facilities covering the situation in 18 EU Member States. This paper reports some preliminary analytical findings regarding the extent to which existing provisions that have been put into existence to advance safety objectives due to synergy effects could be expected advance security objectives as well.

The paper provides a conceptual definition of safety and security and presents a framework of their essential components. Key differences are presented. A safety framework is examined with the intent to identify security elements potentially covered. Vice versa, a security framework is examined with the intent to identify safety elements potentially covered. It is concluded that synergies are largely absent at the preventive level. Synergies exist at the mitigation level. At the strategic policy level, synergies are obvious.

The security of chemical facilities is important. First, facilities with large inventories of toxic materials could be attractive targets for terrorists. The concern is sabotage causing an intentional release that could endanger neighbouring populated areas. Second, facilities where high-risk chemicals are present could present opportunities for theft. The concern is that relatively small amounts of highly toxic chemicals could be taken to another location selected for higher impact.

The Directive on European Critical Infrastructures (ECI Directive) addresses facility security but does not cover the chemical sector. Chemical facility safety at EU level is addressed by way of the Seveso-II Directive. Preliminary estimates by the chemical industry suggest that perhaps 80% of the existing safety measures under Seveso-II would also be instrumental in terms of raising security. Synergies of this magnitude would imply little need for additional chemical facility legislation.

This paper finds no support for the idea that strong synergies exist at chemical facility level.
Fire in hot asphalt cargo hold, spontaneous ignition during unloading

While unloading hot asphalt from a marine tanker, a fire broke out in the cargo hold. The likely cause was ingress of air caused by the unloading operation and subsequent ignition of asphalt deposits in the headspace due to the presence of pyrophoric iron sulphide compounds. The fire suddenly intensified while personnel were contemplating their options, but it responded well to a foam attack when the decision eventually was taken.

General information
State: Published
Organisations: Technical University of Denmark
Contributors: Hedlund, F. H.
Pages: 23-24
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Loss Prevention Bulletin
Volume: 224
ISSN (Print): 0260-9576
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: English
Electronic versions:
Engelsberg_asphalt_fire_05_s_kolo.pdf
Source: dtu
Source-ID: u::3631
Research output: Research - peer-review › Journal article – Annual report year: 2012

Susse Winther interviews Frank Hedlund in: [Når katastrofen rammer] /When disaster strikes: Hurricane Katrina

Striking a balance between, on the one hand, the need for centralization of the disaster emergency response, and on the other hand, the ability to achieve a flexible and improvised response, that uses scarce resources in an optimal manner – a flexibility which by nature requires decentralization.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Contributors: Hedlund, F. H.
Pages: 14-17
Publication date: 2012
Peer-reviewed: Unknown

Publication information
Journal: Fagmagasinet Samtænkning
Original language: English
Keywords: Disaster, Response, Resilience
Electronic versions:
2012_Samt_nkning_N_r_katastrofen_rammer_002_.pdf
Research output: Communication › Journal article – Annual report year: 2012

The extreme carbon dioxide outburst at the Menzengraben potash mine 7 July 1953

Carbon dioxide is an asphyxiant and an irritant gas. An extreme outburst of carbon dioxide took place 7 July 1953 in a potash mine in the former East Germany. During 25 min, a large amount of CO2 was blown out of the mine shaft with great force. It was wind still and concentrated CO2 accumulated in a valley leading to multiple asphyxiation casualties. Based on a review of concentration–response relationships, the location of victims, and other information, it is concluded that concentrations of 10–30% carbon dioxide may have occurred 450 m from the point of release for at least 45 min. It is concluded that 1100–3900 tonnes of CO2 were blown out of the mine shaft, possibly with intensities around 4 tonnes/s. It is also concluded that the large majority of the gas escaped as a near-vertical high-velocity jet with only little loss of momentum due to impingement. The release was modelled using PHAST. Output from the model is inconsistent with the asphyxiation harm observed. The high-momentum release is predicted to disperse safely and never reach the ground. Carbon dioxide capture and storage (CCS) schemes will involve handling and transportation of unprecedented quantities...
of CO2. Case histories to date include sudden releases of CO2 of up to 50 tonnes only, far too small to provide a suitable empirical perspective on predicted hazard distances for CCS projects. The 1953 outburst contributes to filling this gap.

