

ORGANISATIONAL FACTORS IN ACCIDENT INVESTIGATIONS

– PSA FOLLOW UP

JON ERLING HEGGLAND

Adviser – Human factors

Organisational psychologist

Content

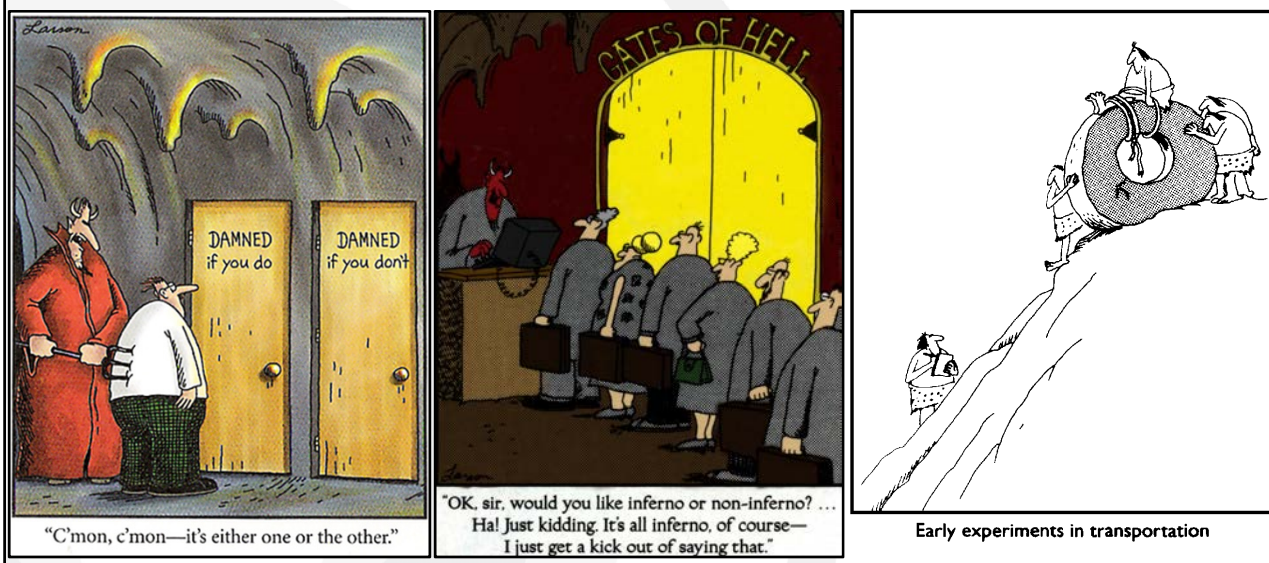
1. Study on organisational factors and measures in accident investigations (in Norwegian only, IFE, 2009)
2. Culture and system for learning (PSA, 2013)

Organisational factors in accident investigations

The PSA's previous experience demonstrates that:

1. the companies' accident investigation reports provide an overview over human and technological factors, but do not address organizational factors in a broad perspective.
2. organizational factors related to structural aspects (e.g. roles, responsibilities, procedures) are included, but factors associated with e.g. cultural aspects, management conditions, power relations and framework conditions on different levels are less visible.

Part 1: Study on organisational factors and measures in accident investigations



Method

A study by the Institute for Energy Technology (IFE) on behalf of PSA

- Title: Vurdering av organisatoriske faktorer og tiltak i ulykkesgranskning/Assessing organizational factors and measures in accident investigation (IFE, 2009)
- 91 accident investigation reports read
 - categories 4 (serious) and 5 (high potential/major accident)
 - from 2007-2008
- Document analysis of 20 accident** investigation reports
- Aim of the study
 - How **different categories of organizational factors** are assessed in the companies' accident investigation reports?
 - Which **measures** related to different categories of organizational factors are suggested in accident investigation reports?
 - To what degree it is possible to assess the **effects of measures, related to organizational factors** that the companies suggest in the accident investigation reports?

