# The development of the Organisational Culture Work Health and Safety Survey (OCWHaS)

Larissa CLARKSON, Verna BLEWETT, Jessica PATERSON and
Hayley ETHERTON

*Central Queensland University, Appleton Institute, Adelaide, South Australia, Australia*

**Abstract.** A key part of the *Keeping Rail on Track* project was to provide a tool to allow organisational assessment and self-reflection. Initially, the RSSB *Safety Culture Survey* was tested to ascertain whether it had applicability in Australian Rail. Results found that the survey was not appropriate in this context. This report reports on the testing of the *Safety Culture Survey* and the subsequent development of a new survey, the *Organisational Culture, Work Health and Safety (OCWHaS) survey*. The *OCWHaS* is currently undergoing refinement and testing for validity and reliability.

**Keywords.** Organisational Culture, Work Health and Safety, Survey

## 1. Introduction

The Australian rail industry is growing rapidly and currently employs over 40,000 people with an additional 60,000 employed in support industries (Australasian Railway Association, 2010). The industry is safety-critical, and the fiscal implications of rail-related incidents are estimated to be around $196 million per year (Department of Transport and Regional Services, 2003). Given the financial, personal and social costs of rail-related incidents, improving health and safety in the industry is crucial. The project, *Keeping Rail on Track*, aimed to improve work health and safety (WHS) outcomes by identifying good practice for the industry. An objective of this project was to provide the Australian rail industry with a means of assessing their organisational culture and WHS management practices. This would allow organisations to recognize the strengths and weaknesses in their organisational culture, as reflected in their WHS initiatives, and help them identify where attention and action are needed to improve WHS.

The current instrument used in Australian rail is the United Kingdom (UK) Rail Safety Standards Board (RSSB) *Safety Culture Survey (*Ackeroyd, 2007). However, it had not been tested in the Australian context. An initial aim of *Keeping Rail on Track* was to ascertain whether the RSSB survey could be applied to Australian Rail. This paper describes the process of testing the *Safety Culture Survey* in Australian Rail and the subsequent development of a new survey, the *OCWHaS survey*.

## 2. Methods

### 2.1 Participants
Participants were employees and contractors of three Australian rail organisations. The companies were from each of the three sectors of the industry; *Urban Passenger*, *National Freight*, and *Heavy Haul*. There were 456 valid responses to the *Safety Culture Survey*, 97

of these were employees in National Freight (response rate 28.5%), 145 were employees of Heavy Haul (response rate 43.9%), and 214 were Urban Passenger (response rate 31.1%). Participants were predominantly male (89.6%), reflecting the male domination of the industry. Over 27% of participants were 34 years and under, 25.3% were between 35 and 44 years, 28.3% were 45-54 years and 17.8% were over 55 years. The majority of the sample (49.6%) were operational employees, while 29.6% were management or professional staff. Finally, 15.1% were WHS professionals or workers' elected health and safety representatives (HSRs). Over 58% of participants had been in the industry for over six years at the time of taking the survey.

*2.2 Materials*

The RSSB *Safety Culture Survey* consists of 54 items and is used to assess safety culture in the rail industry in the UK. It was first launched in 2008 (Ackeroyd, 2007). The items are divided into 11 dimensions which fit within four modules. The 11 dimensions are shown in Table 1.

*Table 1.* Dimensions on the RSSB survey

| | |
|---|---|
| **Dimension 1** | Barriers and Influence |
| **Dimension 2** | Competence and training |
| **Dimension 3** | Communication |
| **Dimension 4** | Organisational commitment and attributes |
| **Dimension 5** | Senior management commitment |
| **Dimension 6** | Supervisor's rule |
| **Dimension 7** | Personal role |
| **Dimension 8** | Workmate's influence |
| **Dimension 9** | Risk taking behaviours |
| **Dimension 10** | Employee participation |
| **Dimension 11** | Organisational learning |

*2.3 Procedure*

The distribution of the survey differed depending on the operational requirements of the organisation. Each organisation was provided with a link to the online survey, and this was distributed to all staff whose email address was known to the organisation. The information contained in the email distribution of the survey matched the cover page of the hard copy of the survey.

In some organisations, paper-based surveys were distributed to all employees. In others, participants were able to obtain a copy of the survey after a short information session conducted by the researchers, often held during their usual meetings.

Participants could return the form in a number of ways to ensure anonymity: by handing the completed survey directly to the researchers; placing the survey in a locked box in their workplace; or mailing the survey to the researchers via reply paid envelopes.