**General information**
- **State:** Published
- **Organisations:** Mathematical Statistics, Department of Informatics and Mathematical Modeling
- **Contributors:** Hedlund, F. H.
- **Pages:** 537-553
- **Publication date:** 2012
- **Peer-reviewed:** Yes

**Publication information**
- **Journal:** Safety Science
- **Volume:** 50
- **Issue number:** 3
- **ISSN (Print):** 0925-7535
- **Ratings:**
  - BFI (2018): BFI-level 2
  - Web of Science (2018): Indexed yes
  - BFI (2017): BFI-level 2
  - Scopus rating (2017): CiteScore 3.22 SJR 1.113 SNIP 2.004
  - Web of Science (2017): Impact factor 2.835
  - Web of Science (2017): Indexed yes
  - BFI (2016): BFI-level 2
  - Scopus rating (2016): CiteScore 2.81 SJR 1.097 SNIP 1.99
  - Web of Science (2016): Impact factor 2.246
  - Web of Science (2016): Indexed yes
  - BFI (2015): BFI-level 2
  - Scopus rating (2015): CiteScore 2.73 SJR 0.969 SNIP 1.932
  - Web of Science (2015): Impact factor 2.157
  - Web of Science (2015): Indexed yes
  - BFI (2014): BFI-level 2
  - Scopus rating (2014): CiteScore 2.69 SJR 0.973 SNIP 2.264
  - Web of Science (2014): Impact factor 1.831
  - Web of Science (2014): Indexed yes
  - BFI (2013): BFI-level 2
  - Scopus rating (2013): CiteScore 2.25 SJR 0.847 SNIP 2.195
  - Web of Science (2013): Impact factor 1.672
  - ISI indexed (2013): ISI indexed yes
  - Web of Science (2013): Indexed yes
  - BFI (2012): BFI-level 2
  - Scopus rating (2012): CiteScore 2.04 SJR 0.883 SNIP 1.911
  - Web of Science (2012): Impact factor 1.359
  - ISI indexed (2012): ISI indexed yes
  - Web of Science (2012): Indexed yes
  - BFI (2011): BFI-level 2
  - Scopus rating (2011): CiteScore 2 SJR 0.817 SNIP 1.728
  - Web of Science (2011): Impact factor 1.402
  - ISI indexed (2011): ISI indexed yes
  - BFI (2010): BFI-level 2
  - Scopus rating (2010): SJR 0.781 SNIP 1.844
  - Web of Science (2010): Impact factor 1.637
  - Web of Science (2010): Indexed yes
  - BFI (2009): BFI-level 2
  - Scopus rating (2009): SJR 0.693 SNIP 1.541
  - BFI (2008): BFI-level 1
Cleaner Production and Workplace Health and Safety: A combined approach. A case study from South Africa

Environmental goals may be pursued narrow-mindedly with no attention paid to the workplace. This book examines combined approaches in cleaner production projects. It explores two main avenues. First, integration into the project specification. The planning tools in use by assistance agencies are examined and it is argued that a dilemma of rigour or relevance exists. Small companies are relevant to target but do not meet rigorous support criteria. Large companies need no help, but are attractive due to low project risk. Second, integration of activities at company level. For large companies, integration of management systems is an option. A study on the South African Nosa 5-Star system refutes earlier criticism of dismal performance of top-down systems. It is argued that integration at this level is viable. For small companies, less formalistic approaches are required. ILO's network concept WISE was introduced to a Waste Minimization Club. It is argued that cost-savings arguments are too simplistic. They ignore both scarcity of managerial attention and opportunity costs, and cannot explain the behaviour of small companies.
Ekstrem eksplosion af benzindampe - igen, igen
I de senere år har der været flere tilfælde, hvor antændelse af benzindampe i det fri har medført en detonation, der har forårsaget omfattende overtryksskader. Faren kunne have været erkendt langt tidligere, hvis tidligere uheld var blevet efterforsket ordentligt.

