

**National Center for Intermodal Transportation** A Partnership Between the University of Denver and Mississippi State



Final Report

## Development of a Selection Tool for use in the Identification, Recruitment & Retention of Safe Intermodal Transportation Workers

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Innovators in intermodal transportation education, research, and technology transfer.

### **Executive Summary**

A total of 486 transportation employees employed by a major railroad completed a series of tests constructed for this project. These tests or instruments included the Denver Lifestyle Questionnaire, a performance rating scale called the Employees Quality Measure Scale and also several tests published y commercial authors include the Safety Attitude Test (AON Consulting), Mechanical and Abstract Reasoning Tests from the Differential Aptitude Test (Pearson Publishing), and a the Web Neuro Test, brief Neuropsychological Screening instrument. Total completion rates for the various tests were as follows:

- 346 completed the Denver Life Style Questionnaire
- 354 on whom the EQMS Scores were available
- 194 AON tests
- 92 DAT tests
- 50 Web-Neuro test

Employee test scores were obtained and correlated with performance indicators from the EQMS instrument. Results of the analyses revealed that:

- Components of the EQMS performance scale were not correlated with the number of person injuries recorded in the data base scores component measures not correlated with person. However the total EQMS score was correlated with the number of with Derailments, Decertifications, Absenteeism, Total incidents, and the injury Frequency Index
- EQMS performance scale scores were significantly correlated with scores on the DAT Spatial Reasoning test.
- Employee number of personal Injuries was significantly correlated with scores on the personality scale of Conscientiousness and Neuroticism
- Total number of employee Decertifications was significantly correlated with spatial relations and safety orientation (r=.205, p<.03).
- Total number of Derailments was significantly correlated with behavior and attitudinal predictors reflecting physical and mental distractibility and activity, possibly indicating a characterological pattern of lack of concentration or distractibility.



- Distractibility significantly correlated with Reaction Time and Digit Span Trials Correct
- Absenteeism significantly correlated with four items from the DLSI

#### Introduction

At the Federal Transit Administration's (FTA) recent (March 11, 2009) working conference on safety culture and workforce development in Arlington, VA; managing human capital, retaining, recruiting, training, and developing competent managers and the need for valid assessment tools to identify deficits in human capital in intermodal transportation agencies were identified as critical workforce development needs. Indeed, there is growing consensus on the desire for more sophisticated assessment tools to address current workforce development deficits. As the demand for transportation continues to increase dramatically amidst the current population boom and reliance on intermodal transportation services, an estimated 40 to 50 percent of the existing local, state, and federal transportation workforce near retirement (Martin, 2001). These "baby boomers" lead at all levels of the transportation industry and little succession planning has been done to address future shortages of competent managers and other personnel (CTC & Associates LLC). Recently, Sen. George Voinovich, R-Ohio estimated that by 2010 approximately 600, 000 employees will retire (U.S. Dept. of Transportation). Further, the Federal Highway Administration (FHWA) reported that 45 percent of its workforce will be eligible to retire by 2010 (Martin, 2001). In order to meet the demands of the future shortages of competent employees, and manage the changing work force climate seen in transportation agencies today, the transportation industry must adapt their training, recruiting, and managing practices. Development of a valid selection tool for entry level employees would greatly enhance the ability of transportation companies and agencies to identify personnel with the potential to competently and safely perform the duties required of those in the transportation industry. Thus, the purpose of this study is to develop a valid and reliable selection tool based on interview and survey data for new and current employees in the intermodal transportation industry.

