



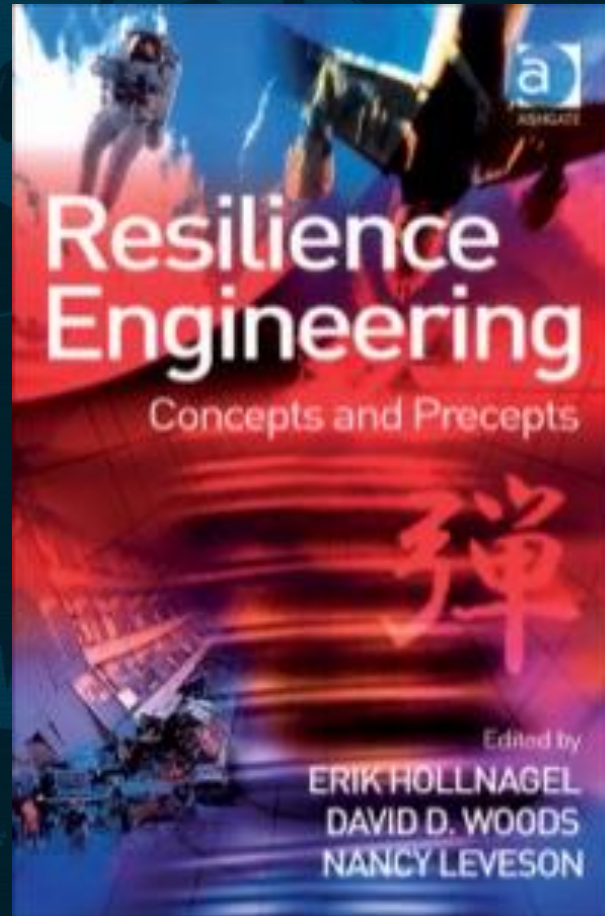
Human Resilience in Flight Operations

AAvPA/PACDEFF – 7-9 November, 2018

Sydney, AU

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Resilience Engineering

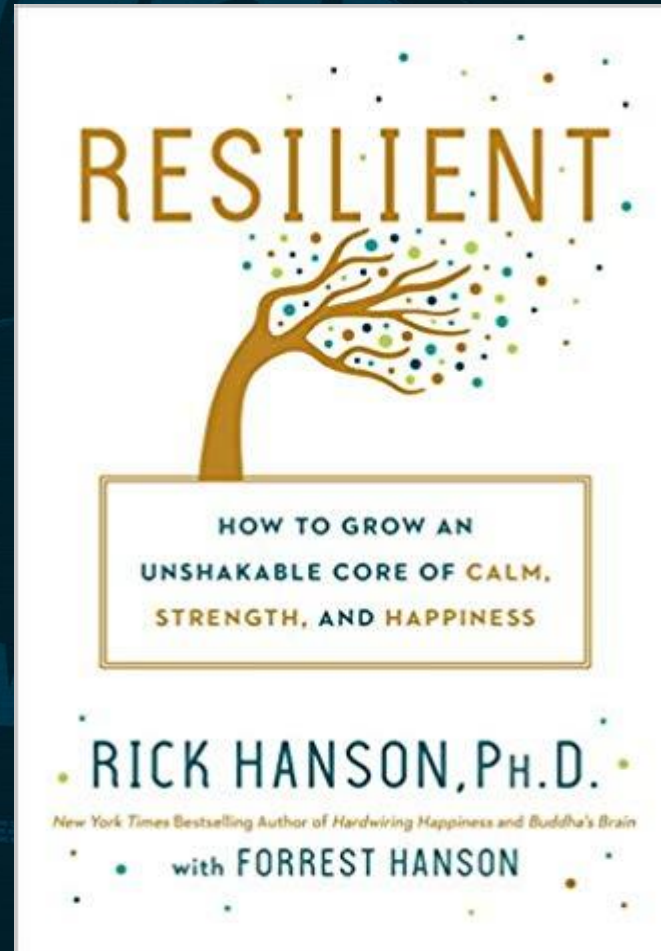


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Resilience Engineering

- Combination of conditions
- Emergence
- Complexity
- Dynamic
- Performance variability
- Competition between objectives
- Risk detection/management
- System Control
- Dynamic stability/balancing
- Dampening
- Early detection
- Decision making (near the boundary)
- Flexibility versus stiffness
- Margins
- Tolerance
- Operational pressures