General information
State: Published
Organisations: Mathematical Statistics, Department of Informatics and Mathematical Modeling
Contributors: Hedlund, F. H.
Pages: 18-21
Publication date: 2011
Peer-reviewed: No

Worst case-scenarier opstår for ofte

General information
State: Published
Organisations: Mathematical Statistics, Department of Informatics and Mathematical Modeling
Contributors: Hedlund, F. H.
Publication date: 2011
Peer-reviewed: No

Worst case-scenarier opstår for ofte

General information
State: Published
Organisations: Mathematical Statistics, Department of Informatics and Mathematical Modeling
Contributors: Hedlund, F. H.
Publication date: 2011
Peer-reviewed: No
Institutional support of learning from accidents: some obstacles to getting a useful community-wide database in the EU

General information
State: Published
Organisations: Mathematical Statistics, Department of Informatics and Mathematical Modeling, Riso National Laboratory for Sustainable Energy
Contributors: Hedlund, F. H., Andersen, H. B.
Publication date: 2006
Peer-reviewed: No
Electronic versions:
904.pdf

Bombastiske initiativer løser ikke risikoproblemet

General information
State: Published
Organisations: COWI AS
Contributors: Hedlund, F. H., Kragh, E.
Publication date: 21 Nov 2004
Peer-reviewed: Unknown

Publication information
Journal: Ingeniøren
ISSN (Print): 0105-6220
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Electronic versions:
Bombastiske_initiativer_loser_ikke_risikoproblemet.pdf
URLs:
http://ing.dk/artikel/bombastiske-initiativer-loser-ikke-risikoproblemet-59448
Source: PublicationPreSubmission
Source-ID: 92849256
Research output: Communication › Contribution to newspaper - Newspaper article – Annual report year: 2004

Atomterror - Risikoen er faldet efter den kolde krig

General information
State: Published
Organisations: Technical University of Denmark
Contributors: Hedlund, F. H.
Publication date: 4 Nov 2004
Peer-reviewed: Unknown

Publication information
Journal: Ingeniøren
Volume: 47
Issue number: 1
Bhopal-katastrofen skyldtes et fatalt ledelsesmæssigt svigt

General information
State: Published
Organisations: COWI AS
Contributors: Hedlund, F. H.
Pages: 4
Publication date: 2004
Peer-reviewed: Unknown

Publication information
Journal: Ingenioeren
Volume: 50
Issue number: 1
ISSN (Print): 0105-6220
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
URLs:
http://ing.dk/artikel/59891-bhopal-katastrofen-skyldtes-et-fatalt-ledelsesmaessigt-svigt
Source: orbit
Source-ID: 314897
Research output: Communication › Journal article – Annual report year: 2004

Uheldsforebyggelse: Hvorfor er det altid en menneskelig fejl?

General information
State: Published
Organisations: Unknown
Contributors: Hedlund, F. H.
Publication date: 2002
Peer-reviewed: Unknown

Publication information
Journal: Ingenioeren
Volume: 48
Issue number: 2
ISSN (Print): 0105-6220
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
URLs:
http://ing.dk/artikel/44629-hvorfor-er-det-altid-en-menneskelig-fejl
Source: orbit
Source-ID: 314904
Research output: Communication › Journal article – Annual report year: 2002
Participation or rule - Which approach could have the better short term prospects of improving the working environment in South Africa?

During the apartheid era, industrial relations in South Africa were highly adversarial. The large black unions were basically mass protest organisations campaigning against white political power and the general climate was not conducive towards the creation of participatory structures at the workplace level. On the contrary, shop stewards were nurtured in the skills of confrontation and disruption. This paper argues that barriers to workplace participatory structures sown under apartheid will disappear only slowly and that this will negatively influence the prospects of such structures to be a vehicle for improvements in the working environment - at least in the short term. On the other hand, this paper argues, recent developments in the South African labour market are increasingly conducive towards the use of rules (or procedures) in the workplace. Companies increasingly produce and adhere to standard operating procedures (SOPs) a part of ISO quality management certification schemes. Furthermore, because of low levels of formal skills of the workforce, recent legislation requires employers to spend a certain percentage of the wage sum on skills upgrading. A likely consequence is that companies will standardise tasks by means of SOPs, train employees to follow the SOPs and then issue compliance certificates. The Scandinavian countries have a tradition of consensus, participation and reliance on local activities to advance the working environment. The paper does not seek to decry this participation-based approach or question the value of it, but rather point to certain limitations and difficulties if a similar approach is transferred to other countries, for example as part of development assistance programmes.
Security at chemical facilities – overview of different regulatory approaches taken in EU Member States