An article in the Indianapolis Star reported that "U.S. railroads expect to hire 80,000 workers nationwide over the next six years."<sup>1</sup> According to the Association of American

<sup>&</sup>lt;sup>1</sup> http://www.railjobs.com/railroadjobnews/news2.html

Railroads (AAR) railroads employed 221,000 workers in 2003. Some in the field believe that the industry is growing which is reflected in the fact that intermodal freight has been increasing and many see intermodal as one of the key growth areas. Intermodal rail service moves truck trailers or containers by rail from other modes of transportation. In fact, according to Tom White of the Indiana Railroad Association "Intermodal traffic surged from 3 million units in 1980 to more than 10 million this year", White said. The industry is almost up 9 percent compared to last year", he said.<sup>2</sup>

Due to changes in the Railroad Retirement Act that reduced the age that workers with 30 years of experience could receive full benefits more workers are retiring, this change will result in the need to recruit and hire many more new employees. CSX, based in Jacksonville Florida has estimated that it will hire nearly 4,500 workers through 2005, while Virginia-based Norfolk Southern expects to hire about 2,000 people a year over five years. Railroad employment peaked in 1944 with 1.7 million workers.<sup>3</sup>

Historically, the railroad industry went through a 20-year period of no significant hiring, White said. "Technology allowed the railroads to eliminate a lot of jobs to improve efficiency," he said. The number of Class I employees decreased by about 50 percent from 1980 to 1990. Even with the projected thousands of new workers, though, the number of total railroad workers will continue to decrease, according to a June report by the U.S. Railroad Retirement Board. "What it will boil down to (is) 110,000 will leave, 80,000 will replace them," said Jim Metlicka, public affairs specialist for the board. Despite such declines, railroads are searching for new talent.<sup>4</sup> Many companies have resorted to outside vendors to assit in the hiring process. AMDG Inc., an Atlanta-based recruiting and training company, conducts testing and interview sessions for CSX. In addition, Norfolk Southern looks for employees with good attitudes and

<sup>4</sup> Ibid.

<sup>&</sup>lt;sup>2</sup> http://www.railjobs.com/railroadjobnews/news2.html

<sup>&</sup>lt;sup>3</sup> Ibid.

experience, as well as wanting "the people we hire understand the need to be safe, not reckless in their duties."<sup>5</sup>

A valid, reliable and cost effective selection tool would be useful for several reasons. The most important reason is to identify individuals who can perform jobs in the intermodal transportation industry competently. Many individuals are selected on the basis of interviews that subsequently wash out of on-the-job training programs because they do not have the temperament, the cognitive ability, or the interest in working in the 24-7 transportation industry. In addition, the personal preferences and values choices of individuals can come in conflict with the demands and requirements of the working in the transportation industry. A second reason has to do with the fact that many individuals have the ability and the interest and the temperament for the job but also have characteristics which can contribute to accidents and injuries on the job such as distractibility, lack of vigilance, and other key characteristics. A recent report (FHWA, 2004) identified several factors that contribute to unsafe behavior and accidents in the transportation industry. The authors recommended systematic hiring, driver selection tests, behavior based safety, and driver self management as tools and techniques for reducing these events. In addition, the study also concluded that aggressiveness, impulsivity, risky-behavior, job dissatisfaction, sleep disorders, heart or medical conditions, introversion, depression were some of the other factors that could contribute to accident occurrence. Consequently, the present study hopes to build upon these recommendations in developing tools that can be used to improve safety in the entire intermodal transportation industry.

Based on these reports and their recommendations it would seem that an initial effort at development would include the administration of a battery of exploratory instruments tests and measures that can assess the gamut of the factors contributing to safety and performance in vehicle drivers to determine their effectiveness and validity with a population of intermodal transportation workers.

<sup>&</sup>lt;sup>5</sup> Ibid.

There are two main purposes of this study; 1) to develop a reliable and valid instrument for use in the selection and hiring of intermodal transportation workers such as railroad engineers, truck drivers, etc., and 2) to develop a reliable and valid instrument that will be useful in determining who would be a safe and productive employee with limited risk of accidents and health related concerns. The development of a tool for selecting employees with reduced safety risk, increased probability of competent job performance, better health behaviors and longer job tenure in the intermodal transportation industry would be a significant contribution to the field. As a result of an aging workforce and a decline in the ability of the transportation industry to attract and retain high functioning executive's additional tools are needed to be able to identify the most promising individuals for the industry. It is proposed that an assessment battery consisting of cognitive, personality, behavioral, and neurobehavioral measures be administered to a sample of individuals within the industry to establish initial utility, reliability and concurrent validity.