PSA use of the IFE study

- Regulatory and industry implications of the IFE report: (IFE, 2009).
 - Different categories of organizational factors (Bolman & Deal, 2003)
- Implications of the IFE (2009) report related to needs of improvement in accident investigation and regulatory practice.
 - Different perspectives on accident and ways of modeling accidents (Lundberg et. al., 2009; Katsakiori, et al., 2009; Le Coze, 2010; Hollnagel, 2004; Morath & Turnbull, 2005)
- See also paper: *Organizational factors in accident investigations – A regulator's perspective* (Wiig & Heber, 2009)

Categories of organizational factors

Frame	Assumptions	Keywords
Structural	<ul style="list-style-type: none"> Organizations exist to achieve goals. Structure should fit goals. Rationality should be maximized. Coordination and control through hierarchy and rules. Specialization and structure are basic principles. 	Responsibility, hierarchy, structure, rules, feedback, command, control, organizational goals.
Human Resource	<ul style="list-style-type: none"> Organizations exist to server human needs. There is mutual dependency between people and organizations. When the fit between people and organization is good, both benefit and the other way around. 	Competence, group dynamics, participation, needs, motivation, learning, leadership styles, training.
Political	<ul style="list-style-type: none"> Organizations are coalitions between groups with different values, beliefs, and realities. All decisions involve scarce resources. Scarce resources and enduring differences makes conflict inevitable and power a key asset. 	Power, bargain, build coalitions, set agenda, conflicts.
Symbolic	<ul style="list-style-type: none"> Many different events in organizations are ambiguous and not subject to one rationality. Interpretation and meaning are crucial issues – people interpret experiences differently. Culture is the glue that holds the organizations together through shared values and beliefs. 	Value, symbols, myths, meaning, interpretation, stories, heroes, roles, playing, visions, culture.

From Bolman & Deal 2003; Gallos 2006

Perspectives on accidents

- **Systems thinking:**

- emphasizes the interdependence of people, technology and organizations as opposed to considering these aspects in isolation.
- requires considerations of connections both within and outside the organization (Morath & Turnbull, 2005).
- makes the fundamental assumption that accidents are not caused by incompetent humans; accidents are composed of multicausal variables that interact to create the conditions in which the accident may occur (Allsop & Mulcahy, 1996)

- **Individual thinking:**

- Viewing accidents in an individual perspective, arguing that the accidents are caused by the “Bad Apples”, hamper organizational learning and cause a loss of rich information (Vincent 2006; Leape 1994).

- **Vital principles to be aware of in accident investigations:**

- “What-you-look-for-is-what-you-find”-principle
- “What-you-find-is-what-you-fix”-principle (Lundberg et al, 2009).

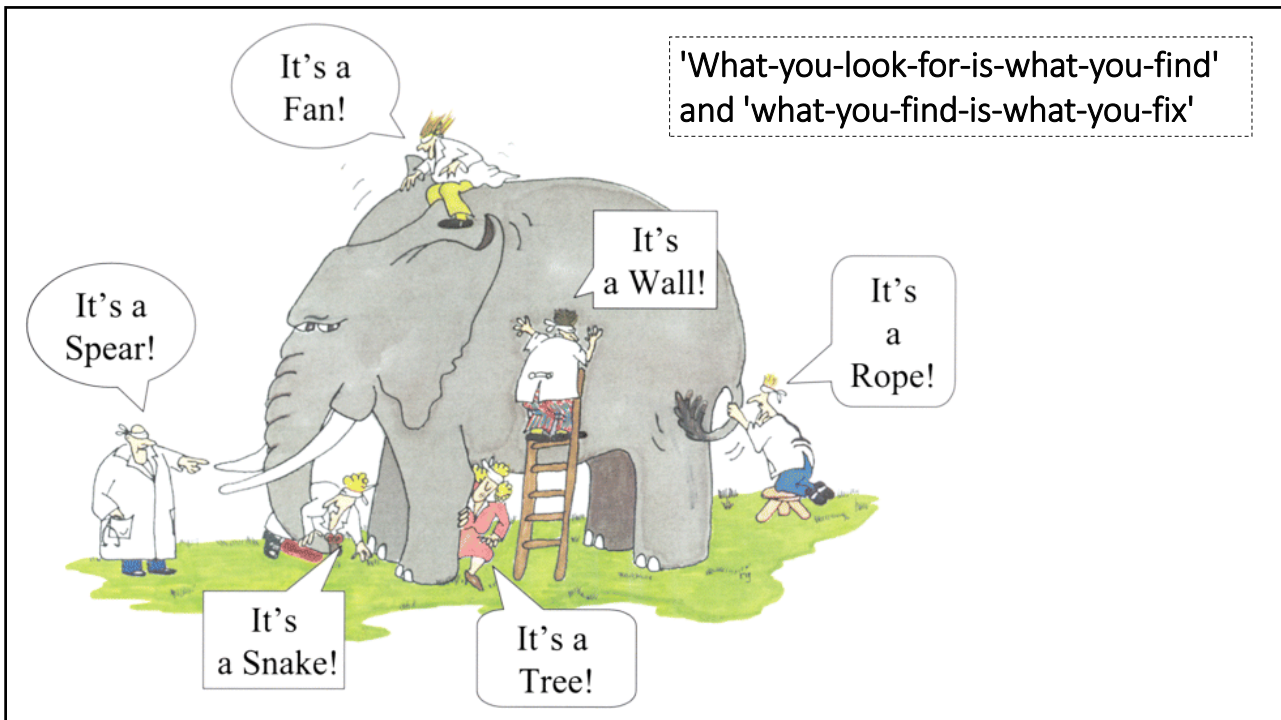
Understanding cause and effect in accident investigations: Our theories and models

