



8-9 APRIL 2014

interchange

The Human Factors Analytical Tools Project

Key Technology-Related Human Factors Issues

- Inadequate operator understanding of the technology
- Sub-optimal physical design or location of the technology
- Sub-optimal information provision or feedback
- Distraction
- Attenuation to alarms
- Failing to act on an alarm
- Problems transitioning between different modes

Evaluating New Technology

Three analytical tools:

- Task analysis
- Situation awareness measurement
- Verbal protocol analysis

Plus resistance to technology

Task Analysis

Method:

Focus group
discussions

Observations/
think aloud protocol

Consult subject
matter experts re
top 5 goals

Categorisation/
identification of
goals and sub-goals

Time-consuming for
researchers
and participants

Recommendation:
Existing task analysis

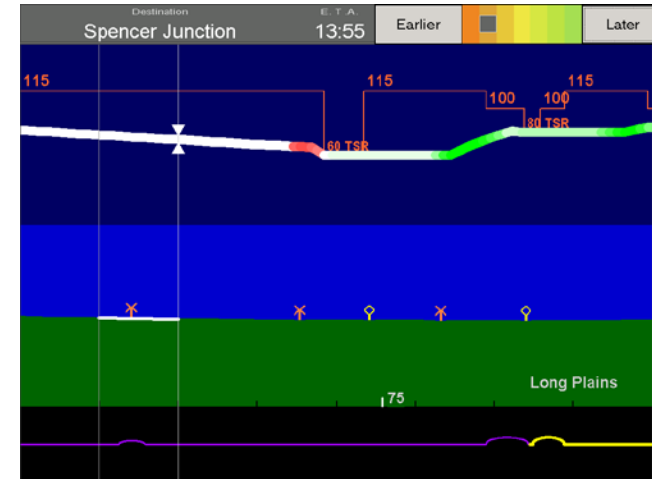
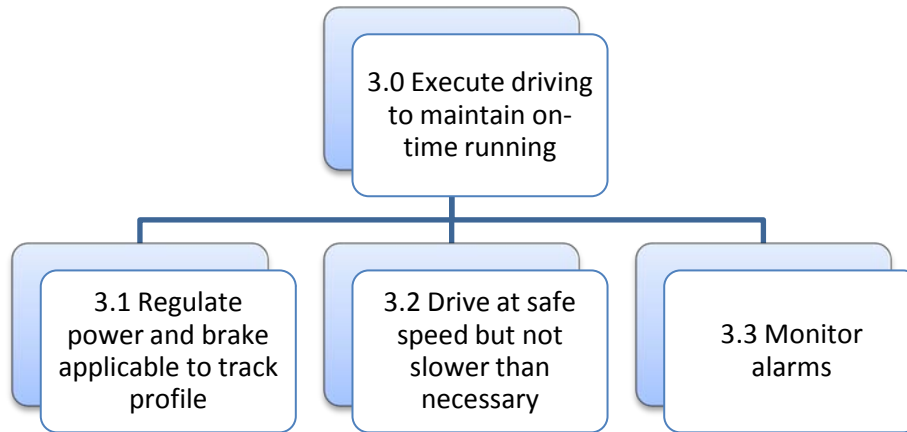
Subject matter
expert review

Modification
of task analysis

Completed
task analysis

Rose & Bearman, 2013

Evaluation using Task Analysis



Situation Awareness Measurement

SART



LETSSA



LETSSA

- Sound theoretical underpinning
- Real world application
- Predicts performance
- Predicts SAGAT
- Same questionnaire for all scenarios – real or simulated
- Simple scoring

Verbal Protocol Analysis

- Direct measure of situation awareness?
- Differences between participants
- Difficulties in coding
- Difficulties with inter-rater reliability
- What does it tell us?

Resistance to Technology

Similarities to other domains:

- Perceived usefulness/ease of use
- Perceived personal impact
- Individual characteristics
- Social influences
- Organisational factors

Resistance to technology

Rail specific characteristics:

- Tradition
- Pride

Minimising resistance

REFLECTIONS

READ MORE ABOUT MY RESEARCH IN ...

Making effective use of task analysis to identify human factors issues in new rail technology

Applied Ergonomics

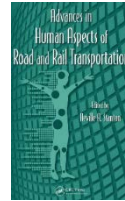
J.A. Rose, C. Bearman



An Evaluation of the Low-Event Task Subjective Situation Awareness (LETSSA) Technique

Human Aspects of Road and Rail Transportation

J.A. Rose, C. Bearman, J. Dorrian



Constructing and Evaluating the Low-Event Task Subjective Situation Awareness (LETSSA) Measure