## 3.   Results

A Confirmatory Factor Analysis (CFA) was conducted using IBM SPSS Statistics AMOS 20.  The initial analysis tested the 11 factor model, which was evaluated statistically through goodness-of-fit indices. While the RMSEA, SRMR and $\chi^2$/degrees of freedom

ratios were all acceptable, the model itself was significant and the GFI was under .9 ($\chi^2$ (1322) = 2995.5, $p < .001$; $\chi^2/df$ = 2.27; GFI = .79; SRMS = .06; RMSEA = .05). The standardized factor loadings were low, with 12 under .5 indicating a poor fit. Item 15 "Some safety procedures/instructions/rules are not really practical", item 29 "Some safety procedures/instructions/rules do not reflect how the job is done", item 34 "Some safety procedures/instructions/rules do not need to be followed to get the job done safely" and item 38 "Some jobs here are difficult to do safely" all had low factor loadings (<.5) on Dimension 1 *Barriers and Influence*. These items were removed to see whether this would improve model fit, despite the fact that removal of these items would leave Dimension 1 with only two questions. Removal of these items did not improve model fit. Item 1 "Sometimes I am uncertain how to do a job safely", item 16 "My safety is more important to me than "getting the job done" and item 30 "I have responsibilities for the safety of my colleagues" all had low factor loadings on Dimension 7 *Personal Role*. Removal of these items did not improve model fit, and would leave this factor with only one latent variable. Item 2 "Not all the safety procedures/instructions/rules are followed here", item 4 "People here wear their 'Personal Protective Equipment (PPE) when they are supposed to", and item 12 "I sometimes hear about others taking shortcuts" all loaded <.5 on Dimension 9 *Risk-taking behaviours*. Again, removal of these questions would only leave this dimension with one question, and analyses revealed that removing these questions would not significantly improve model fit. Modification indices also did not indicate any area for improvement of the model. This suggests that the *RSSB Safety Culture Survey* is not a good fit, at least for this cohort.

An Exploratory Factor Analysis (EFA) using principal axis factoring with varimax rotation with Kaiser Normalisation was conducted to examine the underlying factor structure for the survey in the Australian rail industry. Eleven factors (with Eigenvalues exceeding 1) were identified as underlying the survey. Examination of the rotated component matrix showed that 26 of the 54 items loaded on the first factor. Further, for two of the additional factors there was only a single item, and these cross loaded with other factors. With the exception of a few items, Dimensions 1, 2, 6, 7, and 8 were extracted clearly from the factor analysis. No other clear structure was able to be identified from the remaining items.

## 4. Justification for the development of a new instrument

Together, the results of the factor analyses suggest that the RSSB *Safety Culture Survey* in its current form is not applicable in the Australian context. This may be due to differences in the culture of Australia versus the UK, or differences in the nature of the rail industry in both countries. Some questions were not reliable indicators of the pre-defined dimensions but removal of these would lead to a reduction in the content validity of the survey. Examination of the items also indicated that some were not worded in a way that would allow consistent interpretation of the result. For instance, responding 'agree' or 'strongly agree' to the item "Sometimes I am uncertain how to do a job safely" does not indicate the cause of the issue. It may be a lack of appropriate training, those individuals may be in an inappropriate role, or there is a lack of appropriate or practical procedure. Based solely on responses to this question, organisations would be unable to identify the most appropriate solution. During the analysis of qualitative data the *10 Platinum Rules,* that had been deduced from research in the mining industry (Shaw et al., 2008), were used as an analytical framework. It was identified during the qualitative analysis (see Paterson, Blewett, Rainbird and Etherton, this edition) that some aspects of organisational culture and WHS were not within the scope of the RSSB survey. For instance, analysis of the

qualitative data revealed that aspects such as mindfulness (Weick & Sutcliffe, 2001) and demand and control (Karasek, 1979), were not being addressed by the current survey. It was hypothesized that the *10 Platinum Rules* may show better applicability in rail, given the similarities between the two industries. This was confirmed qualitatively in the research as outlined in the Paterson et al. (this edition) paper.

## 5. Development of a new survey – The Organisational Culture Work Health and Safety Survey

A new survey was proposed that would incorporate some of the high performing items from the RSSB survey as well as questions from the *Digging Deeper* survey (Shaw et al., 2008), the *Copenhagen Psychosocial Questionnaire (COPSOQ) II* (Pejtersen, Kristensen, Borg, & Bjorner, 2010), questions proposed by Weick and Sutcliffe (2001) to assess mindfulness.

Questions from these sources were added to a pool of available items. These items were then grouped under each of the *10 Platinum Rules* (Shaw et al., 2008) via an iterative process that aimed to identify at face-value the more appropriate items for each rule. This left some rules with no questions that adequately addressed that rule. In these instances, new questions were generated by the research team. The *10 Platinum Rules* are shown in Table 2.