- Our models and methods for understanding cause and effect in accident investigations influence:

- the way we understand and explain accidents
- the way questions are posed
- our focus on different aspects of an accident
- the answers we choose to include in our analysis
- and lead to different recommendations for improvement
- the conclusions we draw

- It is challenging to include the complex and dynamic nature of an organisation in a simplified integrated method for accident investigations, but:

- it can give us valid knowledge on basic mechanisms in an accident
- and it is necessary to find information and analyse an accident in a specific setting



Vital learning points from the regulator's perspective

PSA conclusions

- Human error and individual perspective dominates several of the ten categories
- Organisational factors included are mostly related to structural and human resource frame
- Focus on individual aspects without the organisational context may limit the flow of information and learning after an accident.

Ten categories for organizational factors most often addressed in the accident investigations (IFE, 2009):

1. Competence, experience and knowledge
2. Procedures and guiding documents
3. Safety- and risk assessment
4. Communication
5. Goal conflicts
6. Work practices
7. Maintenance
8. Roles and responsibility
9. Management functions
10. Design



Conclusion

Based on the results from the study on organizational factors in accident investigation within the Norwegian petroleum industry (IFE, 2009) the PSA as a regulator argues that there is a need for:

1. broader perspectives on organizational factors and
2. a stronger emphasis on a system perspective in accident investigations.

9 investigations in 2015

- | | |
|-----------------|--------------------|
| • 24. March | <i>Knarr</i> |
| • 23. March | West Venture |
| • 4. March | Transocean Barents |
| • 20. February | Scarabeo 8 |
| • 18. February | <i>Gudrun</i> |
| • 14. January | Mærsk Giant |
| • 29. November | Mongstad |
| • 7. August | Eldfisk |
| • 22. September | <i>Heidrun</i> |

Gransking	Type	Avvik	Forbedringspotensial													
Eldfisk 7.8.2014	Gul ESD og utslipp	Styring av risiko ved oppstart av produksjon etter nødavstengning	Arbeidsfrie perioder	Sikkerhetstiltak igjennom produksjonsoppstart	Prosedyrer	Robusthet mot enkeltfeil og svikt i sikkerhetssystemer	Verifisering av designkrav til sikkerhetssystemene før oppstart og drift	Manglende uavhengighet mellom kontroll- og nedstengningsfunksjon for rivvålding	Barrierestyring, risikovurderinger i og analyser i forbindelse med modifikasjoner	Konsekvensklassifisering av systemer og utstyr	Vedlikeholdsprogram for dreneringsystemet	Ytelsekrav for beredskap	Opplæringsprogram og øvelser			
Mongstad 29.11.2014	Personskade	Manglende risikovurdering av endring til ventil med gir										Mangelfull opplæring i ventils virkemåte	Uheldig praksis ved bruk av stige	Mangelfull risikovurdering før bruk av stige		
Mærsk Giant 14.1.2015	Ufrivillig låring av livbåt	Vedlikeholdsrutiner på livbåtsdrevsystemet	Opplæring	Prosedyrer som omhandler livbåter og evakuering	Periodisk program for sakkyndig kontroll og sikring av kompetanse på personell som utfører vedlikehold	Kvalifisering og oppfølging av leverandører						Arbeidsprosess for bruk av sikkerhetsskjetting på livbåter	System for vurdering av utført arbeid av 3. part			
Guðrun 18.2.2015	HC lekkasje															
Scarabeo 20.2.2015	Mann over bord	Vedlikehold av gangrister (grating)	Barrierestyring	Vedlikeholdstyring	Kompetanse og opplæring							Plassering av Banana Sheaves	Arbeidsprosedyre - flytting av BOP	MOB-båt øvelser	Personellkontroll	Skjema for rapportering av hendelser
TO Barents 4.3.2015	Person/klemskade	Mangelfull sikkerhetstiltak utoverforming av arbeidsplattformer og svingende gjennomføring av påbegynt beskyttelsestiltak	Mangelfull ledelse, operasjon eller rutiner for entring og boretårn	Mangelfull ledelse, risikoforståelse og risikovurdering i forbindelse med samtidige aktiviteter på boretårn												
West Venture 23.3.2015	Fallende gjenstand	Mangelfull tilrettelegging for løfting av testehodet ned gjennom rotary/spider	Mangelfull planlegging og ledelse	Manglende etterlevelse av styringssystem for løfteoperasjoner												
Knorr 24.3.2015	Brann															
Heidrun	Personskade															
Ledelse styring		Operasjon prosedyre		Etterlevelse		Opplæring		Teknisk/design/verifikasjon			Vedlikehold		Oppfølg av levr.		Beredskap	

