



Hello Tomorrow 

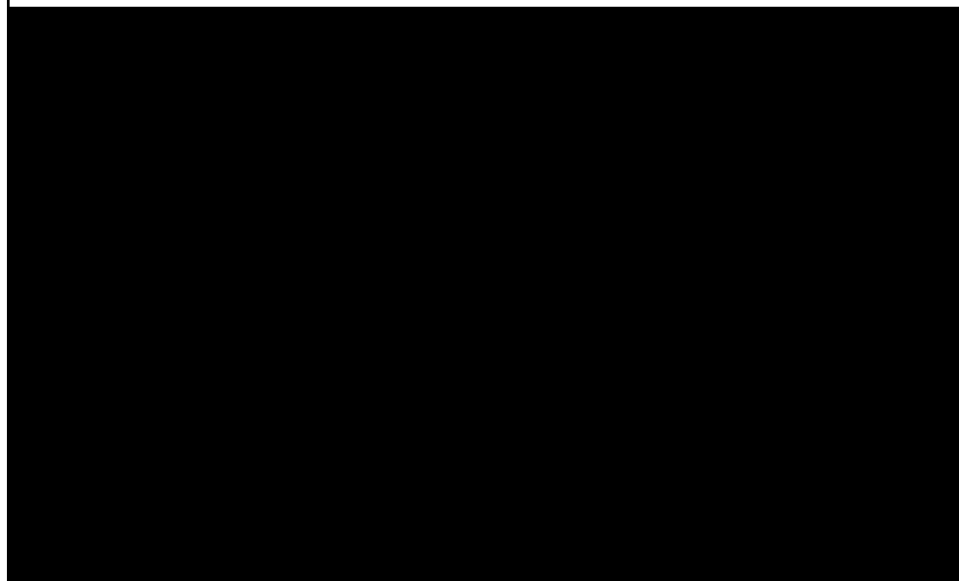
Outcome or Process?

- The Focus in Training for Safe Operations

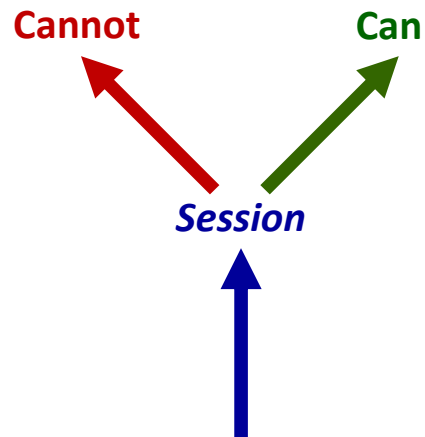
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Human Factors Manager

Global Humanitarian Aviation
Conference & Exhibition
23-25 October, 2018
Sharm El Sheikh, Egypt

Air Canada 759



The Role of Training



The Role of Training



(NTSB report on US Air 1016, 1995, p. 119)



“CRM”

“Loss of SA”

“Startle”

“Monitoring”

Counterfactual Statements



- “They should have seen...”
- “An earlier decision would have...”
- “If the crew would have considered...”

A statement saying what a crew could have done to prevent a certain outcome

Thoughts?

Digging for "Root Cause"



Did they see?

What did they see?

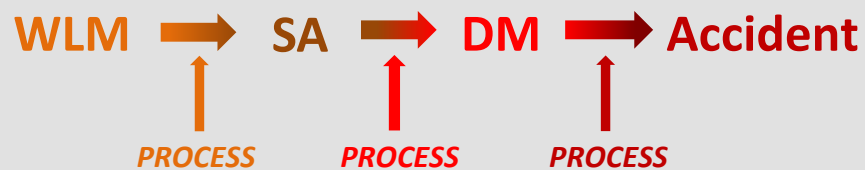
Did they understand?

How did they understand it?

Did they know what to do?

Answering the “Why”?

Understanding what happened...



Label → Explanation



Assessment: “Lost SA”, “Lack of communication”, etc.



