FINAL TORC WORKSHOP
DEC 1ST, 2016

T.O. Grøtan, SINTEF Technology and Society, Norway
TORC
Training for Operational Resilience Capabilities

- Eni Norge
- Strukton Rail
- Infraspeed Maintenance BV
- Nederlandse Aardolie Maatschappij BV (NAM)
- French ATM

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Outline

• Celebration!
  • Scope
  • History
  • Achievements

• Agenda of the day
  • Opening remarks: TNO
  • Keynote (to reflect our heritage from Resilience Engineering)
  • Resilience from the company perspective—why and what?
  • Resilience in the context of compliance; theory and implications of "resilience a la TORC"
  • Live demo of TORC game
  • Companies' experience with TORC/game.
  • How do we proceed to strengthen resilience?
  • Safety and beyond? How can TORC be utilized?
  • Closure (16:00)
What we will learn

• how industrial companies in rail transportation, aviation and oil & gas industry receive and conceive the idea of resilience in their operational contexts
• the TORC approach to training based on the idea/theory of resilience in the context of compliance
• the TORC methods, tools and the TORC gaming approach
• the expectations and experiences of companies piloting the TORC approach
• the potentials and prospects for utilization and further development of the TORC approach
TORC project structure 2014-16

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Training for Operational Resilience Capabilities (TORC)

- WP1: TORC Concept development
- WP2 (Case): oil & gas
- WP3 (Case): railway, oil & gas
- WP4 (Case): aviation
- WP5: Evaluation and dissemination
- WP6: Project management

Industry Partners:
- EniNorge
- Strukton Rail
- Infraspeed Maintenance BV
- Nederlandse Aardolie Maatschappij BV (NAM)
- French ATM
Point of departure: Distinctive but coherent training

Operator/process training: *Experiencing the margin* of manoeuvre

Management training: *Mandating the space* of manoeuvre

Integrated Training: Decision support. Reconciling margin vs space, Safety1 vs 2.

**Safety-I premises:**
(Strict) Compliance

**Safety-II premises:**
(Utter) Resilience

Well-defined "compliance base"

Strategic resilience

**IMPERATIVE of COMPLIANCE**
Dutch Engineering; crucial for things to move

Source: www.eninorge.com

- The world's heaviest "dry cargo" ever; from Korea to N. Norway (2015)
- Is now producing oil outside Hammerfest (March 2016)
.... including TORC gaming

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SINTEF
- EniNorge
From rudimentary to "capabilitized" resilience through training/gaming
Presumed application areas

• **Normal operation**
  - Procedures (SOP) constitute the compliance base

• **Emergency training**
  - Plans for "Defined Hazard and Accident Scenarios" (DHAS) constitutes the compliance base

• **Unexpected situations**
  - The compliance base must be "found" on the spot
(Agenda)

• Opening remarks: TNO
• Keynote (We departed from Resilience Engineering, but arrived in a different context. Did we go (too) far?)
• Resilience from the company perspective– why and what?
RESILIENCE IN CONTEXT OF COMPLIANCE

T.O. Grøtan, SINTEF Technology and Society, Norway
"Guilty pleasure": (TORC) Theory

Safety, Reliability and Risk Analysis: Beyond the Horizon – Steenbergen et al. (Eds)

Hunting high and low for resilience: Sensitization from the contextual shadows of compliance

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TO RULE, OR NOT TO RULE IS NOT THE QUESTION (FOR ORGANIZING CHANGE TOWARDS RESILIENCE IN AN INTEGRATED WORLD)
Tor Olav Grøtø

Organizing, thinking and acting resiliently under the imperative of compliance
On the potential impact of resilience thinking on safety management and risk consideration

Thesis for the degree of Philosophiae Doctor

Trondheim, April 2015
Norwegian University of Science and Technology
Faculty of Engineering Science and Technology
Department of Production and Quality Engineering
Paradoxes of resilience as a concept

- A situated practice that cannot be expected to recur in the exact same way

- In/across organizations: dependent on the creative use of different strategies collaboratively applied by (multidisciplinary) teams in line with operational demands that can vary over time

- Benefits from training and rehearsal
  - Countering risk of adaptive failure: resilience is a fallible practice

- Descriptive or normative approach to the "resilient object"?