Psychological Resilience



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Psychological Resilience

- Recognizing

- Compassion
- Mindfulness
- Learning

- Resourcing

- Grit
- Gratitude
- Confidence

- Regulating

- Calm
- Motivation
- Intimacy

- Relating

- Courage
- Aspiration
- Generosity

Resilience

- Woods – “... how well can a system handle disruptions and variations that fall outside of the base mechanisms/model for being adaptive...”
- Woods - Prevent something bad arising, prevent worsening, recover

Resilience in Flight Operations

- Goal – restore “normalcy” following disruptions
 - Detection and Recognition
 - Selection of a plan to move to back toward normal operations
 - Performing the recovery
- Operations perspective (strategic)/Line pilot perspective (tactical)
- No one-size-fits-all solution – many paths to recovery

Marble in a bowl metaphor



The operation controls the slope



Embracing Disruption (Strategic Level)

- Aversion to uncomfortable topics
- Wishful thinking/Optimism bias
- Better to embrace that disruption will happen
 - the marble will move
 - Detailed investigation of events – focus lessons on common factors
 - Events (plus one) analysis
 - Pre-mortem exercises (Klein – “The Power of Intuition”)
 - Strategic risk management – RRM model

Improving Pilot-level Resilience

- Detection and Recognition
- Selection of a plan to move to back to normal operations
- Performing the recovery

Improving Detection and Recognition

- Failures in recognition
 - Pilots fail to detect the disruption early

- **Training/Familiarity**

- Event sharing
- Training scenarios – faint signals
- Risk management emphasis
- Build Confidence

- **Workload management**

- Clear procedures (background and intentions)
- Prioritization (balancing)
- Highlight desired behaviors

- **Fatigue/Inattention/Laxity**

- Fatigue Risk Management Program
- Schedule planning
- Promote desired practices

Improving Detection and Recognition

- Failures in recognition
 - Pilots misidentify the meaning of the disruption
 - Emergence problem
 - Complexity/Novelty
 - Recognition Primed Decision Making (RPDM)
- Emergence problem
 - Probabilistic
 - Imagination
- Complexity
 - Develop sensitivity
 - Increased depth of assessment
 - Operational safeguards (limits)
- Recognition Primed Decision Making
 - “Bad side” of RPDM

Plan Selection

- Risk management is the key
- Woods, “...people balancing multiple goals will tend to act riskier than we want them to, or riskier than they themselves really want to.”

Plan Selection

- Failures with selecting the recovery plan
 - Pilots select the wrong plan – misplaced assumptions, selection error
 - Ultimately unavoidable
 - Promote process for correcting their error and selecting a better plan
- Mitigating plan selection error
 - Clear assumptions/Intentions
 - Available support assets
 - Supported in recovery process

Plan Selection

- Failures with selecting the recovery plan
 - Pilots select the wrong plan – misplaced risk assessment
- Risk management
 - RRM model
 - Better Briefing (Rethinking the Briefing)

Plan Selection

- Failures with selecting the recovery plan
 - Pilots refuse to change their original plan – plan continuation bias
 - Plan continuation bias
 - Empowered PM role and culture
 - Search for counterfactuals

Recovery Completion

- Failures in recovery completion
 - Pilot misapply the plan
 - Pilots unsure how to recover
 - Unique events
- Better plan execution
 - Team leadership/dynamics
 - RRM tools
- Who ya gonna call?
 - Open channels to Company
 - Team practiced in handling unique events



[alarm buzzing]

Questions?



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