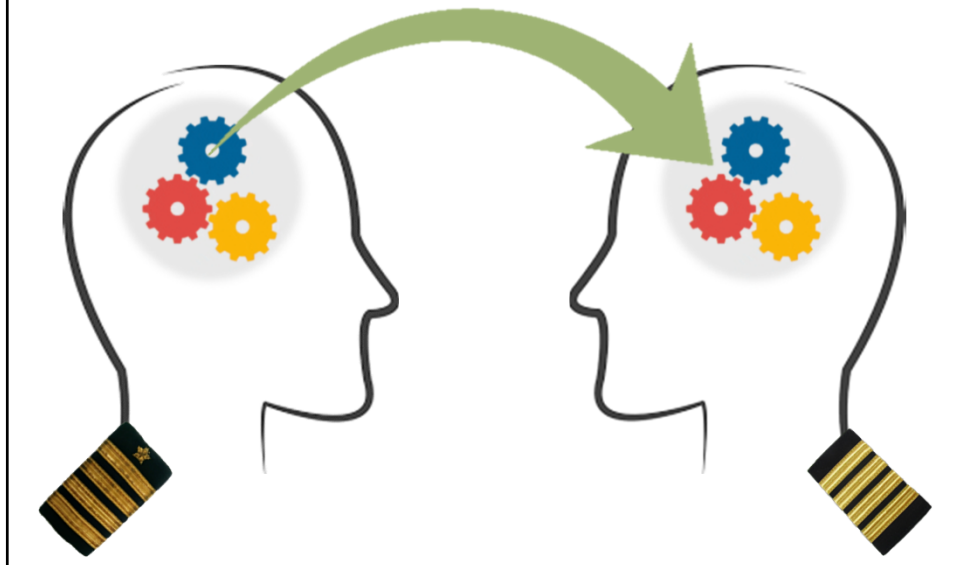
Start

Seq1 **FACTS** ents

Outcome



The Role of Training



The Role of Training



Expert = Also know how they are doing – while doing

Training ↗ Understanding ↗ Capacity

Proficient = Know what they are doing and why

Training ↗ Understanding ↗ Capacity

Competent = Know what they are doing

Singapore Airlines 368



Process and Regulations



- (c) The assessment should be based on the following principles:
- i. only observable, repetitive behaviours are assessed,
 - ii. the assessment should positively reflect any CRM skills that result in enhanced safety,
 - iii. assessments should include behaviour which contributes to a technical failure, such technical failure being errors leading to an event which requires debriefing by the person conducting the line check,

Process and Regulations



(5) Methodology of CRM skills assessment

The assessment should be based on the following principles:

- (i) only observable behaviours are assessed;
- (ii) the assessment should positively reflect any CRM skills that result in enhanced safety;
and
- (iii) assessments should include behaviour that results in an unacceptable reduction in safety margin.

Way Forward



How to train then?



Cognitive



Thinking

Artefacts

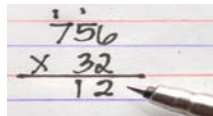


Things

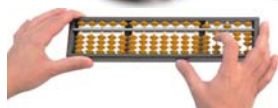
Cognitive Artefacts = Things to think with

(Krkauer, 2016)

