

# › SUSTAINABLE SAFETY VISIONS AND PERSPECTIVES



# SUSTAINABLE SAFETY

## VISIONS AND PERSPECTIVES

### COLOFON

- SUSTAINABLE SAFETY – VISIONS AND PERSPECTIVES is a collection of contributions presented during the symposium at the occasion of the retirement of prof Gerard I.J.M. Zwetsloot, PhD from TNO and organized by TNO on 2nd June 2015.
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# FOREWORD

Responsible management of a company creates sustainable basis for successful business operations, for customers' satisfaction, and for welfare of stakeholders and employees. This principle is becoming more and more important in heavy global competition, and examples of good business cases exist. However, if this principle is violated, you may face serious business problems through losing the trust of customers and weakening the company image. Nowadays we have seen a breathtaking example of irresponsible business actions in car industry.

Occupational safety and health is a part of responsible company management. Maintaining and enhancing safety and well-being of employees is a legal duty of managers. It is also an important factor for increasing productivity. Smooth production requires accident-free workplace. Thus "zero accidents" is both an ethical goal and an essential productivity factor. Many companies have already adopted this goal for their safety policy. Successful business cases exist. Also, research is producing new knowledge and understanding how to apply this zero accident vision.

This publication "Sustainable Safety – visions and contributions" brings valuable knowledge about new safety approaches for readers. It combines useful scientific information to be used in everyday practices. Personally I have enjoyed innovative and constructive way of working together with TNO experts. I am convinced that this publication will open up new innovative approaches in occupational safety.

Helsinki, 19th October 2015

**BY MARKKU AALTONEN, PHD**

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# INTRODUCTION

Safety science is developing continuously. Experience and research contribute to the growing body of knowledge on safety and reflect new challenges demanded by developments in technology, the evolution of organisations and changing configurations of men, machines and organisations. Safety can thereby be regarded as a dynamic non-event (Weick 1987) created by people (Zwetsloot et al 2007) supported by resources in the context of business assets.

Safety sought by organisations will be the result of continuous co-creation in a business process and will depend on managerial ambition and commitment as well as employees living up core values dedicated to creating a safe work (environment) and deciding and behaving accordingly.

Companies and their stakeholders that consider safety as a corner stone of their business philosophy and key to their license to operate and integrated into business operations will therefore continuously need to nurse the safety level acquired and to adapt and improve in order to cope with new challenges. This publication addresses this on-going dynamic process being captured in the concept of sustainable safety.

There is not (yet) a generally accepted definition of sustainable occupational and industrial safety. But we understand sustainable safety as:

*“long lasting safety performance that is compatible with, and contributes to sustainable development and sustainable employment”.*

There are four main reasons to explore the concept of sustainable safety, as well as the factors, actions and programmes that have the potential to contribute significantly to sustainable safety.

1. Many organisations struggle to (further) reduce their accident frequencies. In fact, both at the company and country level, after periods of safety improvement there seems a kind of stagnation in further safety improve-

ments. The accident and incident frequencies seem to plateau, or even to increase slightly. How can new progress be achieved?

2. It is now realised that in the past decades, in Western economies, the accident frequency reductions are partly due to the transitions in our economies that have become more service oriented. Offshoring of hazardous activities, i.e. to exporting hazards and risk to low wage countries was an important factor. Clearly, these developments do not represent real safety improvements. They do, however, increase the need to reflect on sustainable safety in a global perspective and to refocus on the potential to achieve real safety improvements
3. The social aspects of sustainability enjoy increasing attention, e.g. in the quest for corporate social responsibility, and business ethics. There can be no doubt that sustainable safety is part of all this, but what are the opportunities implied by these developments?
4. Organisations and their business environments are continually changing. Technological innovations are developed and adopted at ever-increasing speed. The increasing proliferation of coupled, networked and project organisations induce growing complexities and increasingly require adaptability and resilience to cope with variance and unknown risks, while customers and society expect high reliability.

The concept of sustainable safety offers a window to explore the long term development and future needs to keep commitment and investment in safety effort on a high level but also to induce creativity and momentum to live up ambition to keep on improving and strengthening safety performance.

Clearly, sustainable safety is a positive concept, so it is more than merely the absence of accidents and incidents. In any practical situation sustainable safety requires the ability to deal adequately with variability, uncertainties, ambiguities and change, and to learn from positive as well as from negative events.

On the occasion of the retirement of Gerard Zwetsloot in March 2015, TNO organised a mini symposium in which the concept of sustainable safety was explored from the per-

spectives of science, government and business. Representatives of stakeholders in these fields presented their view at sustainable safety.

Scientists from TNO and its network reflected on those perspectives and challenged the presenters for in-depth insights. In parallel several experts presented their expert-opinions on sustainable safety through posters. This resulted in an attractive set of perspectives and insights of what sustainable safety actually is, and where it may lead us to. These contributions are compiled in this publication and which also includes the vision of Gerard Zwetsloot being presented as key note during the symposium.

We hope that this publication will contribute to the development and acceptance of the concept of sustainable safety and that our readers enjoy reading the inspiring reflections and ideas of the contributors.

TNO, Leiden, September 2015

**JOHAN VAN DER VORM**  
**GERARD ZWETSLOOT**

# SUSTAINABLE SAFETY IN PERSPECTIVE

## SUSTAINABLE SAFETY, THE WAY FORWARD

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# SUSTAINABLE SAFETY, THE WAY FORWARD

Prof Gerard I.J.M. Zwetsloot, PhD

## INTRODUCTION

Many industries pursue accident prevention and safety promotion. While traditionally the focus is on tactical and operational challenges of risk control, there are valid reasons to go beyond that. From a long-term perspective, it seems important to focus also on strategic challenges of risk control, and to pay genuine attention to the emerging concept of sustainable safety.

As stated in the [foreword](#) there are several reasons to better explore the concept of sustainable safety. As this concept has not yet a generally accepted definition, this paper is meant to contribute to the development of a common understanding. Before we look far in the future developments, let's first assess where we are with safety science and safety in industrial practice.

## THE THIRD AGE OF SAFETY

Andrew Hale and Jan Hovden came in 1997 with the concept of 'the third age of safety' (Hale and Hovden 1997). After a period wherein safety was mainly depending on technology and a period wherein most attention was going to safety organisation and safety management (systems), they analysed that most of the recent research in safety was on safety culture and safety behaviour.

Many consultants took over that concept, and many of them illustrated that with the following well-known figure (1).

Though these consultants often refer to Hale & Hoven, It is worth noting that Hale and Hovden did not give such a

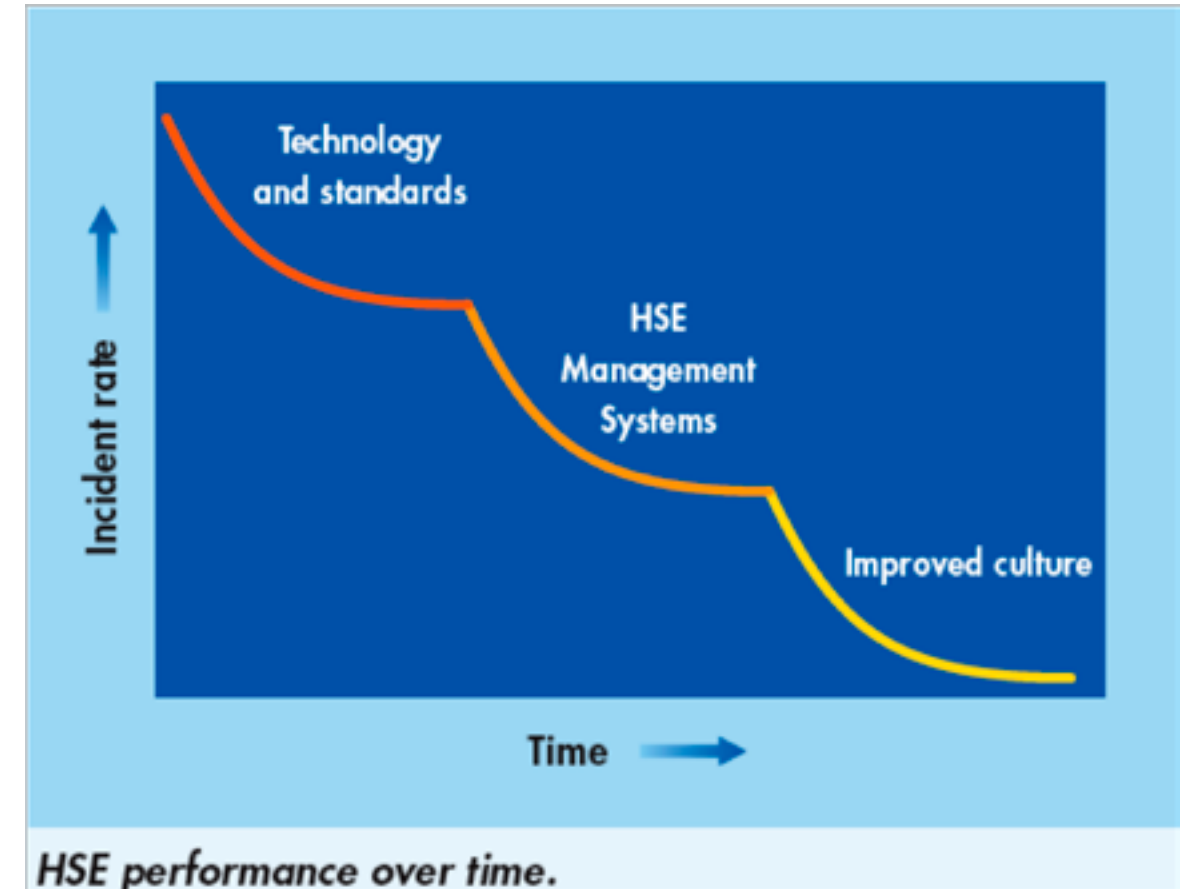


Figure 1 The third ages of safety versus incident rate



figure, nor did they suggest the relationship with safety performance in the manner depicted. That is, however, for me not the reason that I see a need to redefine the third age of safety.