Conclusion

- We find no common features among these incidents that separates them from other incidents we have looked into.
- Vi kan ikke se noen fellestrekk ved disse hendelsene som skiller dem fra andre hendelser vi har fulgt opp de senere årene.

A platypus is a platypus

– on categorisation and the human brain

When a platypus was first discovered, it was so strange that it was initially rejected as a hoax. It was only after it was found to be a real animal, and not a hoax, that it was accepted as a new species.

But a platypus is a platypus. It is not necessary to force the platypus into any category, except as a matter of convenience. And when we do force the fit, we reduce opportunities for learning about the reality that is actually there.

Schein (1993), On Dialogue, Culture, and organizational learning, REFLECTIONS vol 4, no. 4

PART 2: CULTURE AND SYSTEM FOR LEARNING



Yggdrasil

The world ash

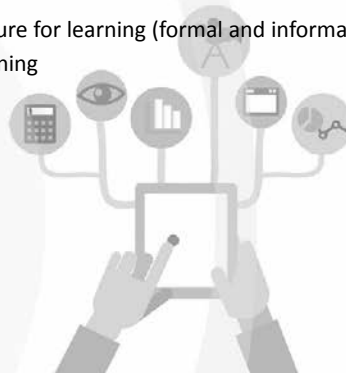
Project goals and main themes

GOALS

- Develop a common understanding of the concept organisational learning
- Further develop our own approach towards the players and in audits
- Improve our own audit methods

MAIN THEMES

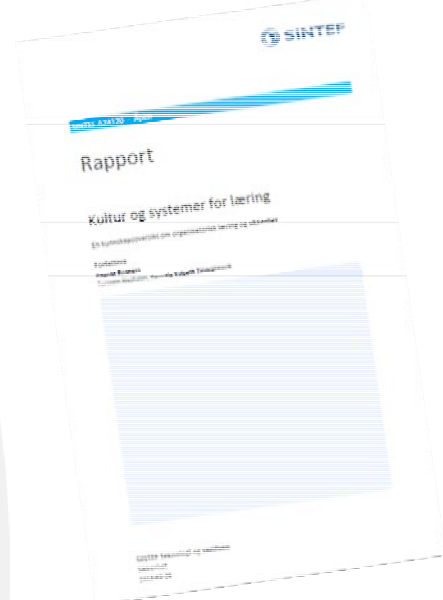
- The relation between systems, structure and culture for learning (formal and informal learning processes)
- Organisational promoters and constraints on learning
- Learning in complex organisational interfaces
- Handling of learning dilemmas
- Critical approach:
 - Is all learning positive for safety?
 - The relation between learning and improvement



Review of the literature

CONTENT:

- The concept
- Influential theories on organisational learning
- Organisational learning and power
- The «drift» concept's relation to organisational learning
- Organisational learning in complex and unstable structures
- Learning after accidents and critical events
- Learning and HSE work
- The regulatory role



SINTEF report A24120 (2013, Norwegian): Ragnar Rosness, Torstein Nesheim & Ranveig K. Tinmannsvik: «Kultur og systemer for læring. En kunnskapsoversikt». SINTEF og SNF. Lenke på Ptils nettsider: https://ptil-dokumenter.mikromarc.no/Rapporter_2013/SINTEF%20A24120%20Kultur%20og%20systemer%20for%20l%C3%A6ring%2020En%20kunnskapsoversikt%20om%20organisatorisk%20l%C3%A6ring%20og%20sikkerhet_SISTE.pdf

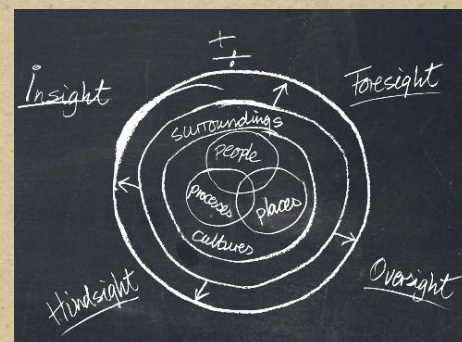
a book about learning — Textbook

Name: _____

<http://www.ptil.no/a-book-about-learning/category1118.html>

CONTENTS

Boundless learning	8
Foresight and hindsight	16
The map and the terrain	18
Learning on the wrong track	28
Carrot and stick	34
Promoters and constraints	38