The proposed study relates to intermodal transportation workforce development. More specifically, the orientation is toward the development of a competency model for executives in all branches of transportation. The project relates to both new hires and potential executives in both the passenger and freight industries. Further, the project involves contributions that will improve the safe and efficient operation of the intermodal transportation system.

#### Method

#### Participants

The participants for this study will consist of currently employed intermodal transportation workers from a large nationally based transportation provider. Participants will have been successfully employed and certified to have passed all hiring and selection criteria.

#### Procedure

After consultation with appropriate hiring authorities, human resources, and management study participants will be invited to complete a battery of psychological tests and to also complete a detailed work history and biographical and demographic questionnaire. These instruments and the data from them will then be cross referenced and compared with existing employee work history that includes, demographics and reports of performance including injuries, citations, absenteeism and other relative data.

#### Measures

Several Measures were employed in this study to gather historical, performance, attitudinal and behavioral characteristics of the study participants. These measures were in some cases constructed for the specific study and in other cases purchased from test publishing companies.

### Differential Aptitude Tests

The Differential Aptitude Tests for Personnel and Career Assessment (DAT for PCA) are a series of assessments designed to measure an individual's ability to learn or to succeed in a number of different areas such as mechanical reasoning, verbal reasoning, numerical reasoning, and space relations.

All of the DATs are timed, multiple-choice tests with time limits ranging from 12 to 25 minutes. These assessments can be used individually or administered as a battery of tests.<sup>6</sup>

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 $www.shrm.org/templatestools/assessment resources/shrmtestingcenter/products/psychcorp/pages/dat.aspx\#sthash.X6PZ1XIy.dp\ uf$ 





Figure 1. Sample Abstract Reasoning Item.

The Abstract Reasoning Test is a non-verbal measure of reasoning ability. It involves the ability to think logically and to perceive relationships in abstract figure patterns. It is comprised of 30 multiple-choice items and has a 15 minute time limit.



Figure 2. Sample Mechanical Reasoning Item.

The Mechanical Reasoning Test measures the ability to understand basic mechanical principles of machinery, tools, and motion. The items represent simple principles that involve reasoning rather than specialized knowledge or training. It is comprised of 45 multiple-choice

items and has a 20 minute time limit. The questions on the test portray simple principles which involve reasoning instead of something that requires specialized training or knowledge. This test assesses one's ability to comprehend basic mechanical principles of motion, tools, and machinery.



Figure 3. Sample Spatial Relations Test Item.

The Space Relations Test measures the ability to visualize a three-dimensional object from a two-dimensional pattern and to visualize how this object would look if rotated in space. It assess the ability to "think in three dimensions." It is comprised of 35 multiple-choice items and has a 15 minute time limit.

### AON Work Practices Test

Aon Hewitt's Workplace Practices test is designed to predict the safety behavior of job candidates. This test targets propensity to take risks, impulsiveness, beliefs about controllability of accidents, desire to focus on following rules and doing things correctly, general responsibility, and work ethic. Organizations in a wide range of industries have implemented and validated the test since Aon Hewitt's original validation efforts. Data show that certain characteristics predispose workers to consistently experience more workplace injuries and illnesses. For example, individuals who are more conscientious are more careful, thorough, and focused on avoiding mistakes, and experience fewer workplace accidents. In addition, individuals who are more risk averse and apt to follow rules are less likely to ignore or short-cut safety procedures. Finally, individuals who take personal responsibility for their own actions also tend to be more likely to look out for their own safety and the safety of coworkers. New employees are particularly prone to workplace injuries and illnesses. Specifically, employees with less than three years of tenure in an organization account for approximately 50% of workers' compensation claims, while employees with less than one year of tenure are over three times more likely to file a workers' compensation claim than employees with more tenure.