- Who is the "resilient subject"?
  - Functional approach/description renders residual risk on sharp-end (Bergström et al. 2015)
  - Managerial responsibility – hardly addressed
    - Support, accountability, liability, legitimacy; a defined space of maneuver?
Behind the rational facade; Resilience under the imperative of compliance
("Safety II in context of Safety I")

- Resilience must unfold in the context of a compliance regime, enforced by management systems that are *external even to local management preference*.
- Resilience training must be conducted and orchestrated with a defined relation to existing compliance-oriented training, aiming for a delicate balance.
- Managerial attention may shift attention to alternative modes of control in terms of articulating a *space of maneuver* to field staff.
- The appreciation of "rudimentary" resilience, and the need to strengthen it, may be accentuated and made explicit by simulation or by reflection on action.

"World of Compliance"; Dominant, socially and legally demanded.
Institutionalized; to "rule by rule"

Training for sustained growth – beyond the comfort zones!
(TORC) Pragmatics of resilient subjects

- Resilience Training must be recognized in/from pragmatic contexts
- A double-hermeneutic approach (A. Giddens) foundation is needed
  - Aim to understand understanding subjects rather than explaining objects
- Distinct pragmatics must be recognized, engaged an supported for collaboration
  - Operational pragmatics
  - Managerial pragmatics
  - Integrated (continual reconciliation)
- Resilience in the context of compliance
  - Resilience does not unfold in a contextual void, but in the context of its opposite orientation
Extended focus: "CvR" reconciliations

- TORC training as a vehicle for a productive co-creation of functional and effective rules and trustworthy and reliable adaptive capacities, in conjunction.
- CvR reconciliation thus also implies an act of finding mutually measured CvR calibrations; aiming for increased resilience; complementing optimization of rules
- The "rational facade" tend to rest on a machine metaphor (Morgan, 2006) for the stable and enduring organization
- The resilient contribution rests on a more organic and adaptive organizational metaphoric\(^7\)
  - ultimately pointing towards "organized impermanence" as described by Weick (2009).
TORC design: Distinctive but coherent training

Operator/process training: 
*Experiencing the margin of manoeuvre*

Management training: 
*Mandating the space of manoeuvre*

Integrated Training: 
Decision support. Reconciling margin vs space, Safety1 vs 2.

Well-defined "compliance base"

Safety1 premises: 
(Strict) Compliance

Safety2 premises: 
(Utter) Resilience

Strategic objective
Aspiration and calibration

- Progressive aspiration levels *for resilient functioning* (inspired by Longstaff et al. 2013, Woods 2015)
  - R1. Defend normalcy (preferred mode of operation)
  - R2. Build robustness to anticipated disturbance
  - R3. Stretch and rebound in an (isolated) surprising/unexpected situation/episode
  - R4. Sustain resilient (R3) functioning over time

- Operational *margin* and managerial *space* must be (vertically) aligned, "as far as possible"
  - Two extreme "pathologies" can be envisaged through WAI vs WAD in the TORC space

- The actual balance point is not a normative issue, but a local, situated issue
  - External expectations, accountabilities and mandates
  - Inherent dynamics of system, actual capability of staff
  - Adaptive history, precarious present, resilient future
Aspiration levels and underlying modalities
Top-down or bottom-up approach?
HOW CAN WE UTILIZE TORC FURTHER?
SAFETY AND BEYOND?

T.O. Grøtan, SINTEF Technology and Society, Norway
"Sensitization device": margin vs space to maneuver
Opening doors to new arenas & issues!

Compliance vs Resilience (CvR)
Shifting competence envelopes

Distinct but coherent training activities

Mutual sensitization to existing practices

Experimentation
Deepening the impact of TORC sensitization to maneuverability: two prospects

"Puzzled organizations" (Baumard 1999)

Business needs (e.g., retiring staff)

Contextualized engagement, Proactive sensemaking

Professional competence.
Communities of practice.

Learning organizations.

Anomalizing

Presumed application areas

• Normal operation
  • Procedures (SOP) constitute the compliance base

• Emergency training / resilience management
  • "DHAS" constitutes the compliance base
    • E.g., (H2020) DARWIN. Resilience Management Guidelines. "Expect the unexpected and know how to respond"

• Unexpected situations
  • The compliance base must be "found" on the spot
Technology for a better society