**Redefining the third age of safety**

For me the reason for redefining the third age of safety stems from the fact that such an understanding of the three eras of safety seems to neglect the fact that safety, as far as we can influence it, is always man-made. In an earlier publication (Zwetsloot et al 2007) we emphasized this already in the title: safety as well as unsafety is created, in our complex world, as the result of co-creation and co-learning by key agents.

When we acknowledge that in the third age of safety there is no longer one group of experts of key agents that is able to ensure safety, but safety is co-created by many agents in social-dynamic processes. Safety is no longer a matter of ‘we fix the problem’, but it is an on-going challenge and it is an inherent part of (working) life to deal responsibly with risks.

This also explains directly the challenges that we face nowadays to improve safety sustainably. See table 2.

**The three core principles of (safety) excellence revised**

To further our understanding of sustainable safety, I will now make use of the three core principles for excellence, including safety excellence, that I introduced in my inaugural lecture at Erasmus University (Zwetsloot 1999), as well as in my most frequently cited publication (Zwetsloot 2003).

The principle of continual improvement comprises incremental improvements as well as radical innovations in the two other dimensions.

The principles ‘doing things right’ and ‘doing the right things’ jointly form a two by two matrix, whereby I have now given the well-known traffic light colours to the four quadrants. Clearly, the ideal is doing the right things right, while doing the wrong things wrong is dramatic. The development of sustainable safety requires ‘doing the right things right’.

*Table 1 The redefined third era of safety*

Era	Focus	Responsible key agents	Dominant mid-set
1	Technology	Engineers	Natural scientific thinking is dominant (we fix it)
2	Organisation	Management (experts)	Planning, designing and implementing management systems (management tools “to fix it”)
3	Culture and Behaviour	All stakeholders, managers, workers, experts, etc.	Shared values and intrinsic motivation (an on-going challenge)

*Table 2 Some important challenges in the third era of safety*

Safe behaviour cannot be forced by law or rules (only)
Safe behaviour is related to values, ethics and personal beliefs
Interpersonal behaviour and culture are always ambiguous
Trust, organisational justice, transparency and a learning attitude are important
Cultural and behavioural changes require long-term approaches and persistency

*Table 3 Some important challenges in the third era of safety*

The three core principles of (safety) excellence (Zwetsloot 1999, 2003)
Doing things right (preferably already the first time)
Doing the right things
Continuous or continual improvement



But what about the two other quadrants, that are represented here with different kinds of orange? Usually we intend to do the right things and do or best to do them in the right way. But, if the goals or plans are leading us to the wrong direction, we end up trying to do the ‘wrong things right’. When we encounter problems, we will try to fix the problems, try again and again, but we will fail because we then still continue to the wrong things, which cannot be easily fixed. Compare a business that is investing in the wrong things. The result will be that time, effort and money are wasted, and that there is a need to start all over again, with another investment. Doing the ‘wrong things right’, is therefore much more problematic than ‘doing the right things wrong,’ in the latter case, correction can be made relatively easy.

Figure 2 The two by two matrix of excellence

Doing the right things right	Doing the right things wrong
Doing the wrong things right	Doing the wrong things wrong

Unfortunately it is much more difficult to recognise that we are sometimes doing the ‘wrong things right’, while the negative impacts are often disastrous.

Unfortunately: **doing the wrong things right** is much worse than **doing the right things wrong**; while we often assume that we are ‘doing the right things’, merely because we try to do things right.

**Doing things right?**

Doing things right is mainly the challenge of focusing on (technological or socio-technological) problem solving: how can we solve it? What technological options do we have? What rules and procedures are vital? How do we solve specific safety problems? What protective barriers are important, may fail, and should be strengthened? And ... How do we fix that?

We recognise here the dominant mind-set: “we know how to make it safe” – the engineering (fix it) mind-set that we know

so well from the first and second era of safety! But we now also understand that this mind-set is no longer sufficient in the third era of safety. A related issue is that safety experts usually focus on ‘control’, the world of work is nowadays constantly changing (including innovations, organisational change and developments in the workforce).

**Continuous improvement?**

In theory, the principle of continuous improvement seems easy: a system can be improved stepwise, e.g. well-known Plan, Do, Check, Act (Deming) cycle. This is true in a static world, where everything else remains constant; but we live in a rapidly changing, turbulent world. In a constantly changing situation, the ‘continuous improvement process’ usually turns out to be a process of constantly adapting to new conditions, leading to little or no improvements. Thereby, the role of safety (and health and environmental) experts in organisations is usually to make sure the status quo does NOT lead to (safety) problems, but their role is usually not to contribute to innovations in production or products that are good for the SHE. As a result, the process of continuous improvement, rather than addressing both other dimensions, is often limited to attempts to do things better (including doing the wrong things better).

Table 4 Scientific and practical evidence (Zwetsloot 2014)

Scientific evidence	Practical evidence
Based on experimental research e.g. Randomised controlled trials	Based on practical experimentation or learning from experiences e.g. Case studies
Theory based	Practice based
Not always practically applicable	Not always theoretically sound
Universal knowledge	Local and context dependent knowledge
Simple and complicated contexts	Complex and chaotic contexts
High credibility for researchers	High credibility for practitioners
Can be the basis for practical implementation (challenge!)	Often precedes scientific knowledge

Another relevant topic is the nature of evidence that is taken into account, when the question arises whether the ‘right things are done’ or not. There is often a counter-productive gap between scientific and practical evidence. Scientists and practitioners tend to overlook the value of respectively practical and scientific evidence. The two types of evidence can be characterised as in the next table.

The table clarifies that scientists have preference for contexts that can be controlled so that they allow for experimental research, i.e. research in which the results of experiments can be predicted, and the experiment is used to confirm or validate the predictions. Practitioners, on the other hand, are working in the complexity of organisations and change. They prefer to learn from experience or form ‘natural experiments’. The two groups can therefore easily have divergent views on what is the right thing to do in a certain situation. Both types of evidence have, however, their qualities and limitations. A good combination of scientific and practical evidence is therefore likely to be the best option in many situations.

**FOUR KEY DEVELOPMENTS THAT UNDERLINE THE NEED TO REFLECT ON ‘DOING THE RIGHT THINGS’**

There are four developments with major impacts on the perspectives on ‘doing safety rightly’, and so on our vision towards sustainable safety.

Table 5 Four major developments that urge the need for reflection on ‘doing the right things’

Development	Reference
Is safety referring to a ‘safe status’? or ‘the ability to sustain operations under various circumstances’?	Hollnagel 2012
The definition of "risk" is no longer "chance or probability of loss", but "the effect of uncertainty on objectives"	ISO 2009
“Vision zero” is increasingly recognised as a driver for innovation and the basis for the development of a prevention culture	Zwetsloot et al 2013a
There is a growing attention for values, business ethics and beliefs that underlie safety actions	Zwetsloot et al 2013b

Let us have a concise look at each of these four developments.

**Safety as a status or ability?**

If we accept the resilience engineering notion of variation and change as an inherent characteristic of systems (Hollnagel 2014, Hollnagel et al 2006), the organisation and its key actors need abilities in order to be able to adapt the processes and actions to the variability. This implies among others that the work organisation is of vital importance. There is abundant scientific evidence - from literature that focuses on socio-technical design of work organisation, on psychosocial risk management or on workplace innovation - that factors like decision latitude, learning opportunities as part of the job content, the availability of personal and job resources including social support are very important in order to be able to cope with ‘demands’, i.e. is with variation in work (e.g. Karasek & Theorell 1990, Dhondt et al 2014). This points out a body of knowledge that is relatively unknown to safety researchers, but is probably very relevant for sustainable safety. A recent study of Bergh et al illustrates this: factors in the work organisation that are relevant for psychosocial risk management, turned out to be much better predictors of ‘hydrocarbon leaks from oil platforms’ than the age or complexity of the technical installation (Bergh et al 2014).