#### WebNeuro

An objective assessment of cognitive strengths and weaknesses, backed by the world's largest brain database, delivered online and reported instantly.

Available to clinicians and employers, WebNeuro is the only product of its kind available on the web which provides an accurate and objective assessment of person's cognitive function and efficiency, compared to the normal standards as found in the Brain Resource database.

The assessment takes approximately 30 minutes and the completed report is then provided within minutes to the individual's clinician, providing detailed analysis of cognitive strengths and weaknesses.

#### **Employee Quality Measurement Scale (EQMS)**

This measure was a composite of several components of the employee work history record maintained by the company. It included reports and frequencies of accidents, incidents, absenteeism and rule violations leading to engineer decertifications and the like. A total score was computed from all of these indicators to reflect the overall employee quality index.

## Results

### **EQMS Scores**

The EQMS scores were obtained from the historical data available on study participants. Interestingly, the EQMS score, which are a composite of all indicators, was not significantly correlated with personal injuries.

Results of the assessment battery indicate that there are only three measures that have a significant correlation with the EQMS Score: Spatial Reasoning (r=-.240, p<.014), not preferring midnight work (r=-.093, and having a preference for competitive fringe benefits (r=.251, p<.001).

	EQMS	P<	N
Verbal Reasoning	ns		83
Mechanical Reasoning	ns		83

Spatial Reasoning	240	.014	83
Risk Aversion	ns		192
Safety Orientation	ns		192
Work Orientation	ns		192
q12. Starts quarrels with others	ns		338
q25. Is inventive	ns		338
q51. It's inevitable, I will probably get injured or have an accident at			
work.	ns		338
q62. I like working midnights	093	.044	338
q74. Competitive fringe benefits are important to me in my job	.251	.001	328

Multiple regression analysis reveals that only Spatial Reasoning makes a sufficiently strong contribution to the overall variance to warrant its inclusion in a predictive equation.

Further analysis of the other performance measures with the EQMS score shows that the other measures have significant relationships with EQMS with the exception of Personal Injuries. Given that the correlations between the other measures and EQMS are low it will make more sense conceptually to develop prediction equations, and therefore selection batteries that predict the individual performance measures.

					Total Incident	Frequency	EQMS
		Derailments	Decerts	Absenteeism	Count	Index	Score
Personal Injuries		037	.114 <sup>*</sup>	065	.821**	.293**	007
Derailments			028	.058	.276**	.484**	321**
Decertification				.065	.349**	.231**	534**
Absenteeism					.383**	.611**	200**
Total # Incidents						.686**	306**
Frequency Index							347**

Table 1. Correlation Between Performance Indicators and EQMS Score (n=354)

\*. Correlation is significant at the 0.05 level (1-tailed).

\*\*. Correlation is significant at the 0.01 level (1-tailed).

No significant correlations were obtained between any of the measures on the Web Neuro Battery and the EQMS scores. However it should be noted that there were only n=49 observations for some of the correlations.

### **Personal Injuries**

A number of significant correlations were obtained between scales on the Denver Lifestyle Inventory and the personal injury indicator. As can be seen in Table 2 there were quite a few correlations. The combined summary scores of Conscientiousness and Neuroticism were also significant predictors of the scores on the Personal Injuries Scale.

It should be noted that Personal Injuries scores increase with increasing longevity in the position. In other words, there is a risk associated with simply being on the job longer that is associated with a higher number of personal injuries. Consequently, this measure may have some as yet undetermined confounds.