Period: 2 Nov 2017
Frank Huess Hedlund (Speaker)
Department of Applied Mathematics and Computer Science
Dynamical Systems
Statistics and Data Analysis

Description
It is a European Union policy goal to enhance high-risk chemical facility security. This presentation presents some results of a study carried out for the European Commission, DG Home Affairs.

The study aimed to provide an overview of existing provisions and measures that help to enhance security at chemical facilities. These provisions and measures may for instance have their background in safety legislation or non-regulatory initiatives implemented by industry or in specific legislative provisions targeting security aspects implemented by individual Member States.

This presentation briefly reviews: 1) the concept of a high-risk chemical facility; 2) the analytical framework developed to identify security elements relevant for a chemical facility; and 3) possible synergies, the extent to which safety measures can be expected also to improve security. The study found that Member States have taken three distinct regulatory approaches: 1) folding security into Seveso safety legislation; 2) enlarging the scope of existing national security provisions; and 3) encouraging partnerships with industry associations to promote voluntary initiatives such as the security addendum to the Responsible Care programme.

Denmark has recently taken the first approach, adding security to Seveso (III) safety reporting. The presentation briefly reviews some of the resulting challenges.

Degree of recognition: International

Documents:
SRA Nordic Chapter 2017

Related event
02/11/2017 → 03/11/2017
Espoo, Finland
Activity: Talks and presentations › Conference presentations
Fællesarrangement mellem IDA – SAM (selskab for arbejdsmiljø) og IDA – RISK (selskab for risikovurdering)

Ingeniørhuset, København

Sikkerhed, sikring og sikkerhedskultur,
Indlæg om sikkerhed og sikring, herunder præsentation af resultater fra opgave for EU kommissionen om sikring af Seveso anlæg.

Description

Fællesarrangement mellem IDA – SAM (selskab for arbejdsmiljø) og IDA – RISK (selskab for risikovurdering)

Ingeniørhuset, København

Sikkerhed, sikring og sikkerhedskultur,
Indlæg om sikkerhed og sikring, herunder præsentation af resultater fra opgave for EU kommissionen om sikring af Seveso anlæg.

Related event

Sikkerhed, sikring og sikkerhedskultur
14/12/2015 → 14/12/2015
Denmark

1st Nordic Chapter Risk Conference
Period: 16 Nov 2015
Frank Huess Hedlund (Speaker)

Department of Applied Mathematics and Computer Science
Statistics and Data Analysis

Description

Failure to learn after accidents – the lamentable situation in Denmark

1st Nordic Chapter Risk Conference

Related event

1st Nordic Chapter Risk Conference: The Future of Risk Analysis in the Nordic Countries
16/11/2015 → 17/11/2015
Lund, Sweden

Activity: Talks and presentations › Conference presentations

Failure to learn after accidents – the lamentable situation in Denmark
Period: 16 Nov 2015
Frank Huess Hedlund (Speaker)

Department of Applied Mathematics and Computer Science
Statistics and Data Analysis

Description

Learning from own – and better, other people’s – past accidents and misfortune is an ancient accident prevention strategy. The benefits of such learning are obvious. What is not so obvious, however, is how to make this seemingly simple and straightforward idea work in practice. This presentation presents evidence in support of the view that such learning processes appear to be impeded, dysfunctional or entirely absent in Denmark. Two Danish accident cases in which major learning opportunities were foregone will be presented. The first case relates to a wood pellet facility, a sustainable renewable energy project, which experienced a devastating dust explosion. The accident was insufficiently investigated and root cause issues relating to principles of inherent safety were not identified. As a result, a repeat explosion took place eight years later. The case offers a text book example of the truism that if accidents are not investigated, and root causes not identified, accidents recur. The second case (not presented). In both cases, significant sector-relevant learning opportunities were foregone. Indeed, the cases have slipped into oblivion. There is no useful information in open sources that could potentially prevent repeat occurrences elsewhere. Learning is absent.