**A new understanding of risk**

In the ISO 31,000 standard on risk management (ISO 2009), risk is defined as the effect of “uncertainty on objectives”. This implies that risk should not only refer to potential negative outcomes, but also to potential negative deviations from objectives. If risk, as suggested by this global standard also refers to positive possibilities, to opportunities, what are the implications for sustainable safety? It suggests that we can learn from ‘positive deviations and events’ as well as from ‘incidents’. Perhaps we should also learn from goal achievement (especially under unexpected conditions) (Hollnagel 2014 about safety 2) and goal exceeding to improve safety. This would greatly increase the number of opportunities for learning, as accidents and incidents are fortunately, the exception. It is now increasingly recognised that rigid elimination of variation and risks may also reduce opportunities for innovation and learning. Another consequence is the growing attention for early assessment of uncertainties and how we deal with them (risk governance, e.g. Renn 2008).

**Vision zero as a driver for long-term safety**

The Zero accident vision (ZAV) is a promising new paradigm, which has been developed in industrial practice and offers new perspectives for accident prevention. The basic idea of ZAV is that all (serious) accidents are preventable, and companies should therefore have the ambition to prevent all (serious) accidents (Zwetsloot et al 2013). Increasingly companies feel their identity and reputation do not allow for accidents and work-related diseases. Most managers are already familiar with other ‘zeros’ (lean, defects, waste, tolerance of unacceptable behaviour, etc.) and know there are sound business cases for each of them. There are five major new perspectives revealed by thy ZAV concept (Zwetsloot et al 2013, 2015):

- 1) The concept of a commitment strategy for safety
- 2) ZAV as the basis for a prevention culture
- 3) ZAV leads to innovative practices and requires creativity
- 4) Zero is the only ethically sustainable safety ambition
- 5) ZAV thrives in networking and co-learning.

A commitment strategy for safety, based on vision zero, differs from the more traditional risk control strategy for safety. The crucial difference lies in the motivational impact. Sustainable safety implies a long-term journey and therefore requires ‘motivators’, not ‘satisfiers’ (Beer 2009). The psychological difference is that a ‘satisfier’ only motivates up to a certain point, and has no effect beyond that. A ‘motivator’ keeps its effect.

The dominant risk management (or problem solving) cycle is a satisfier. Through time, the most pressing problems are solved; remaining problems are less severe, making them less relevant and decreasing motivation. We need positive, inspiring goals as motivators, such as 'vision zero' or 'resilience', or perhaps even better: sustainable safety. Motivation may increase over time thanks to successes achieved and shared.

#### [Growing attention for values and business ethics \(ref. ....\)](#)

In the world of business there is a growing attention for corporate social responsibility, and business ethics. The need to distinguish a company or brand from its competitors also leads to an increasing attention for core values that are related to the company's identity.

Health, safety and well-being at work represent values in themselves; this raises the challenges (1) how can we strengthen and share them? And (2) how can we connect them closely to the corporate core values? It is also known that other values, e.g. trust and justice can support health and safety (see Zwetsloot 2013b for an overview).

The challenge is then to further develop and share the value of safety, comprising to both its economic and social value. This implies that safety should not only be regarded as a purely rational issue (the natural preference of safety engineers). It is important to use also ethical or social justifications for sustainable safety.

### **SUSTAINABLE SAFETY IS NOT A STAND-ALONE ISSUE**

Excellent safety and business excellence can and should go together. This notion is also the basis for mainstreaming safety into business management. Striving for sustainable safety is a natural part of corporate social responsibility and good employership (Zwetsloot & Starren 2004)

The quest for sustainable safety requires also a broader vision on people (especially managers and workers who have to generate and enjoy safety): it requires resilient people and good psychosocial working conditions (e.g. a good work organisation, with decision latitude, learning opportunities as part of the job, and sufficient vertical and horizontal social support). That will also enhance the adaptability to respond to variance and new challenges dealing with new risks and surprising scenarios. The values underlying the ambition of sustainable safety are very similar to those for sustainable employment or environmental sustainability.

### **THE ROAD AHEAD**

If long-term safety is taken seriously in our ever more complex world, we need to embark on the long-term challenge of sustainable safety, which implies a shared responsibility of all members of an organisation, and for all stakeholders having an impact on safety.

We have to be aware, sustainable safety will never be fully fixed; it is an on-going challenge. It is part of life to deal with risks; this requires a reflecting, flexible and learning mindset, serious attention for reviewing whether we are still 'do the right thing' and a quest for safe (workplace) innovations.

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# QUALITY JOBS FOR SAFETY

## WORKPLACE INNOVATION TO BECOME A HIGH RELIABILITY

Perspective from science by prof Frank Pot, PhD

Recently the importance of sustainable safety was emphasized again when on 18 February 2015 a condensate leak occurred on the Gudrun platform of Statoil in the North Sea. Nothing serious happened, among other things because the company has an advanced safety approach. Besides the traditional tools and protocols a Psychosocial Risk Indicator (PRI) has been developed and included in Annual Employee Survey. This PRI is about objective conditions in work organisation and job content. Research into the relation between PRI-scores in 2010 – 2011 on the one hand and hydrocarbon leaks on the other hand shows that PRI explains more of the variation in hydrocarbon leaks than technical factors do.

PRI appears to be a very adequate approach: risks in the work organisation instead of individual behaviour. However it should be integrated in the daily work processes and not treated as a separate project. Furthermore PRI is expressed numerically and aims at ranking and prioritising, it should be underlined that it is only part of the overall system of dealing with psychosocial risks within the organisation. A broader concept is needed to cover the overall system.

Such a concept could be ‘workplace innovation’ as developed in several European countries and as has become EU-policy from 2012 and is being disseminated through the European Workplace Innovation Network (EUWIN). This concept relates to the Norwegian tradition of ‘workplace democracy’ and ‘employee driven innovation’.

Variations in the process and disturbances will always occur. Instead of extending safety protocols even more, job control, workplace consultancy, employee voice should be promoted. These characteristics can be found in ‘high responsible organisations’ as well. So different approaches and different fields of expertise come together and should be integrated.

## FROM POLICY TO SUSTAINABLE SAFETY PERFORMANCE

Perspective from science by Linn Iren Vestly Bergh, Msc

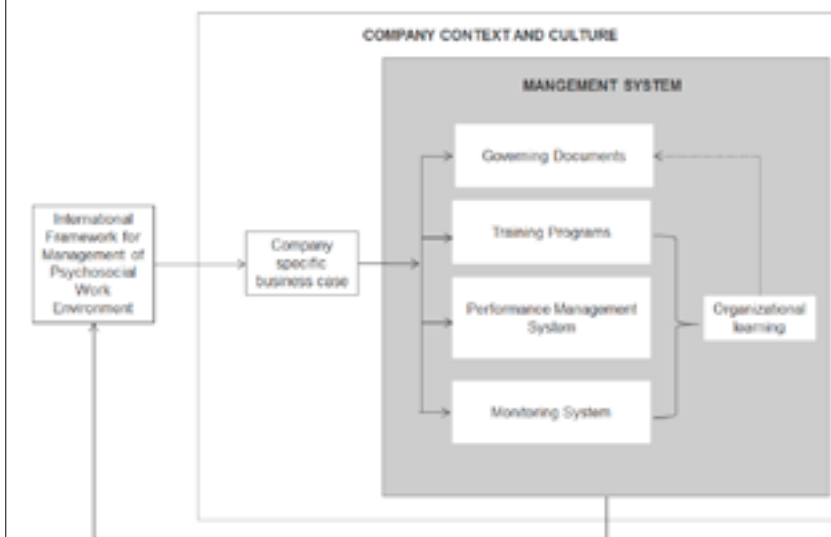
Psychosocial risks in the oil and gas industry can have a significant impact on health and safety outcomes and must be handled in the same manner as other operational risks. A sustainable and comprehensive system for psychosocial risk management should ideally be embedded in organisational operations and processes. One way of integrating psychosocial risk management into a larger process is to link it to an organisation’s strategy using familiar concepts or techniques.

The purpose of this presentation was to show how a multinational oil and gas company have integrated international recognised frameworks and standards for managing psychosocial risk into the internal management system (PRIMA-EF, PAS1010 and WHO’s Global Framework for Healthy Workplaces). In the implementation process the various components of the internal management system have been methodically assessed in order to ensure sufficient integration. Psychosocial risk management principles have over the years been integrated into: governing documentation, training programs, the performance management system and monitoring system (Bergh, Hinna & Leka, 2014a).

As part of this work a performance indicator for psychosocial risks has been developed and implemented into the internal performance management system (Bergh, Hinna, Leka & Jain, 2014b). The development of the indicator has included exploring the indicator’s relationship with hydrocarbon leaks. Results from the analysis show that psychosocial

risk indicator significantly accounted for variation in hydrocarbon leaks (Bergh, Ringstad, Leka & Zwetsloot, 2014). The company has also tested an internal auditing tool for the psychosocial work environment. The tool includes performance standards that are linked to the company’s internal governing documents and monitoring system (Bergh, Hinna, Leka & Zwetsloot, 2015 - In press). The presentation also addresses challenges encountered in the process and lessons learnt that can be useful for other organisations and the industry as a whole.