	Personal Injuries
q4. Is depressed, blue	.115 <sup>*</sup>
q13. Is a reliable worker	099*
q14. Can be tense	.095 <sup>*</sup>
q19. Worries a lot	.106 <sup>*</sup>
q29. Can be moody	.138**
q38. Makes plans and follows through with them	121 <sup>*</sup>
q56. I believe that I will be able to prevent an accident from occurring to me.	.148**
q60. I have no problem with working 14 days straight.	.113 <sup>*</sup>

Table 2. Correlations Between Measures and Personal Injuries (n=338)

q62. I like working midnights	.125 <sup>*</sup>
q63. My spouse or partner is ok with me working midnights.	.098*
q65. I prefer to lay off from work for family events if they are important.	155**
q66. My family resents the amount of time I am away from home.	171**
Conscientiousness (Summary Score)	090*
Neuroticism (N7) (Summary Score)	.145**

\*. Correlation is significant at the 0.05 level (1-tailed).

\*\*. Correlation is significant at the 0.01 level (1-tailed).

The gradually increasing line in Figure 1 shows that the number of injuries increases at an increasing rate over time from 0-5 years of employment to greater than 20 years of employment broken down by 20 percent intervals of frequency of years of employment.



Figure 4. Personal Injuries and Job Tenure.

### Web Neuro Battery

Several significant correlations were obtained between the Web Neuro Battery – Total Immediate Recall test (a memory recognition test summing the total number of recognized words over three trials) and the Personal Injury Scores. In addition there were significant correlations between successful completion of the Maze test on the Web Neuro inventory and number of

personal injuries (Maze learning time' or time taken to the end of the final trial with at least one error- just before successfully completing the maze without error twice consecutively). However it should be noted that there were only n=51 observations for some of the correlations. Also of interest, the combined set of variables, entered simultaneously into a regression equation does result in a significant prediction of personal injuries ( $R^2 = .083$ , F(14, 323) = 2.084, p<.012). The most significant predictors in the set of variables appear to be related to family concern for the employee and the presence of safety locus of control (items 66 and 56 respectively). Based on these results it is recommended that a Conscientiousness and Neuroticism measure be included in the selection assessment battery.

## Decertification

The Decertification score was correlated with a number of the other key predictors in the assessment battery. Table 3 shows the results of the correlations. As can be seen

	Decerts	P<	N
Verbal Reasoning	.263**	.008	83
Mechanical Reasoning	.262**	.008	83
Spatial Reasoning	.421**	.000	83
Risk Aversion	.078	.141	192
Safety Orientation	.146 <sup>*</sup>	.022	192
Work Orientation	.024	.372	192
q12. Starts quarrels with others	108 <sup>*</sup>	.023	338
q25. Is inventive	.094 <sup>*</sup>	.042	338
q51. its inevitable, I will probably get injured or have an accident at work.	.104 <sup>*</sup>	.027	338
q62. I like working midnights	.139**	.005	338
q74. Competitive fringe benefits are important to me in my job…	145**	.004	328

Table 3. Correlations between assessment measures and Decertifications.

All of the measures in Table 3 are significantly related to the occurrence of Decertifications. Interestingly, when we look at persons who have only been working for 8 years or less the correlation between spatial relations (r=.309, p<.02), safety orientation (r=.205, p<.03), is significant. The relationships are nearly doubled in the group of workers who have worked more than 19 years suggesting that these factors influence job performance in even experienced personnel.

The results are less clear with respect to the relative or comparative effectiveness or predictive power of the measures due to the fact that there fewer subjects to study as not all participants completed all of the measures. The comparative results are shown in Table 4, and indicate that there is a significant overall prediction of the occurrence of Decertifications ( $R^2$ )

=.345, df = 36, F(6,30) = 2.637, p<.036). However, the variable that contributes the most is Spatial Relations (t=3.502, p<.001).

-		Unstandardize	ed Coefficients	Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	.148	.837		.177	.860
	SR	.041	.012	.535	3.502	.001
	Risk A	011	.018	123	616	.543
	Safety O	.004	.014	.054	.291	.773
	q12. Starts quarrels with others	182	.146	238	-1.249	.221
	q51. its inevitable, I will probably get injured or have an accident at work.	102	.138	130	735	.468
	q62. I like working midnights	.065	.070	.144	.924	.363

Table 4. Regression Coefficients <sup>for</sup>	<sup>or</sup> the Prediction Decertification.
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a. Dependent Variable: Decerts

Thus, it is recommended that the Spatial Relations Reasoning test be included in a selection battery.