*Table 2. The 10 Platinum Rules*

| | |
|---|---|
| **Rule 1** | Put people first |
| **Rule 2** | Consult and communicate |
| **Rule 3** | Don't let issues fester |
| **Rule 4** | Rationalize paperwork and systems |
| **Rule 5** | Develop skills in work health and safety |
| **Rule 6** | Hear bad news |
| **Rule 7** | Fix your workplace first |
| **Rule 8** | Manage hazards |
| **Rule 9** | Monitor performance |
| **Rule 10** | Apply resources |

We have called the new survey the *Organisational Culture Work Health and Safety* (*OCWHaS*) survey to indicate that it is an examination of the nexus between organisational culture and work health and safety. It has 117 questions split into five sections. The first section (Section A) collects demographic information and information about the participant's position in the industry. This section can be tailored to suit the organisational structure and work groups within each organisation. The second section, Section B asks about the workplace. Responses are collected on a 6-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Participants can respond "Don't know" and this is coded as 0. Some questions are negatively worded to identify response bias. The third section (Section C) also gathers information about the workplace but responses are collected on a 6-point Likert scale that ranges from 1 (Never/Hardly Ever) to 5 (Often). Again participants have the option of responding 0 (Don't know). The fourth section (Section D) is about incident assessment. Participants are asked to indicate the order in which management assesses the cause of an incident. The final section (Section E) is an

open space where participants can write any comments they have. This allows for limited qualitative analysis of employees' WHS and organisational culture issues, and gives them a platform to voice their opinions.

## 6.  Discussion and Conclusion

The results showed that the *RSSB Safety Culture Survey* was not an appropriate fit to the Australian rail industry. In response, a new survey, the *OCWHaS* survey has been developed. This survey is based on the *10 Platinum Rules*, which had emerged from the mining industry and were hypothesized to have applicability in a rail context.  The survey is long and has many duplicate questions. The issue is which questions should remain in the survey and which should be removed. To refine the survey we must administer it and then perform analyses on the performance of each of the questions.

While we can be sure that the survey has face validity, given that the questions have been taken from existing surveys and the survey is grounded in the findings of *Keeping Rail on Track*, we are unsure whether the survey is reliable and has construct validity. A project is now underway to assess the validity and reliability of the survey by administering the survey to members of the Australian rail industry. Reliability will be assessed through a factor analysis. Construct validity will be determined via convergent and divergent validity with other established measures. Participants will not only complete the *OCWHaS*, but also the *COPSOQ II* (short questionnaire) and the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985). If responses on the *OCWHaS* survey correlate well with responses on the *COPSOQ* then we can demonstrate that the survey has convergent validity. The Satisfaction with Life Scale is a 5-item instrument of overall satisfaction with life that is considered to be distinct from Organisational Culture, and WHS (Diener et al., 1985). Therefore it would be predicted that scores on the Satisfaction with Life Scale will not correlate highly with scores on the *OCWHaS* survey and this would provide evidence of discriminant validity. Future research should look at obtaining further evidence of construct validity by collecting qualitative data via focus groups and interviews with rail employees in parallel with administering the *OCWHaS* survey.

**References**
Ackroyd, P. (2007). RSSB Safety Culture Toolkit Project Final Report T397. London, UK: Rail Safety and Standards Board Ltd.
Australasian Railway Association. (2010). Australian Rail Industry Report 2010. Canberra, Australia: Australasian Railway Association.
Department of Transport and Regional Services. (2003). Rail accident costs in Australia 2003. Canberra, Australia: Australian Government: Department of Transport and Regional Services.
Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49,* 71-75.
Field, A. (2009). *Discovering statistics using SPSS*. London, UK: Sage publications.
Karasek, R. (1979). Job demands, job decision latitude and mental strain: Implications for job redesign. *Administrative Science Quarterly, 24*, 285–307.
Pejtersen, J. H., Kristensen, T. S., Borg, V., & Bjorner, J. B. (2010). The second version of the Copenhagen Psychosocial Questionnaire. *Scandinavian Journal of Public Health, 38*(3), 8-24.

Shaw, A., Blewett, V., Stiller, L., Aickin, C., Cox, S., Ferguson, S., & Frick, K. (2008). Digging Deeper: Wran Consultancy Project Final Report (two volumes). Sydney: NSW Mine Safety Advisory Council.

Weick, K. E., & Sutcliffe, K. M. (2001). *Managing the unexpected: assuring high reliability in an age of complexity*. San Francisco: Jossey-Bass.