Complementing and Competing Cognitive Artefacts



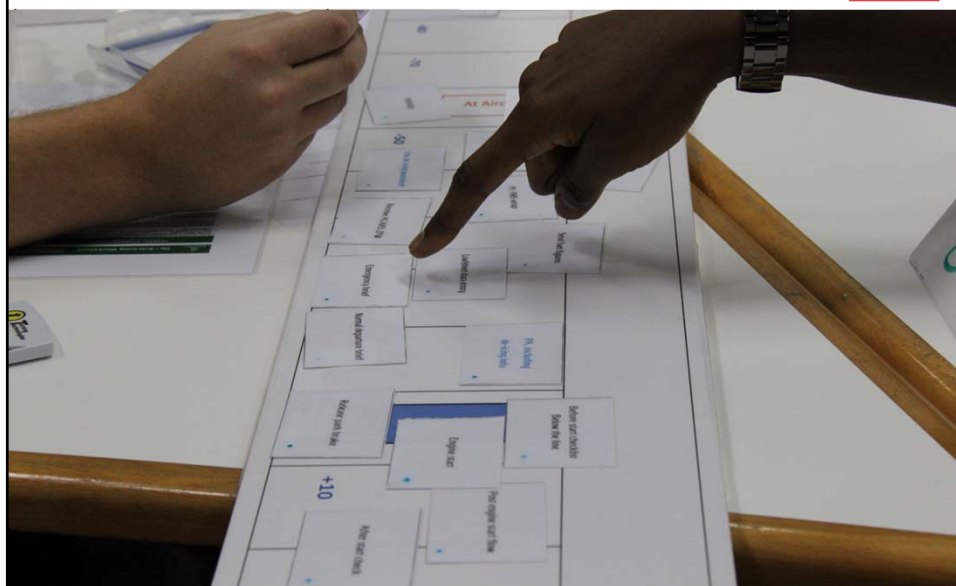
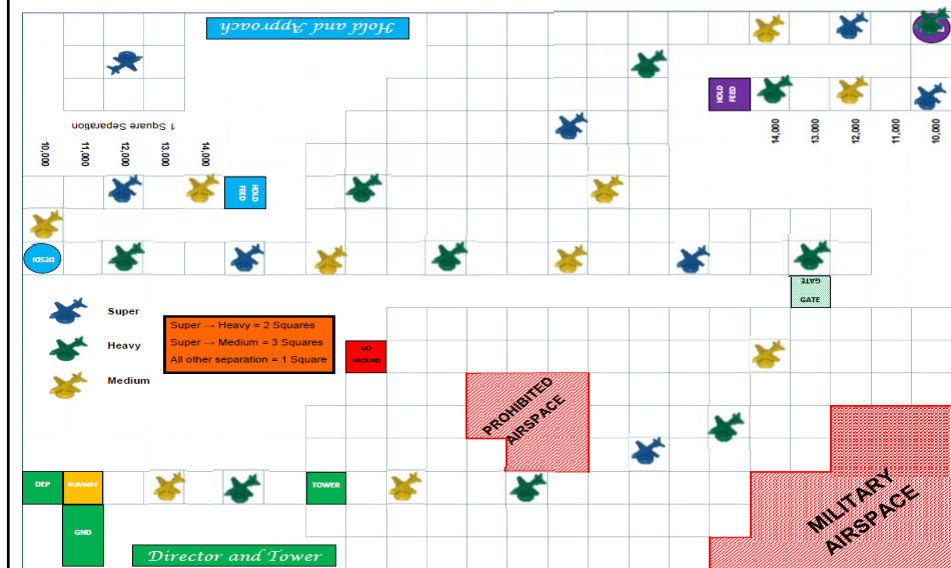
XLVI



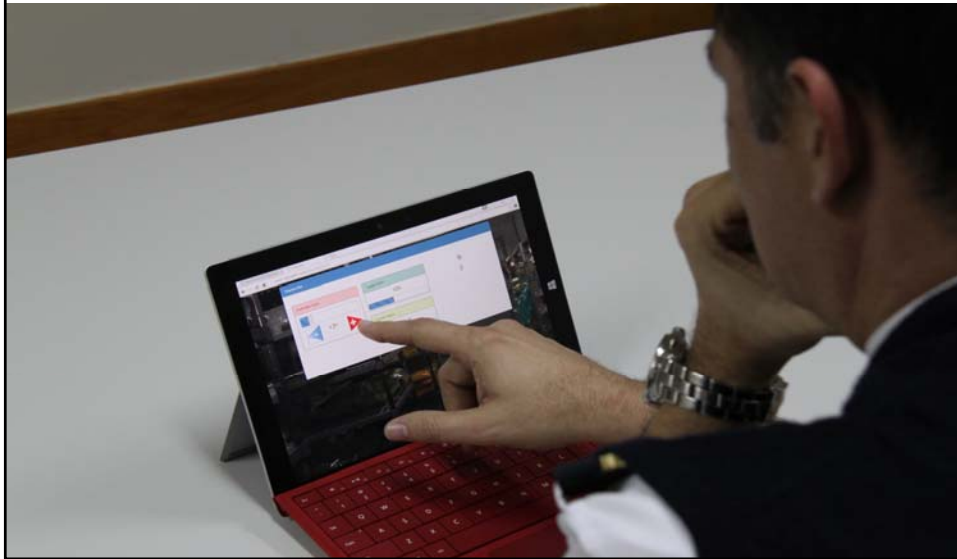
Complementing
Leaves a supporting structure