### Derailments

A number of measures in the assessment battery were significantly associated with the number of derailments reported in the work history. As can be seen in Table 5 the majority of these indicators were derived from the Denver Life style Inventory (DLSI). In the interest of simplicity and to reduce the number of variables depicted to a more manageable number, the correlation matrix is omitted here and only the results of the regression analysis are presented. Results of the stepwise analysis of variance resulted in a six-step procedure which identified six main variables that were significantly predictive of the occurrence of derailments. These predictors were largely behavior and attitudinal and consist of items apparently reflecting

physical and mental distractibility and activity, possibly indicating a characterological pattern of lack of concentration or distractibility. In addition, the results also identify the impact of family considerations. Taken together these measures accounted for nearly 10% of the variance in reported derailments (R2=.091, F(6,331)=5.512, p<.000).

Also of interest is the fact that there is a significant difference in the number of derailments depending upon the length of time with the railroad. Derailments increase after the first five years and then decline gradually. (see Figure 2). The graph shows a slight rise in derailments as the individual approaches 30 years on the job. This data reflects two issues. First, persons who have a derailment during the first few years of working are unusual. This may reflect the lack of opportunity due to lack of seniority or other factors.



Figure 5. Derailments over time of employment.

Nevertheless, the assessment selection battery data are fairly robust with statistically significant results and large N's. The results suggest that personality factors may play a fairly large role in the prediction of these events.

		Unstan Coeff	dardized icients Std.	Standardized Coefficients		
Model		В	Error	Beta	t	Sig.
6	(Constant)	.856	.232		3.692	.000
	q43. Is easily distracted	.051	.027	.107	1.908	.057
	q63. My spouse or partner is ok with me working midnights.	067	.022	169	-3.066	.002
	q65. I prefer to lay off from work for family events if they are important.	058	.024	129	-2.366	.019
	q1. Is talkative	047	.022	113	-2.141	.033
	q42. Likes to cooperate with others	079	.038	117	-2.112	.035
	q41. Has few artistic interests	.043	.020	.111	2.080	.038

Table 5. Regression analysis predictors of Derailments in work history.<sup>a</sup>

a. Dependent Variable: Derailments (Human Factor)

Table 6. Significant Correlations of Web Neuro Measures with Derailments				
	Derailments (Human Factor)			
Digit Span Trials Correct	.293*			
Digit Span Forward	.241 <sup>*</sup>			
Attention and Concentration - Reaction Time	343**			
Info Processing Efficiency - Switching	291 <sup>*</sup>			
Choice Reaction Time	264*			
Maze Completion Time (emzcompk)	249*			
Maze – Path Learning Time (emzinitk)	244 <sup>*</sup>			
Emotion Recognition - Fear Faces	.257 <sup>*</sup>			
Emotion Recognition - Sad Faces (gettsdS)	.237 <sup>*</sup>			
Delayed Emotion Recognition – Avg Response Time -(dgtstrt)	254 <sup>*</sup>			
Delayed Emotion Recognition – Fear – (dgttrtF)	263 <sup>*</sup>			

Tabla 6	Significant	Corrolations	of Wob	Nouro	Moseuroe	with	Dorailmonte
i able o.	Significant	Correlations		neuro	weasures	with	Derailments

Delayed Emotion Recognition – Anger -(dgttrtA)	259 <sup>*</sup>
Delayed Emotion Recognition – Disgust - (dgttrtD)	247 <sup>*</sup>

\*. Correlation is significant at the 0.05 level (1-tailed).

\*\*. Correlation is significant at the 0.01 level (1-tailed).

When these variables are compared to each other and entered simultaneously in the regression analysis only two of the measures have sufficient strength to warrant inclusion in the final stepwise equation, namely Reaction Time (t=-2.88, p<.006) and Digit Span Trials Correct (t=2.56, p<.014). Again, both of these are measures of distractibility and concentration, plus, for Digit Span, short-term immediate memory.