Proceedings of the AAvPA Conference 2012

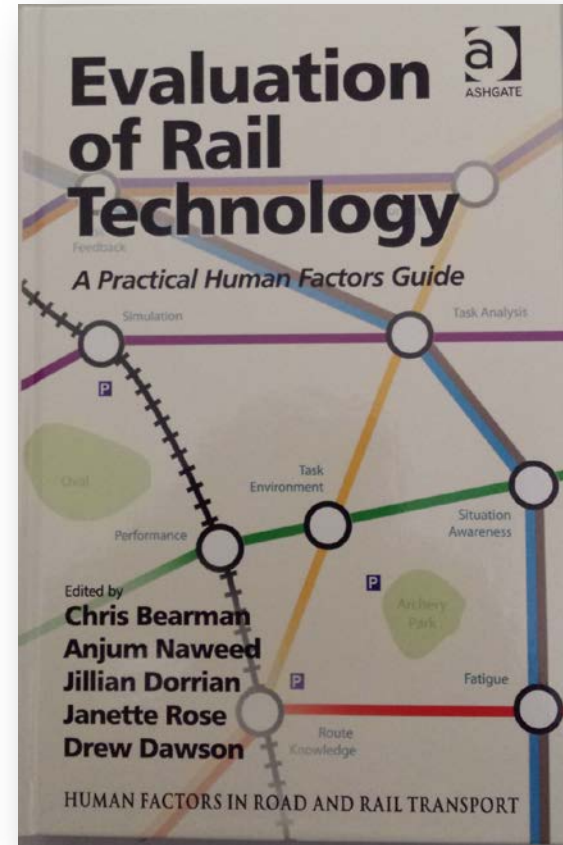
J.A. Rose, C. Bearman, J. Dorrian



Cease and resist! Exploring resistance to technology in the rail environment

Proceedings of the World Congress for Rail Research 2013

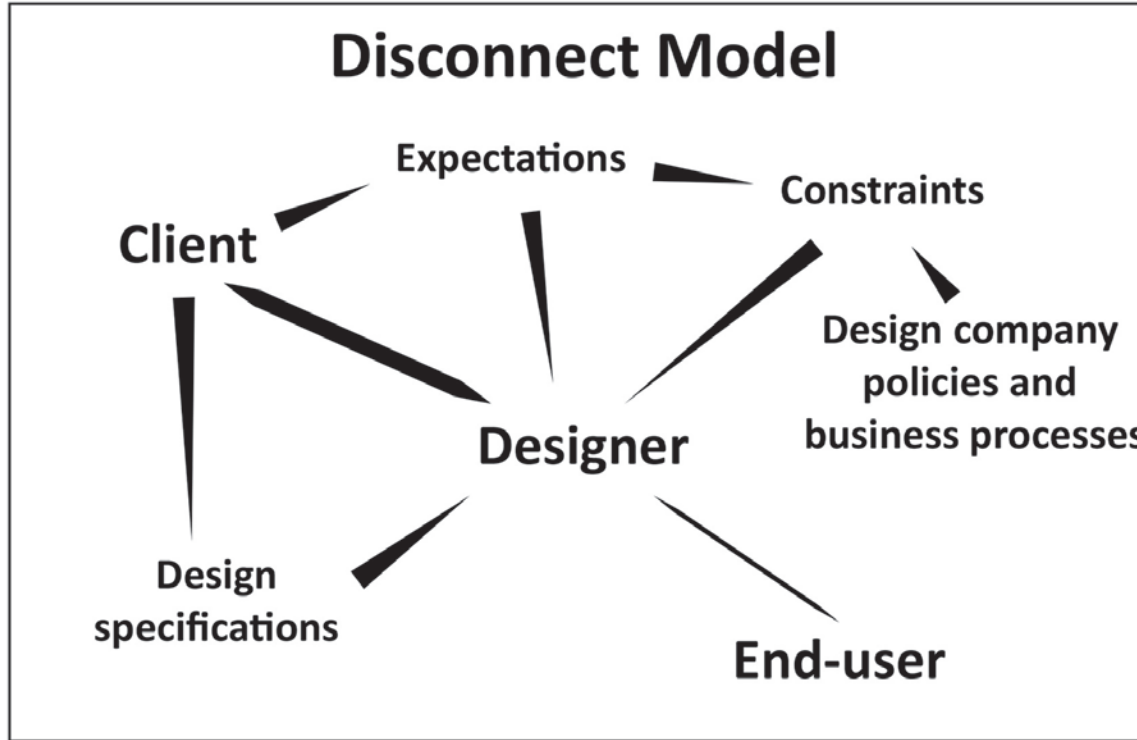
A. Naweed, J.A. Rose





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Designer/client/end-user Disconnect Model (Day 2013)

DREAM safety analysis tool

(Design Risk Error Avoidance Model - Day 2014)

Design process steps where safety hazards can occur:

1. Design Concept formation
2. Drafting specifications
3. Building, Constructing, Coding, Writing Business Rules
4. Testing
5. Deploying, Implementing
6. Training
7. Maintenance

DREAM safety analysis tool

Design Process audit

Staff training

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