Research Problem

When railway incidents occur, transport operators often struggle to get back to normal, and passengers complain of a lack of information.

Is this because the railway staff themselves lack information?

Are there fundamental and unresolved organisational and human factors issues affecting railways’ resilience to crises?

The challenges of recovery and resilience to incidents are worse for high speed rail services, due to:

- the speed of the trains themselves, so there is less time to resolve problems;
- the rapidity with which the effects of incidents can spread; and
- because of the complex interfaces of international services.

Lynne’s Research focuses on:

- The need for information. Many transport operators have a selection of decision support tools but these are not integrated and each provides only a partial picture of the situation. Lynne’s work with UK train operators has highlighted a number of needs for incident management – in terms of both information and the tools they use.
• Other operators, such as French railways, have created an integrated, statistically based decision support tool, called Excalibur, which is mainly used for incident tracking by their National Operations Centre. This uses data on past incident durations to predict the likely, best case and worst case incident duration, for a given incident type, line type and time.

Excalibur Decision Support Model

Does the population of a model such as Excalibur rely on a labour-intensive, centralised railway such as SNCF, or are there lessons to be learned that could assist with providing better incident support on other railways?

• Organisation human factors and their impact on recovery from incidents, using systems, risk based and resilience engineering techniques to evaluate organisations’ readiness. Case studies such as the Eurostar incidents of 18-19 December 2009 are a rich source of material for analysis.

Methodology

Identification of the problem has been undertaken through case studies and through literature review.

Literature study in the domains of resilience engineering and cognitive task design has also assisted Lynne in determining the operators’ and organisational requirements for incident readiness.
Assessment of organisations’ resilience to crises has been undertaken using a risk based assessment of each railway operators’ resilience for both its own incidents and its impact as an interfacing organisation. Further assessment will be undertaken to determine the effectiveness of improved, integrated information sources and decision support tools. This will be applied to international train operations to assess the usefulness – international train operations are currently changing rapidly as the regulations concerning open access by new train operating companies are evolving.
Programme

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<tr>
<th>Milestone</th>
<th>Actual / Planned Date</th>
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<tbody>
<tr>
<td>Part time (40%) PhD started</td>
<td>December 2009</td>
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<tr>
<td>Visits to SNCF and Eurostar</td>
<td>Jan – March 2009</td>
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<td>Visits to UK Train operators</td>
<td>April- May 2009</td>
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<tr>
<td>Research – train operation literature</td>
<td>2009-2010</td>
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<tr>
<td>Literature research – human factors and resilience engineering literature</td>
<td>2010</td>
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<tr>
<td>Assessment</td>
<td>2010-2011</td>
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<td>Further research into decision support tools</td>
<td>2011-2012</td>
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<tr>
<td>Application to international railway operators and refinement of research</td>
<td>2012</td>
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<tr>
<td>Thesis write up</td>
<td>2012-2013</td>
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Author background

Lynne graduated with an MSc. (Eng.) in Railway Systems Engineering from the University in Sheffield in 2001.

She is a Chartered Engineer, employed as a Principal Systems and Human Factors Engineer by Halcrow Group Ltd.

She has 28 years experience in control systems engineering, systems assurance and human factors, including 10 years’ work on the Channel Tunnel Rail Link project and 6 years with Eurotunnel. During her time there, she led the section of the Eurotunnel Inquiry into the Channel Tunnel fire of 18 Nov. 1996 which dealt with adequacy and compliance with procedures.

Publications


Collis L.M. 2009, “Building Railway Control Centres – Human-Centred Design” Lecture on the Ergonomics module of the MSc. (Eng.) in Rail Systems Engineering and Integration, University of Birmingham


Collis L.M. 2000, Inter-disciplinary Interfaces in Real-Time Control: Protecting Works Across Infrastructure Control Boundaries’ Thesis (MSc. (Eng.) in Rail Systems Engineering, University of Sheffield


Collis L.M. and Schmid F. 1999 Case Studies on Human Centred Design for Railways, IEE People in Control Conference, as above