Figure 1 Integration of international framework for psychosocial risk management into practice and internal business processes



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# SUSTAINABLE SAFETY: GOVERNMENTAL RESPONSIBILITIES REDEFINED

Perspective from government by Rob Triemstra, MSc

The aim of sustainable safety has been an underlying goal of the Dutch ministry's policies over the last decades. In my contribution I will give an overview of the developments in this respect.

Since the early '80s, the work environment policies in the Netherlands were consistently based on three principles: (1) combating the risks at source, (2) adapting to technical progress and the state of science, and (3) measures that are reasonably achievable. The form these principles got, changed over time in terms of allocation of responsibilities, characteristics of governmental interventions, instruments used and the focus in policy.

Till 1980 we had traditional legislation, which means that the government was the main agency responsible for health and safety, and intervened via command and control.

In the period 1980-1995 changes occurred as a result of New Public Management. Government was no longer the only responsible agency, and involved employers and employees and their organisations. At the same time the government focused on efficiency and effectiveness, while privatization and decentralising were important issues. Framework regulation (based on EU directive) was introduced, and the aim was to reduce legal requirements to a minimum. Strategic spearheads were covenants with sectors (involving social partners), the introduction of financial incentives while organisational measures were increasingly in the focus.

The period 1995 – 2010 was focused on governance. Government elaborated further on New Public Management. New were the introduction of more goal oriented legislation with room for local specification and tailoring. Within organisations, OSH management systems and safety behaviour were addressed, as well as organisational (safety) culture. Thereby the personnel were increasingly recognised as a vital human asset.

Currently the focus is on establishing new relationships. The employers and employees are regarded more consequently as those with prime responsibilities for health and safety. The government takes a facilitating role. Governmental role is increasingly limited to facilitating, agenda setting, and monitoring.

With a focus on new developments (e.g. the introduction of new risks, as with Nano technologies), and relatively new themes such as sustainable employment, psychosocial risks, and safety behaviour and culture, and an on-going active social dialogue the limits of this transfer of responsibilities are not yet reached.

## CONCLUSION

The vision on the role and responsibilities of the government in relation to employers and employees has changed significantly over the years. Responsibilities are increasingly addressed at source, where the hazards and risks are generated and dealt with. The governmental policy for sustainable safety focuses on strengthening commitment and ownership, adequate support where necessary, and promoting suitable solutions.

*Rob Triemstra is deputy director Healthy and Safe Work, and head of the department for Safe Work at the Netherlands' Ministry of Social Affairs and Employment.  
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## GOVERNMENT: STAY CONNECTED WITH THE PEOPLE AT RISK WHEN 'REDEFINING RESPONSIBILITIES'

Reflection by Annick Starren, MSc

In this section I will reflect on the presentation of Rob Triemstra in which the government's shift from prescription and control to commitment, support and suitable solutions is described. Instead of being pushed by enforced laws and regulations, the government aims to stimulate own initiatives and responsibility. When pulled by intrinsic motivation, the companies will be more likely to live up to their responsibility regarding safety. The question is 'What is the right way to empower companies for safety?' and how to do this without being seen as a government that just reduces their activities?

The changing world of work has led to a new safety context, which requires a different approach from the government. The roles of the human element and organizational factors including culture have become more and more recognised as determining factors. This is especially true for empowerment, commitment and dialogue.

It requires interventions aimed at (collective) learning processes and values, and interventions that will not "fall on your toes". Moreover the benefits will often take their time. These two characteristics of interventions make it difficult to stick to the new approach. For example in a recent project in a manufacturing company, safety results became visible, but it took a few years. In the end, the company recognised this as a result of the earlier switch in their safety approach, although this is difficult to proof scientifically. The example shows that the motive for the new governmental strategies can easily be criticised as cold cut, and not be acknowledged as a strategy to strengthen ownership.

When I worked at the Ministry of Transport, I noticed how hard it can be to give the Human Factor attention among specialists in the construction of bridges and roads. It is so much easier to make them happy with double hulled vessels, technology and asphalt, even while this “hardware” did not appear to bring the solution anymore. Approaches based on human factors, like creating commitment and dialogue, felt out of their comfort zone, since their expertise has been on technology for years. To support this transition, it is very desirable to have a situation in which government emphasizes self-regulation via commitment and empowerment.

The process towards self-regulation is a process that shifts from compliance to ownership, from ‘having to act safe’ to ‘wanting to act safe’. Compliance will be the base level, the minimum; a learning culture is the ambition. This is a delicate process, because:

- If there is too much regulation, there is no room for “wanting”;
- If there is too little regulation, there is too much room for confusion, insecurity and even possibly fraud.

How does the government monitor a balanced development of this transition towards self-regulation? What are their controls and how do you know that safety knowledge is still available at the different levels from senior management to the shop floor? When a regulator makes withdrawing movements, there’s a need at all levels to have the confidence that they’re in control.

### **LOW SKILLED- HIGH RISK JOBS**

Specifically for workers that are vulnerable, like the groups in heavy, dirty, mostly dangerous work, this confidence is needed. Having done projects in industries with low-skilled jobs, I’ve experienced working environments I did not know they existed in the Netherlands. Bullying and ignoring seemed the norm. Reporting accidents? “Not really.” Complaining about poor safety shoes? “Not here”. Driven by fear, and the idea that you cannot do anything else, dangerous situations are not reported, because “my manager will think that I’m complaining”. One day I asked such workers their opinion about what the government does for their safety. Their answer was: “no idea, they are criminals

themselves”.

Safety problems arise in many cases not as a result of ineffective regulation but as a consequence of poor implementation. Problems arise when we have lost connection to the safety values and there is barely communication with and confidence among the target groups at risk.

Presently, the government aims to reward companies that are proactive in safety and to stimulate businesses to take ownership. As long as we stay connected on a human level, learnings and successes can be expected. They should be monitored, communicated and rewarded at all levels. This way there are opportunities to give safety an extra push, based on every one’s motivation, which may vary from a focus on protecting their own health to improved business processes. In this way new governmental policies create opportunities for sustainable safety to “fly”.

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# SUSTAINABLE SAFETY IN BUSINESS OPERATIONS

Perspective from Business by Ton Jeen, Msc MSHE, ExxonMobil

For a sustainable safety culture three elements are essential:

1. Clear and strong objective
2. Safety management system
3. People to make the system effective.

This can be demonstrated with a personal example: pictures taken during the 2015 Roparun, somewhere in France, on the way from Paris to Rotterdam. Each year approximately 325 teams raise money for charity (to support people suffering from cancer) and as a “thank-you” to the sponsors these teams run a non-stop relay race from Paris (or Hamburg) to Rotterdam.

How do they do that safely?

1. They have clear, strong objectives: raise a lot of money and stay safe until home again.
2. The system is a short word-document with roles & responsibilities of all team members.
3. The team members make it happen: they are motivated and take care of each other.

If you have participated once, you have the “Roparun virus”, it is built into your DNA.

Safety culture is built in the same manner. It only takes longer in an organization to get where the organization wants to be.

Within ExxonMobil safety and operations integrity are of utmost importance.

My first day within ExxonMobil day started 30 years ago with safety: “Safety first in everything we do”. In this spirit you

are trained and developed. The ultimate objective is Nobody Gets Hurt. This is not a slogan, but it is an expressed value and integral part of the safety culture.

The journey towards a sustainable safety culture started after the Exxon Valdez oil spill in Alaska in March 1989. This incident resulted in the Operations Integrity Management System, a worldwide systematic approach to prevent similar incidents from happening. OIMS covers all ExxonMobil activities.

We believe that all incidents are preventable.

Hazards are part of our daily lives, the key to success is to identify these hazards, eliminate and/or manage them. This is done in such a way, that we protect our employees, contractors, customers, the public and the environment. And in a structured manner.

As our Chairman and CEO of the Exxon Mobil Corporation stated on Nov. 9th, 2010 before the National Commission on the Deepwater Horizon Oil Spill:

- A culture of safety has to be born within the organization. You cannot buy culture. You have to make it yourself.
- Creating a strong, sustainable safety culture is a long process. If an organization is truly going to overhaul its approach to safety, it has to be committed from day one. But, you can’t start until you start – and you’re never going to finish.
- And without leadership by example and without thoughtful, honest and objective self-assessment, no system is sustainable.

The people in an organization make the difference. Together they create the company safety culture. As it is not easy to comment on your own culture, let me refer to the TNO survey at ExxonMobil Rotterdam in June 2012. TNO concluded that a uniform safety culture existed across the organization (compliance driven and learning organization).

Finally, two sustainability examples are given to demonstrate how we are managing the impact of our operations, protecting not only our employees, contractors, customers, the public and the environment, but also wildlife: 1. Ecosystem management in Alaska’s North Slope and 2. Swallows nesting in tank farm at the Antwerp Refinery.