Competing
Leaves no supporting structure

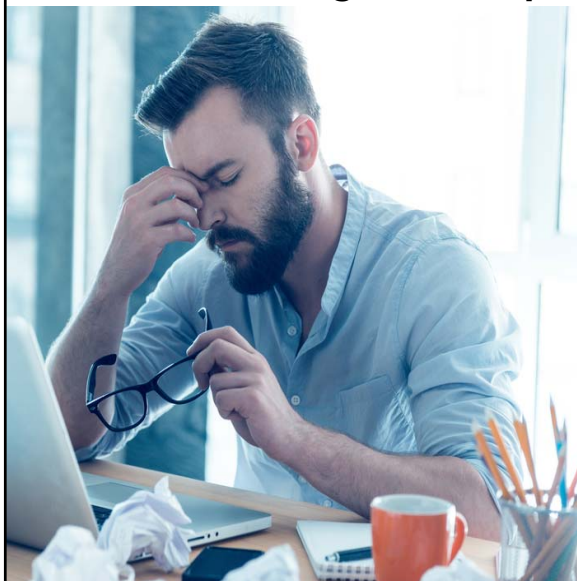
(Krkauer, 2016)



"Simple Simulation" for Training



You have changed career, grown a hipster beard and now you are the manager of a supermarket...



Call from the supermarket:

"The automatic temperature control in the cold storage room has failed, you must come and sort out the temperature manually!"

Cold Store



Thermo Sim

Controller Input

Target Value

+04

Start

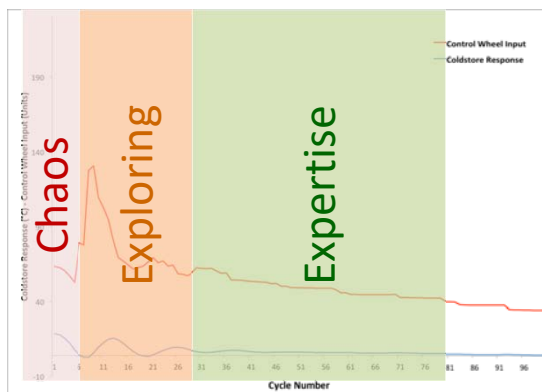
Current Value

+14.1

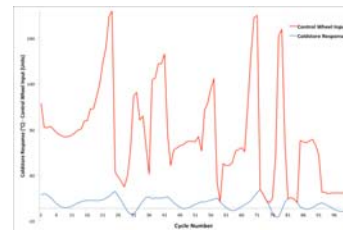
100
8



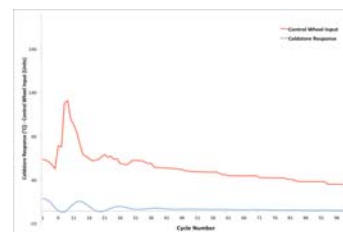
Cold Store



“Phases of Learning”