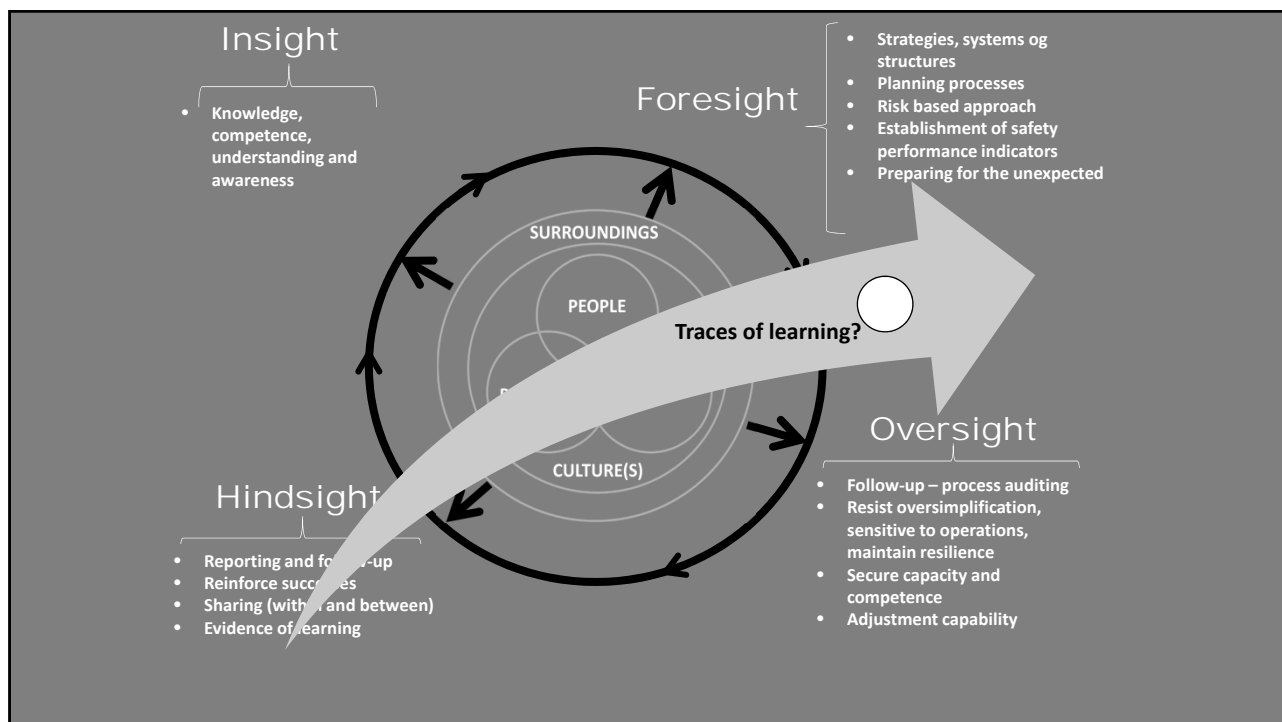


Learning on the wrong track...

- Accidents can happen even if you follow procedures to the letter because learning gets on the wrong track. (e.g. Challenger – NASA, 1986)
- Learning on the wrong track is normally invisible to those involved
- Learning gets on the wrong track most frequently when people encounter conflicting requirements or find themselves subject to incompatible pressures
- No simple recipe exists to prevent learning from getting on the wrong track

"NASA safety culture has become reactive, complacent, and dominated by unjustified optimism. Over time, slowly and unintentionally, independent checks and balances intended to increase safety have been eroded in favour of detailed processes that produce massive amounts of data and unwarranted consensus, but little effective communication (p. 180)"

[Columbia Accident Investigation Board, 2003\)](#)



Organisational learning threats and defenses

ORGANISATIONAL LEARNING THREATS	ORGANISATIONAL LEARNING DEFENSES
STATIC AND RIGID	DYNAMIC AND FLEXIBLE
SANCTIONS AND PUNISHMENT	OPEN AND TOLERANT
"GROUP THINK" AND "SILOS"	VARIATION AND DIVERSITY
BLINDNESS	ALERTNESS
CLOSED AND MONOPOLIZATION	SHARING AND INVOLVEMENT
MISTRUST	TRUST
NONCHALANCE	CURIOSITY
SERVILITY AND POWER	COURAGE TO CHALLENGE

THANK YOU

Any questions?