*Ton Jeen is Safety Security, Health & Environment (SSHE) Regulatory Advisor Netherlands at Exxon Mobil. Ton is chairman of the safety work groups of the refining and chemical industry associations (respectively VNPI and VNCI). He is also chairman of the Board of the Foundation for Cooperation in Safety, the owner of the Safety for Contractors Certification system (VCA).*

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# VIEWS ON SUSTAINABLE SAFETY

## EXPLICITLY DEALING WITH SAFETY

Kees Le Blansch

## SUSTAINABLE SAFETY

Jan Heijmans

## SUSTAINABILITY AND EXTENDED STAKEHOLDERISM

Jan Popma

## TOWARDS A NEXT GEN OF SAFETY: SUSTAINABLE ADAPTIVITY

John Stoop

## SUSTAINABLE SAFETY, HUMANS AND PARADIGMS

Remco Visser

## RESILIENCE AS PREREQUISITE FOR SUSTAINABLE SAFETY

Johan van der Vorm

# VIEWS ON SUSTAINABLE SAFETY

Reflecting on the symposium theme sustainable safety, experts from several organizations having worked with Gerard Zwetsloot gave their view on sustainable safety.

Their contributions are inspired by:

- Dealing with risk and safety in the public domain, next step sustainable safety? Can it facilitate or can it be combined with social innovations?
- Sustainable safety requires pro active culture, behavioral awareness and coaching of employees to act safe with key values: to be professional, inventive and cooperative.
- Sustainable safety requires but is not only build on participation of employees and needs a wider range of stakeholders cooperating on safety with the company.
- The need to cope with a dynamic world of work and to deal with the unexpected, new approaches of safety management are needed like the ESREDA Cube, a learning space model, aiming at sustainable adaptivity to support continuous change and improvement.
- Receiving input on safety in development and production from people with diverse perspectives will introduce multi paradigms to deal with sustainable safety as a non stable state allowing innovative combinations of knowledge to emerge.
- Resilience engineering provides a perspective on developing capabilities for sustainable safety to be able to deal with variations, uncertainties and disturbances and to become adaptive to both negative and positive experiences.

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*Jan Heijmans is programme manager of the Go- No Accidents programme at Heijmans Ltd. Jan is also manager integrated safety for the A9 Gaasperdammerweg project.*

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*Jan Popma is senior researcher risk and regulation at the Hugo Sinzheimer Institute and assistant professor at the Institute for Interdisciplinary studies at the University of Amsterdam.*

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*John Stoop is owner of Kindunos; John is consultant airline/aviation safety. John is also guest professor at the Technical University Delft in the section Operations and Management of Transport Systems.*

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*Remco Visser is coordinator occupational safety and health at the Netherlands Institute for Applied Scientific Research TNO.*

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*Johan van der Vorm is senior technical consultant at TNO in the field of resilience, safe & healthy business. Johan is Secretary of the Council and member of the Resilience Engineering Association (REA).*

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Dr. Kees Le Blansch, Bureau KLB  
Den Haag, 27 mei 2015  
klb@bureauklb.nl

## Explicitly Dealing with Safety

Dutch risk policy making: from 'dealing with risks' to 'sustainable safety'?

The Dutch policy approach to risk and safety in the physical domain (environment, water, infrastructure, transport)

- **1989:** 'Omgaan met risico's' ('Dealing with risks')
- **2006:** 'Nuchter Omgaan met risico's' ('A sober approach to risks')
- **2014:** 'Bewust Omgaan met Veiligheid' ('Explicitly Dealing with Safety')<sup>1</sup>

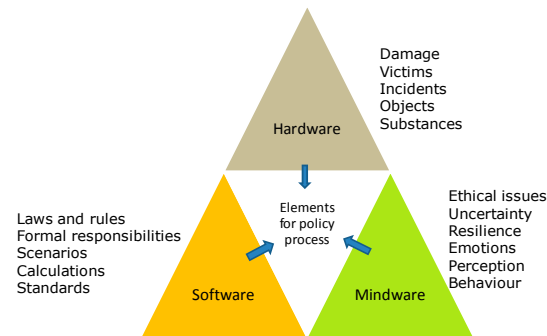
### Ten principles:

1. Make the policy development process fully transparent.
2. Be explicit with regard to 'who' is responsible for 'what'.
3. Weigh the risks and response measures explicitly against the social costs and returns.
4. Involve the citizen in policy development at the earliest possible stage.
5. Take into consideration the accumulation of risk (in a person/group or at a location).
6. Apply the precautionary principle in case of uncertainty & complexity.
7. Identify new risks at the earliest possible opportunity.
8. Maintain an ongoing dialogue about interests, emotions, risk perception and ethical considerations.
9. Address both 'security' and 'safety' in combination wherever possible.
10. Facilitate socially desirable innovations explicitly in relation to safety policy.

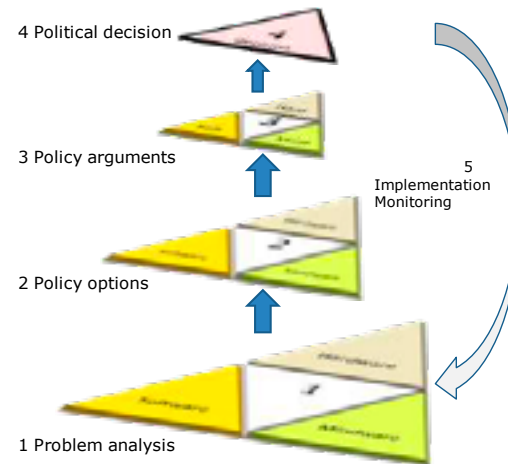
- **Next?:** 'Duurzaam Omgaan met veiligheid'? ('Sustainable safety'?)
  - *Maybe yes:* from incident-driven, material, physical, sectoral and to precautionary, process-oriented, societal, integral; from environmental to sustainability concerns
  - *Maybe no:* too all-encompassing concept; broad x broad = void.

<sup>1</sup> With the advice of: the Scientific Council for Government Policy (WRR), the Council for the Environment and Infrastructure (Rli), the Health Council of the Netherlands, the Council for Public Administration (BoB), the Netherlands Institute of Public Health and the Environment (RIVM), the Netherlands Environmental Assessment Agency (PBL) and DEGAS

### Policy principles and process: 3 'worlds'



### Policy process: 5 steps



heijmans



GEËN ONGEVALLEN

heijmans

## Sustainable Safety

Heijmans' three key values are: professional-inventive-cooperation. We aim to be the best contractor and employer. Therefore, we strive for continuous improvement.

This involves improved working conditions and safety on project sites. The construction industry features constantly changing circumstances and a high degree of complexity. Working together with partners, suppliers and sub-contractors under high pressure in terms of both time and cost. Construction is labour-intensive and not without danger. Due to this safe working conditions become even more important. Consequently, Heijmans launched a program aiming to increase sustainable safety within the organisation.

To achieve sustainable safety Heijmans focusses on behaviour and awareness, as it can only be achieved if it is carried out by our people. Our safety programme is based on three main principles: the first increasing awareness and positively changing behaviour with respect to safety. The second a consistent, uniform level of safety within the organisation. The third improving safety on construction sites and workplaces.

Heijmans is working towards sustainable safety within its organization through various activities. For instance, we trained GO! coaches to provide information and stimulate employees to discuss safety issues. We have launched the website [www.geenongevallen.nl](http://www.geenongevallen.nl) and GO! APP which facilitates the reporting of unsafe situations and includes our toolboxes and Health, Safety, Welfare and Environment handbook. Information that can be easily accessed by our employees and sub-contractors. We aim for sustainable safety, but can only achieve it by working on it together.

### Safety rules of conduct

- Ik neem verantwoordelijkheid voor mijn eigen en anderzamen veiligheid
- Ik neem direct actie bij een onveilige situatie
- Ik waardeer dat collega's mij aanspreken op onveilig werken
- Ik spreek mijn collega's aan op onveilig werken
- Ik meld onveilige situaties zodat collega's daarvan kunnen leren
- Ik bespreek veiligheidsdilemma's met mijn leidinggevende

6 rules concerning responsibility, intervening, appreciation and participating

### Sustainable Safety according to Heijmans

A safe and incident free work environment is of great concern to Heijmans. To achieve this we focus on human behavioural factors. We need our people to achieve our zero incidents goal. As technical and system safety interventions are not enough. Heijmans wants all her employees to work safely, help co-workers, and to put effort into improving safety in the workplace. Together we can make Heijmans and the work we do more safe.

### Safety aim

Heijmans aims to be the most safe contractor in the Netherlands. We strive zero fatalities or permanent injuries and an incident frequency < 1. We apply a proactive approach concerning safety. To achieve this we need all our employees, (sub-)contractors and clients to participate.

heijmans



More information  
[www.geenongevallen.nl](http://www.geenongevallen.nl)





## Sustainability and extended stakeholderism

Jan Popma, Universiteit van Amsterdam, [j.r.popma@uva.nl](mailto:j.r.popma@uva.nl)

I first encountered the work of Gerard Zwetsloot in the early '90s. Zwetsloot's study "*Op zoek naar synergie*" (1992) became kind of a bible to me in my work as a works councils trainer in the field of occupational health, safety and environment (OSHE). At the time, to be sure, I was already convinced of the use of integrated systems, and I was zealously trying to lift works councils from a limited "closing-the-stable-door-after-the-horse-has-bolted-approach to workplace safety" to a more strategic, anticipatory approach to OSHE – or rather trying to push it down their throats, with the overconfidence that was typical for so many young males in their twenties that thought themselves to be a *koploper* (*vanguard*) of worker participation.