Documents:
Hedlund - Lamentable situation DK
Related event

1st Nordic Chapter Risk Conference: The Future of Risk Analysis in the Nordic Countries
16/11/2015 → 17/11/2015
Lund, Sweden
Activity: Talks and presentations › Conference presentations

DI's arbejdsmiljøkonference 2015
Period: 10 Mar 2015
Frank Huess Hedlund (Speaker)
Department of Applied Mathematics and Computer Science
Links:
http://di.dk/diuddannelse/Konferencer/Pages/DIsarbejdsmiljoekonference20151216-9723.aspx

Related event

DI's arbejdsmiljøkonference 2015
10/03/2015 → …
Odense, Denmark
Activity: Talks and presentations › Conference presentations

KPI'er og strategisk arbejdsmiljøarbejde
Period: 24 Feb 2015
Frank Huess Hedlund (Speaker)
Department of Applied Mathematics and Computer Science
Links:
https://ida.dk/event/312891

Related event

KPI'er og strategisk arbejdsmiljøarbejde
24/02/2015 → …
København, Denmark
Activity: Talks and presentations › Conference presentations

Mysterious fires in Moirans-en-Montagne checkmated the town's crisis management team: Theme: Crisis management
Period: 22 Oct 2014
Frank Huess Hedlund (Speaker)
Department of Applied Mathematics and Computer Science

Description
Kompetencedage autumn 2014.
The biannual symposium "Competence Days" are organized by Samtænkning, a unit under the Ministry of Defence (Denmark). (www.samtaenkning.dk)
Documents:
Program for kompetenceudviklingsdage på Kastellet 22 og 23 oktober 2014

Related event

Kompetencedage efterår 2014: Tema: Krisestyring
22/10/2014 → 23/10/2014
Copenhagen, Denmark
Activity: Talks and presentations › Conference presentations

Occupational health and safety management audit systems – developments, challenges and perspectives
Period: 10 Sep 2014
Frank Huess Hedlund (Speaker)
Department of Applied Mathematics and Computer Science
Past explosive outbursts of entrapped carbon dioxide in salt mines provide a new perspective on the hazards of carbon dioxide.

Frank Huess Hedlund (Speaker)

Department of Applied Mathematics and Computer Science

ABSTRACT: This paper reports on a source of past carbon dioxide accidents which so far has only been sporadically mentioned in the literature. Violent and highly destructive outbursts of hundreds of tons of CO2 occurred regularly, if not routinely, in the now closed salt mines of the former DDR. The Menzengraben mine experienced an extreme outburst in 1953, possibly involving a several thousand tons of carbon dioxide. This source of accidents fills an important gap in the available carbon dioxide accident history and may provide a unique empirical perspective on the hazards of handling very large amounts of CO2

Emerging risks from fires and explosions in solid biofuels - some evidence from Denmark

Period: 21 May 2013
Frank Huess Hedlund (Speaker)
Related event

5th iNTeg-Risk Conference: Risk Screening - Horizon 2020: From iNTeg-Risk to the E2R2 - European Emerging Risk Radar
21/05/2013 → 22/05/2013
Stuttgart, Germany
Activity: Talks and presentations › Conference presentations

Do provisions to advance chemical facility safety also advance chemical facility security?: An analysis of possible synergies
Period: 8 Nov 2012 → 9 Nov 2012
Frank Huess Hedlund (Invited speaker)
Department of Informatics and Mathematical Modeling
Mathematical Statistics

Description
More than 200 participants from 54 countries attended the event, which was organised by Poland and the OPCW in cooperation with the G8 Global Partnership and international partners.