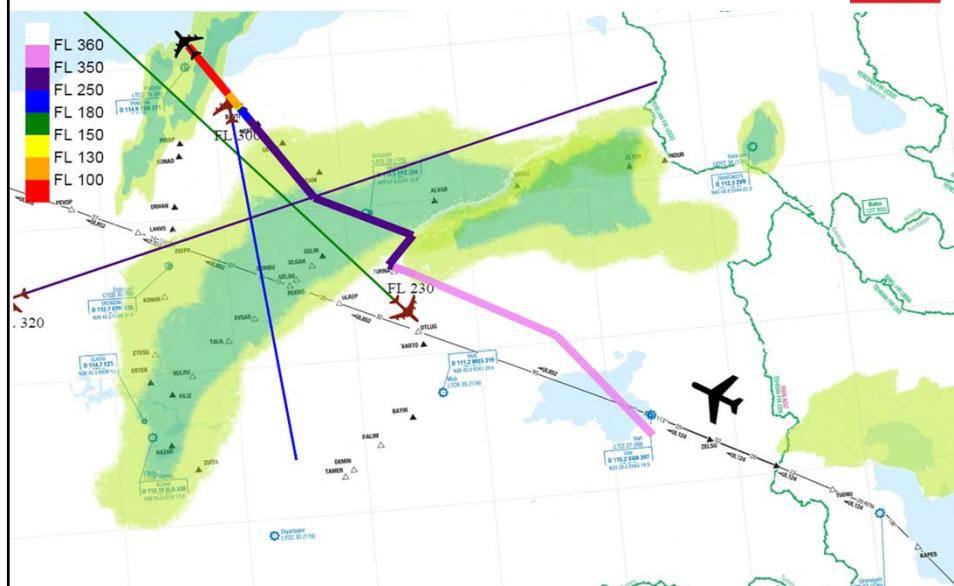


“Reactive”



“Incremental”

*** DEPRESSURISATION DIVERSION ***
DP N3826.8 E04322.2 - BONAM PLUS 050 NM
BEFORE DP - TURN RIGHT AND DIVERT DIRECT TO OITT
AFTER DP - TURN RIGHT AND DIVERT DIRECT TO UDYZ



M/S Antwerpen



Mid-Fidelity Simulation - A project with Boeing



WV 263/104 HDG 093 G/S 570

APT HOME

NEAREST AIRPORTS

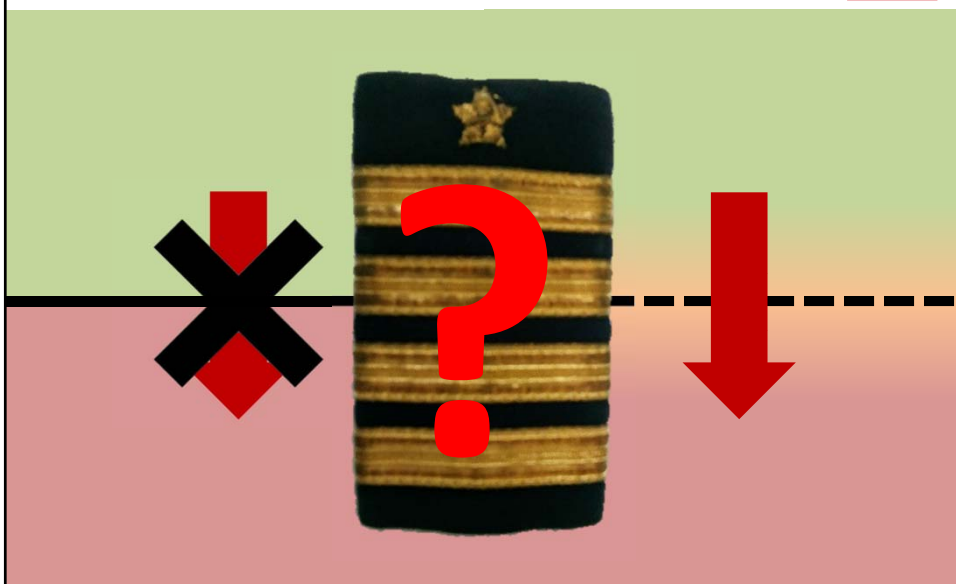
	BRG/DIST	ETA	FUEL REM
CYQX	277/676	07:39	11.5
BIKF	042/868	07:19	12.9
LPLA	162/898	07:41	11.4
EINN	091/1048	07:39	11.5
EIDW	088/1137	07:48	10.7

TIME: 05:54 GW 192.8 t

Focus on Process



The Role of Training



Some things we may never understand...



Summary



- **Success = Process + Outcome**
- **Competence = Applying Process**
- **Proficiency = Understanding Process**
- **Expertise = Understanding and Monitoring Process**
- **Training = Focus on Process**
- **Improved Process ↗ Safety**



Thank you!



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