But it was not until I acquainted myself with Zwetsloot's concept of *koplopers* (*leaders*) and laggards that it occurred to me that *effective* consultancy should be geared to the needs of the company and also requires a bit more patience and tact. This was also stressed by the gentle and patient author of the synergy study that, in the mid-'90s, had become a dear colleague of mine (or rather, vice versa) and who's name switched from Zwetsloot to Gerard.

Some 10 year later (2003), I concluded my PhD-thesis on the OSH-effect of worker participation. It found that worker participation does indeed contribute to better OSH-policies in companies, in a rather narrow sense "doing OSH-things right". However, I too found that the contribution of workers' representatives was rather marginal in terms of *strategic* OSH-policy, let alone as regards Corporate Social Responsibility (that was on the rise then). And strategic issues in the field of *sustainability* still do not really make it to the agenda of works councils (MNO 2011: *De rol van medezeggenschap bij maatschappelijk verantwoord ondernemen*). Faced with the crisis of the last years, in most companies the question of sustainability is confined to "how can we sustain our global market position in the short run?", rather than aimed at long risks that threaten the globe.

Yet, in order to make the switch from 'doing things right' to 'doing the right thing', a switch of which Gerard was one of the early *chroniqueurs* (Zwetsloot 2003: *From Management System to Corporate Social Responsibility*), we'll also need to reconsider the importance of workers' representation in the field of sustainability – a theme that, alas, is missing in the mini-symposium in honour of Gerard. Whereas in matters of *corporate* survival the notion of 'stakeholders', as it is currently coined, is mostly confined to works councils and trade unions, in my opinion a really *strategic* approach to sustainable production and even survival of man, would require companies to open up to stakeholders from outside. Systems like ISO 26000 and the GRI-Guidelines do invoke this broader notion of stakeholderism, but the number of *koplopers* in stakeholderism is still limited.

Since I am by now working at a Faculty of Law, with the overconfidence that is so typical from legal scholars that think legislation to be *the* way to a better world, I feel inclined to suggest that broader stakeholder involvement should be legally binding (added to the Works Councils Act). Companies that resist stakeholderism should have it pushed down their throats. But undoubtedly Gerard will have a more gentle and effective approach to this issue. I sincerely hope that he will share some of his valuable ideas even after his retirement from TNO.

## Towards a Next Generation of safety: sustainable adaptivity

John Stoop Kindunos Safety Consultancy Ltd en Johan van der Vorm TNO

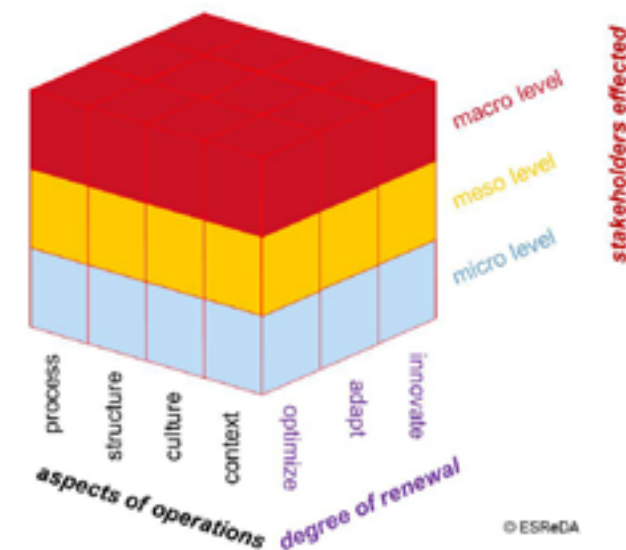
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Until recently, safety could be satisfactory characterized by technological system properties such as robustness, redundancy and reliability. In addition to these technological properties, sociological and organisational characteristics were developed, covering system variety, multiple aspects, actors and factors. Together, they provide the cornerstones for describing and analysing complex socio-technical systems.

With the emergence of new technologies, rapidly changing economic, social and market developments, globalization and privatization, new operating environments call for a Next Gen approach. Such a call is heard in many industrial developments, stimulated by social awareness and acceptance of new risks and hazards, urging a need for a more sustainable society. We should be able to discriminate various aspects of operations to cover the scope of such systems behavior.

Unfortunately, major events have also triggered a sense of urgency to make a next step in safety. Recent major accidents in the offshore, nuclear power and aviation sectors were unanticipated and remained unexplained. The existing toolbox for diagnosis seem to be deficient to cover such new challenges.



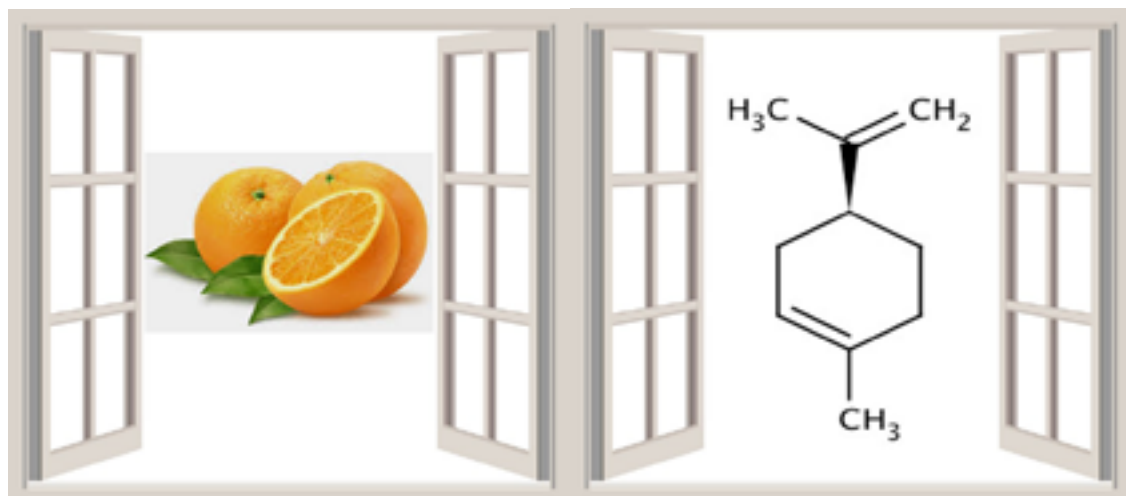
A first major challenge is in the recognition that we have to move from a static system perspective to a dynamic perspective to cope with variety, dynamic behaviour and adaptations. The dimension of time has become critical in responding and recovery, providing resilience to restore towards a safe and sustainable system performance. We should be able to optimize, to adapt and to innovate.

A second major challenge is to deal with the unexpected, the unanticipated. Serendipity has become a critical notion: the ability to get feedback from reality, to disclose by accident phenomena that have not been encountered before. Safety investigations provide access to such unexplored territory.

To meet such challenges the ESReDA Project Group on Learning from Accidents has developed a new tool: the ESReDA Cube. It provides a linking pin between forensics, analysis and sustainable change identifying a learning space to be used for future development.

## Sustainable safety, humans and paradigms

Remco Visser, coordinator occupational health and safety at TNO  
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Safety relies on safe machinery, reliable piping, heavy procedures, thorough instructions for the workers. The history of safety is full of improvements, mostly accomplished after a lot of incidents and accidents. Nowadays the boss word is culture. Safety culture is the boss telling a consistent message like 'Safety First'. And when his message is followed by the necessary attitude and actions on the work floor. You could be convinced that safety is something you can make.

However, safety is not an exact science. It only uses the exact sciences. What is safe, is dependent the way you look at a construction, project or product, dependent on your paradigm.

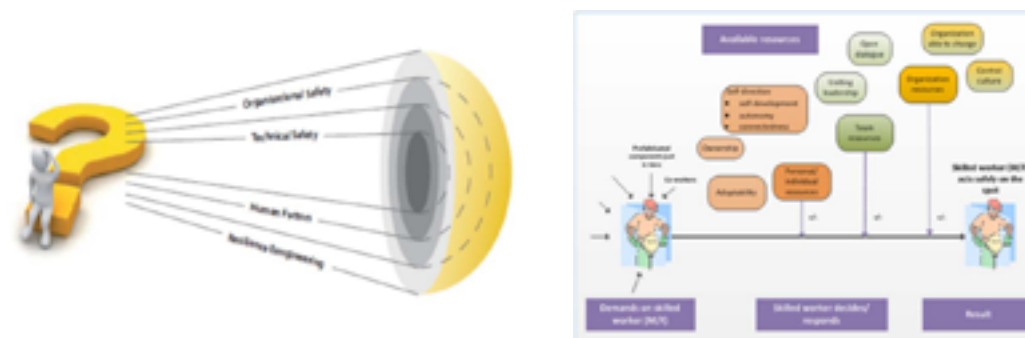
In the nineties, a solvent called limonene was emerging, especially in the cleansing industry. It dilutes fats very well, and better: limonene is made of the orange peels. With a simple steam distillation, you have high yields of limonene. A bio based solvent, produced with steam, should be more sustainable safe than the usual crude oil hydrocarbons from large refineries.