Documents:
Synergy, safety, security
Links:
http://www.opcw.org/international-meeting-on-chemical-safety-and-security/ (Website)

Related event

International Meeting on Chemical Safety and Security
08/11/2012 → 09/11/2012
Tarnów, Poland
Activity: Talks and presentations › Conference presentations

 Hvåd har vi lært af ulykkerne?
Period: 12 Oct 2012
Frank Huess Hedlund (Lecturer)
Department of Applied Mathematics and Computer Science

Description
IDA, RISK - Selskab for risikovurdering. The Danish Society of Engineers, IDA

Related event

Seminar i RISK: Risikostyring som værktøj: Hvåd har vi lært, og hvordan kommer vi videre?
23/10/2012 → …
Copenhagen, Denmark
Activity: Talks and presentations › Conference presentations

Risikoanalyse og worst-case scenarier
Period: 30 Sep 2012
Frank Huess Hedlund (Lecturer)
Department of Applied Mathematics and Computer Science

Description
Oplæg på DTU masteruddannelse i miljø-og arbejdsmiljøledelse

Related external organisation

Technical University of Denmark
Katastrofer, worst case - hvorfor sker de? Er det en blind plet fra evolutionens side? Hvad kan vi gøre?
Period: 29 Aug 2012
Frank Huess Hedlund (Lecturer)
Department of Applied Mathematics and Computer Science
Links:
http://www.mssm.dk/side/program-og-pr%C3%A6sentationer-2012

Related event
Maritim Sikkerhed, Sundhed og Miljø (2012)
29/08/2012 → 31/08/2012
Nyborg, Denmark
Activity: Talks and presentations › Conference presentations

Når planlægningen fejler
Period: 19 Apr 2012
Frank Huess Hedlund (Lecturer)
Department of Applied Mathematics and Computer Science
Documents:
Program

Related event
Kompetenceudviklingsdage på Kastellet (4-2012): TEMA - netværk og uhåndgribelige risici
18/04/2012 → 19/04/2012
København, Denmark
Activity: Talks and presentations › Conference presentations

Risikoanalyse og worst-case scenarier
Period: 27 Aug 2011
Frank Huess Hedlund (Speaker)
Department of Applied Mathematics and Computer Science

Description
Oplæg på DTU masteruddannelse i miljø- og arbejdsmiljøledelse

Related external organisation
Technical University of Denmark
Kgs. Lyngby, Denmark
Activity: Other

Hvordan kan vi undgå worst-case?
Period: 10 May 2011
Frank Huess Hedlund (Lecturer)
Department of Applied Mathematics and Computer Science

Related event
Hvordan kan vi undgå worst-case?
10/05/2011 → …
Copenhagen, Denmark
Activity: Talks and presentations › Conference presentations
Challenges in risk assessment - Insidious erosion of safety margins over time
Period: 23 Nov 2010
Frank Huess Hedlund (Invited speaker)
Department of Applied Mathematics and Computer Science
Documents:
Presentation_NSOAF_safety_conference_2010.pdf

Related event
2nd International Safety Conference in the North Sea Offshore Authorities Forum (NSOAF)
Aberdeen, United Kingdom
Activity: Talks and presentations › Conference presentations

Press clippings:

Ekspert_ Forebyggelse af arbejdsulykker kræver ordentlig udredning
Frank Huess Hedlund
26/01/2017

Subject
Myndighederne bør have mere fokus på at opklare og lære af dødsulykker frem for straf og ansvar, mener risikoekspert. Department of Applied Mathematics and Computer Science , Dynamical Systems, Statistics and Data Analysis

Media contribution (1)

Ekspert_ Forebyggelse af arbejdsulykker kræver ordentlig udredning
26/01/2017
Fagbladet 3F, Print
https://www.fagbladet3f.dk/artikel/ekspert-forebyggelse-af-arbejdsulykker-kraever-ordentlig-udredning
Frank Huess Hedlund
Department of Applied Mathematics and Computer Science , Dynamical Systems, Statistics and Data Analysis

Relations
Research outputs:
Erfaringer frem for ansvar.
Kraftig eksplosion efter sammenblanding af salpetersyre og 2-propanol
Støveexplosion ødelægger dansk træpillefabrik - igen
Press/Media: Press / Media

Risikoekspert: Hvor mange skal dø, før vi lærer noget?
Frank Huess Hedlund
25/01/2017
Department of Applied Mathematics and Computer Science , Dynamical Systems, Statistics and Data Analysis

Media contribution (1)

Risikoekspert: Hvor mange skal dø, før vi lærer noget?
25/01/2017
Fagbladet 3F, Print
Frank Huess Hedlund
Department of Applied Mathematics and Computer Science , Dynamical Systems, Statistics and Data Analysis
Press/Media: Press / Media

Safety expert doubtful if root causes will be identified after Fredericia fire
Frank Huess Hedlund
05/02/2016

Description
Major fire in palm oil tank, possibly initiated by explosion of solution of urea ammonium nitrate, although many details are vague at this point in time
Safety expert doubtful if root causes will be identified after Fredericia fire
05/02/2016
Ingeniøren, Print
Frank Huess Hedlund
Department of Applied Mathematics and Computer Science, Dynamical Systems, Statistics and Data Analysis
Press/Media: Press / Media

Owners of wood pellet stoves risk carbon monoxide poisoning in poorly ventilated pellet storage rooms
Frank Huess Hedlund
03/05/2015

Private households with wood pellet stoves face risk of carbon monoxide poisioning
Frank Huess Hedlund
29/04/2015
Department of Applied Mathematics and Computer Science

30 år efter giftudslip lider Bhopal stadig
Frank Huess Hedlund
04/12/2014

Private households with wood pellet stoves face risk of carbon monoxide poisioning
29/04/2015
Ingeniøren, Print
http://ing.dk/artikel/ejere-af-pillefyr-risikerer-kulilteforgiftning-fra-traepillelagre-175790
Frank Huess Hedlund
Department of Applied Mathematics and Computer Science
Press/Media: Press / Media
Risiko-ekspert: Vi ignorerer eksplosionsfaren fra træpille-stav
Frank Huess Hedlund
10/03/2014
Department of Applied Mathematics and Computer Science

Media contribution (1)

Zum Glück blieb bereits 1953 die große Katastrophe aus
Frank Huess Hedlund
17/04/2013
Department of Applied Mathematics and Computer Science

Media contribution (1)

When disaster strikes: Hurricane Katrina,
Frank Huess Hedlund
15/06/2012

Description
Striking a balance between, on the one hand, the need for centralization of the disaster emergency response, and on the other hand, the ability to achieve a flexible and improvised response, that uses scarce resources in an optimal manner – a flexibility which by nature requires decentralization.

Subject
disaster response, resilience
Department of Applied Mathematics and Computer Science

Media contribution (1)

When disaster strikes. On the balance between centralization of disaster response – and decentralization – the flexibility and improvisation, the ability to cope, a precondition for fast local decision making.
Frank Huess Hedlund
31/05/2012

Description
The disaster response to the 2005 Katrina hurricane is an example of how large federal agencies with massive resources apparently were paralyzed in rigid bureaucracy, whereas smaller and more flexible organizations were better able to adapt (cope) and utilize their limited resources in a highly efficient manner. Improvisation requires trust. If people are fearful, the start to "go by the book". Or as John Tierney from the New York Times said: "Going (down) by the book".
When disaster strikes. On the balance between centralization of disaster response – and decentralization – the flexibility and improvisation, the ability to cope, a precondition for fast local decision making.

31/05/2012
Magasinet Samtænkning, Denmark, Print
Hjemmeværnskommandoen
The disaster response to the 2005 Katrina hurricane is an example of how large federal agencies with massive resources apparently were paralyzed in rigid bureaucracy, whereas smaller and more flexible organizations were better able to adapt (cope) and utilize their limited resources in a highly efficient manner. Improvisation requires trust. If people are fearful, the start to "go by the book". Or as John Tierney from the New York Times said: "Going (down) by the book". Frank Huess Hedlund
Poor levels of safety for rail tank cars - Gas explosion could take place in Denmark

31/07/2009
Nyhedsmagasinet Ingeniøren, Print
http://ing.dk/artikel/elendig-tog-sikkerhed-gasekspllosion-kan ogsa-ske-i-danmark-99854
Frank Huess Hedlund
Department of Applied Mathematics and Computer Science
Press/Media: Press / Media