This is all true, but only within a limited perspective. From another perspective, in the paradigm of the occupational hygienist or the worker, limonene is an ordinary hydrocarbon with a benzene ring, which is irritating for the skin (H315), very toxic to aquatic life with long-lasting effects (H410) and also may cause an allergic skin reaction (H317). These properties cause a serious health problem, especially for the workers in the cleansing industry.

This issue is not a rare one. Within TNO we develop new technology. And almost every week, we face complicated challenges on the broad area of safety. Solar panels are containing lead. For the extraction of bio based fuel from algae you need an apolar solvent like hexane. Etc.

Sustainable safety is in this sense not a fixed state of safety. Safety becomes sustainable when people involved in the development and operational phase of technology can contribute from their different paradigms. These multi-paradigm groups should be well trained and educated. Not only in the university banks but also on the work floor.

## RESILIENCE AS PREREQUISITE FOR SUSTAINABLE SAFETY



Safety is an emergent and dynamic non event. Is it co-created by the workforce in cooperation with its leaders on the basis of company structure, culture and learning. The key is a social technical interplay of people and their environment (assets, tools, machines, communication and data systems etc.).

Assumptions on how work will and should be done will drive operational procedures and training as part of safety management. This has brought us high reliable organizations. However experience with safety management has proven that space of manoeuvre and relevant capabilities still need be provided to the organizations to cope with everyday demands. Be it energy distributors, police, maritime, off shore, oil and gas, chemical industry or rail operations. In the context of e.g. theories on High Reliable Organisations (Weick) and Resilience engineering (Hollnagel, Woods) this requires resilience of people, teams and organisations.

TNO explores with industries mentioned the contribution of resilience to strengthen the safety performance of companies. All levels of the organization are implied and considered as resources for resilience capabilities be it in normal or in emergency mode of business. It relies on the premise that an organization adapts continuously to known and unknown demands and learn from it. It looks for both possible "negative" and "positive" functioning of operations as source for future development and preparedness for variances, unexpected modes of operations, disturbances etc. As resilience capabilities support both the preparation for and the ability to deal with the new and unexpected in every day operations, it is a necessary element of sustainable safety.

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# PRESENTATIONS

This chapter provides the presentations of the three speakers representing the scientific, governmental and business perspective on sustainable safety. The presentation of Gerard Zwetsloot has been integrated in his contribution “Sustainable safety the way forward”.



## **MINI-SYMPOSIUM SUSTAINABLE SAFETY**

Program

### **INNOVATION TO BECOME A HIGH ORGANISATION WITH QUALITY JOBS**

Frank Pot

### **SUSTAINABLE SAFETY – REDEFINED RESPONSIBILITY**

Rob Triemstra

### **SUSTAINABLE SAFETY – A BUSINESS PERSPECTIVE**

Ton Jeen





**TNO** innovation for life

## PROGRAMMA

Time	
15.00	Opening by Drs. Jeroen Borst, Research Manager Urban Environment and Safety and host on behalf of TNO and sponsors
15.10-15.30	Scientific perspective by Prof. dr. Frank Pot, Emeritus Professor of Social Innovation of Work and Employment
15:30-15:35	Reflection by public
15.35-15.50	Governmental perspective on sustainable safety by Drs. Rob Triemstra, Manager at Ministry of Social Affairs and Employment
15.50-16.00	Reflection on governmental perspective by Drs. Annick Starren scientist TNO
16.00-16.15	Business perspective by Ton Jeen, SSHE Regulatory Advisor Netherlands ExxonMobil and chairman of SSVV board
16.15-16.25	Reflection on business perspective by Dr. Linda Drupsteen, scientist TNO
16.25-16.55	Keynote on Sustainable safety by Prof. dr. Gerard Zwetsloot, senior scientist TNO followed by exchange of views with audience
16.55	Closure
17.00-19.00	Reception

Mini-symposium sustainable safety



**SHARE** your knowledge  
and **LEARN** from others

Symposium Sustainable Safety, TNO, Leiden, 2 June 2015

**Workplace Innovation  
to become a  
High Reliability Organisation  
with  
Quality Jobs**

**Frank Pot**

TNO Innovation for life


Radboud University Nijmegen



**Statoil's Gudrun platform in the North Sea**




2



**Hydrocarbon leaks: a major accident potential**

- On 18 February 2015 a condensate leak occurred on the Gudrun platform in the North Sea.
- The gas detectors recorded the leak and the emergency shutdown system started automatically.
- No one was physically injured as no personnel were present in the area.
- Based on material technical investigations the crack was the result of fatigue and overload of an under-dimensioned level valve. No material defects, metallurgical irregularities or welding defects have been proven.
- Statoil's corporate investigation team classifies it to be of the highest degree of seriousness.
- On 13 May the report was ready and published.


3



**Statoil's Psychosocial Risk Indicator (PRI) 1**

- **Job demands**
  - My work load is satisfactory
  - Normally I am able to complete my work tasks within normal working hours
- **Role clarity**
  - In my department the tasks and responsibilities are clearly distributed
  - I am clear about the goals and objectives of my job
- **Relationships**
  - The atmosphere is good among the colleagues in my unit
  - Collaboration is good in my department


4



**Statoil's Psychosocial Risk Indicator (PRI) 2**

- **Job control**
  - I can influence my workload
  - I have sufficient opportunity to plan my own working day
- **Support**
  - I get support from my colleagues when needed
  - I receive necessary support from my immediate superior
  - My immediate superior is available if I want to discuss aspects of my work situation

5



**Company policy and research**

- PRI included in Annual Employee Survey
- Research by Linn Iren Vestly Bergh, Arne Jarl Ringstad, Stavroula Leka and Gerard I.J.M. Zwetsloot
- Hydrocarbon leaks and PRI in 2010 and 2011
- Regression analysis results showed that only the psychosocial risk indicator significantly accounted for variation in hydrocarbon leaks.
- Only partial support was found for the relationship between technical factors and hydrocarbon leaks on the basis of correlation analysis.
- Source: Journal of Cleaner Production, 2013

6



### Comments

- Very adequate approach: risks in the work organisation instead of individual behaviour
- The same items count for quality jobs as well: learning opportunities, wellbeing at work (compare the WEBA methodology as was developed in 1989 for Ministry of Social Affairs)
- It should be integrated in the daily work processes and not treated as a separate project (Linn Bergh et al., 2013))
- PRI is expressed numerically and aims at ranking and prioritising, it should be underlined that it is only part of the overall system of dealing with psychosocial risks within the organisation (Linn Bergh et al., 2013).

7



### The broader concept of Workplace Innovation

- **Workplace innovations** are new and combined interventions in work organisation, human resource management and supportive technologies.
- **Workplace innovation**
  - is a process of productive reflection as part of everyday working life,
  - derives from interaction between stakeholders within and outside the organisation,
  - builds bridges between the strategic knowledge of the leadership, the professional and tacit knowledge of frontline employees and organisational design knowledge of experts,
  - Works towards win-win outcomes as a creative convergence rather than a trade-off

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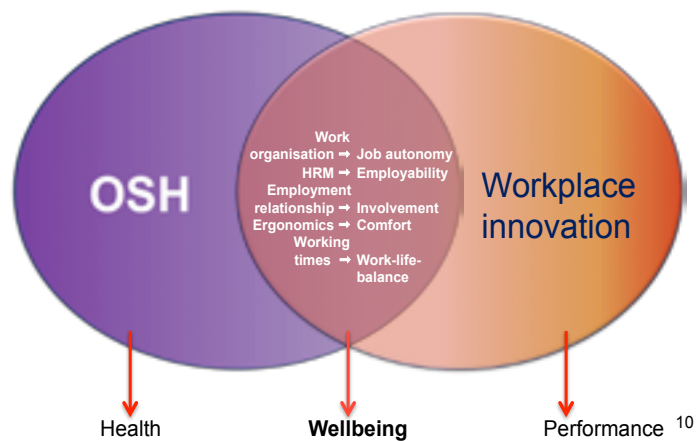
### Concept workplace innovation used by

- Eurofound, Dublin (2005 – recent EWCS, ECS, cases)
- European Economic and Social Committee (opinion 2011)
- European Commission (since 10 October 2012): DG GROW and DG EMPL
- EU OSHA, Bilbao (since 2012)
- European Parliament (18 December 2013)
- IndustriAll ( Manifesto 2 April 2014)
- English translation of Finnish, Flemish, Dutch and Basque programmes
- National tripartite initiatives in UK and Ireland
- OECD (also 'innovative workplaces')
- Number of institutes in USA

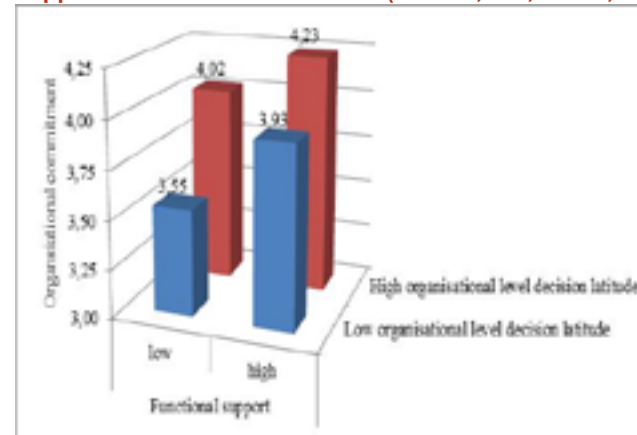
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### Overlap of OSH and workplace innovation



### EWCS 2010 Two-way interaction effect functional support & OLDL on commitment (Dhondt, Pot, Kraan, 2013)



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### Monitor Social Innovation Region Limburg Maastricht University NL: Schumacher, Gerards, De Grip (2015)

- 141 organisations: in industry (56), commercial services (62) and non commercial services (23); all sizes
- Pillars/measurements: strategic orientation on social innovation; speed of internal change; self-organising capacity; talent development; investment in knowledge base; employability
- **Results:** Social innovative organisations perform better:
  - Higher growth of turnover
  - Stronger development of new products and services
  - A more comprehensive sustainability
  - Lower sickness absenteeism

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### High Reliability Organisations (HROs)

- A high reliability organisation has been defined as one that produces product relatively error-free over a long period of time. Two key attributes of high reliability organisations are that they:
- Have a chronic sense of unease, i.e. they lack any sense of complacency. For example, they do not assure that because they have not had an accident for ten years, one won't happen imminently.
- Make strong responses to weak signals, i.e. they set their threshold for intervening very low. If something does not seem right, they are very likely to stop operations and investigate. This means they accept a much higher level of false alarms than is common in the process industries.

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**TNO** innovation  
for life

### Discussion

- Variations in the process and disturbances will always occur. Instead of extending safety protocols even more, job control, workplace consultancy, employee voice should be promoted. A good example is the concept of 'team resilience' in the BAM project
- PRI could be part of workplace innovation (employee driven innovation in Norway) which contributes to become a HRO.
- Advocate to include PRI in other approaches such as 'Safety in the board room' and the OECD's 'Corporate governance for process safety' 2012.
- National or regional programmes can be supportive; social partners should be leading, governments and research institutes supporting






Ministerie van Sociale Zaken en  
Werkgelegenheid

## Sustainable Safety Redefined Responsibility

Rob Triemstra  
Deputy director Health and Safety at Work  
Ministry of Social Affairs and Employment




## Introduction

- Government & sustainable safety:
  - Sustainable safety has always been present in OSH policy and regulations
  - How has policy evolved over time and what is the impact on sustainable safety?




## Sustainable safety in OSH policy and regulation

- Since the early '80s
- Policy and regulations have the following principles:
  - Combating the risks at source
  - Adapting to technical progress and science
  - Measures that are reasonably achievable



Phases	Elements
<ul style="list-style-type: none"> <li>• Before 1980</li> <li>• 1980 – 1995</li> <li>• 1995 – 2010</li> <li>• Current</li> </ul>	<ul style="list-style-type: none"> <li>• Allocation of responsibility</li> <li>• Characteristics of the intervention</li> <li>• Used instruments</li> <li>• Focus in policy</li> </ul>



## <1980 Traditional Public Policy

- Primarily Government
- Law making and enforcement
- Laws and regulations, enforcement, permits and financial incentives
- Technical measures, technical information



## 1980 -1995 New Public Management

- Government in collaboration with employers and employees
- Efficiency and effectiveness, privatization, decentralizing
- Framework regulation and minimum requirements
- Convenants, general regulation, financial incentives (Farbo, SPA)
- Organisational measures

## 1995 – 2010 Governance

- Government in collaboration with employers and employees
- Efficiency and effectiveness, privatization, decentralizing
- Framework regulation, room for specification
- Arbocatalogi, general regulation, (financial) incentive programmes
- Management systems and behaviour
- Culture, recognizing the human as an asset





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## Current: Establishing New Relations

- Is there a limit to the shift of responsibilities?
- Primarily employers and employees
- A government with a facilitating role
- Agenda setting and monitoring new developments
- Social Dialogue
- Human factor, sustainable employability

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## Overview

Phase	Responsibility	Characteristics	Instruments	Focus
<1980	Government	Law making, enforcement	Regulation	
1980-1995	↓	Framework regulation, minimum requirements	↓	
1995-2010		Framework regulation, room for specification		
Current	Employers and employees	Facilitating, agenda setting, monitoring	Social dialogue	

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## Significant developments for sustainable safety

- Developments which contribute to sustainable safety:
  - »Own initiative increases the level of commitment
  - »From general application to custom made solutions
  - »Increased attention to behaviour and culture in policy making

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## Sustainable Safety

- ✓Commitment
- ✓Support
- ✓Suitable Solutions

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Mini-Symposium Sustainable Safety  
TNO Leiden, June 2<sup>nd</sup>, 2015

## Business perspective

Ton Jeen, ExxonMobil SSHE Regulatory Advisor Netherlands

Energy lives here™

### Agenda

• Introduction	2 min
• ExxonMobil SSHE commitment & objectives	2 min
• Operations Integrity Management System	3 min
• Safety Culture and Leadership	5 min
• Sustainable Safety examples	3 min
<b>Total: 15 min</b>	

# Introduction

**ROPARUN 2015**  
How do they do that?

System                      People

Strong commitment to common goals:  
1. Charity, 2. Safety

## ExxonMobil SSHE commitment and objectives

SSHE = Safety, Security, Health and Environment

**Safety and operations integrity are of the utmost importance**

These are the foundations of our business. Nothing is more important at ExxonMobil.

ExxonMobil goal is to provide and maintain a workplace where *Nobody Gets Hurt*.

We continue to work towards that goal.

**ExxonMobil**



## Operations Integrity Management System

### What is OIMS?

- Systematic, structured, disciplined framework for the management and reduction of SSH&E risk
- Corporate-wide commitment with high degree of ownership and involvement
- Complies fully with ISO 14001, OSHAS 18001, Responsible Care® requirements
- Seeks safe and environmentally responsible operations and compliance with all SSH&E laws and regulations

**ExxonMobil**

### OIMS Objectives

Ensure that:

- **Hazards** are systematically identified, evaluated and controlled
- **Risks** from these hazards are managed in such a way that employees, contractors, customers, the public and the environment are protected
- We comply with safety, health and environmental laws

Provide a **Structured** approach for achieving these goals

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Corporate OIMS Elements



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# Safety Culture and Leadership

Safety culture & leadership

*'Companies must develop a culture in which the value of safety is embedded in every level of the workforce, reinforced at every turn and upheld above all other considerations.'*

Rex W. Tillerson, Chairman and CEO, Exxon Mobil Corporation

Source: Statement to the National Commission on the BP Deepwater Oil Spill and Offshore Drilling, Nov. 9, 2010

Safety is more than just a priority at ExxonMobil — it is a core value and an integral part of our culture.

Proactive safety culture ExxonMobil Rotterdam confirmed during DCMR/TNO survey in June 2012

- Uniform safety culture across organisation, compliance driven, learning organisation

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Safety culture & leadership

Concluding remarks by Rex W. Tillerson, Chairman and CEO, Exxon Mobil Corporation (source: Statement to National Commission on Deepwater Horizon Oil Spill and Offshore Drilling, Nov. 9th, 2010)

1. A culture of safety has to be born within the organization. You cannot buy culture. You have to make it yourself.
2. Creating a strong, sustainable safety culture is a long process. If an organization is truly going to overhaul its approach to safety, it has to be committed from day one. But, you can't start until you start — and you're never going to finish.
3. The first and last elements — the bookends of OIMS — are the most critical. These are "Management Leadership and Accountability", and "Operations Integrity Assessment and Improvement". Without leadership by example and without thoughtful, honest and objective self-assessment, no system is sustainable.

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# Sustainable Safety Examples

Sustainability

Managing the impact of our operations on local economies, societies, and the environment, while contributing to society's broader sustainability objectives.



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Up Close: Ecosystem management on Alaska's North Slope

The Arctic region represents one of the world's largest remaining areas of undiscovered oil and gas resources, and we expect the Arctic to play a critical role in helping to meet the world's growing energy demand. We understand that operating in this region presents unique technological, environmental and social challenges.



An ExxonMobil contractor conducting a fish population survey in the Beaufort Sea.

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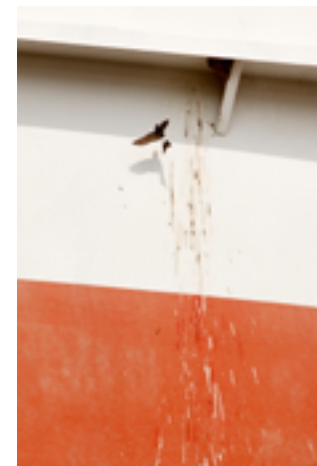
Source: 2014 Corporate Citizenship Report at [exxonmobil.com/citizenship](http://exxonmobil.com/citizenship)

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- Swallows nesting in Antwerp tankfarm
- Legal restrictions during breeding season resulting in adjustment to tank maintenance program
  - Impact of excrements on external corrosion was examined

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# Q&A Reflection

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