Taken together these Web Neuro Measures suggest a strong distractibility component affecting the occurrence of Derailments. Therefore, it is recommended that the assessment selection battery include a personality measure of distractibility. The Web Neuro Digit Span test could be used but its practicality will be an issue.

## Absenteeism

The following table shows the results of the correlation of the various measures with Absenteeism. The majority of the measures reaching significance were from the DLSI.

	Absenteeism
q2. Tends to find fault with others	103 <sup>*</sup>
q3. Does a thorough job	095*
q13. Is a reliable worker	175**
q23. Tends to be lazy	.218**
q46. All accidents are preventable.	107 <sup>*</sup>
q50. People have a responsibility to inform their co-workers if they believe that	.090*
work is being done unsafely.	
q51. its inevitable, I will probably get injured or have an accident at work.	.115 <sup>*</sup>
q60. I am ok with not laying off or having a rest day in a 14 day period. I have	.131**
no problem with working 14 days straight.	
q66. My family resents the amount of time I am away from home.	114 <sup>*</sup>
q84. To what degree do you prefer a job that has activities that involve IDEAS	093*
THINKING AND PROBLEM SOLVING?	
Conscientiousness	093 <sup>*</sup>

Table 7. Correlations of measures with Absenteeism.

\*. Correlation is significant at the 0.05 level (1-tailed).

\*\*. Correlation is significant at the 0.01 level (1-tailed).

Results of the regression analysis of these variables produced a significant equation with four measures from the DLSI. These measures together produced a significant equation ( $R^2 = .106$ , F(4,325) = 9.65, p<.001) that accounted for a total of 11% of the variance in Absenteeism recorded in the history file.

		Coefficients		Coefficients		
			Std.			
Model		В	Error	Beta	t	Sig.
4	(Constant)	.071	.222		.319	.750
	q23. Tends to be lazy	.172	.038	.243	4.550	.000
	q2. Tends to find fault with others	095	.031	166	-3.075	.002
	q51. its inevitable, I will probably get injured or have an accident at work.	.105	.039	.144	2.693	.007
	q66. My family resents the amount of time I am away from home.	081	.032	137	-2.546	.011

#### Table 8. Stepwise Regression analysis of Significant Measures from DLSI and Absenteeism <sup>a</sup>

a. Dependent Variable: Absenteeism

These results suggest that there is a significant association between the occurrence of absenteeism and general personality characteristics of reliability and conscientiousness. However, the relationships are not as robust as the other measures suggesting that we are tapping a fairly mature workforce. Most likely, these measures would be more successful with new-hires as persons low in conscientiousness would have been eliminated from the workforce by the time the sample was taken. **Therefore, it is recommended that a measure of conscientiousness including the items listed above be included in the assessment battery.** 



### **Summary of Findings**

- 486 total subjects of which
  - 346 completed the Denver Life Style Questionnaire
  - 354 on whom the EQMS Scores were available
  - 194 AON tests
  - 92 DAT tests
  - 50 Web-Neuro tests
- EQMS scores component measures not correlated with personal injuries
  - EQMS correlated with Derailments, Decertifications, Absenteeism, Total incidents, Frequency Index
- EQMS scores significantly correlated with Spatial Reasoning
- Personal Injuries significantly correlated with Conscientiousness and Neuroticism
- Decertifications significantly correlated with spatial relations and safety orientation (r=.205, p<.03), is significant.
- Derailments significantly correlated with behavior and attitudinal predictors reflecting physical and mental distractibility and activity, possibly indicating a characterological pattern of lack of concentration or distractibility.
- Distractibility significantly correlated with Reaction Time and Digit Span Trials Correct
- Absenteeism significantly correlated with four items from the DLSI

### **Recommendations:**

- 1. Further refinement of the EQMS score is needed due to the lack of intercorrelation of the composite indicators.
- 2. The Spatial Relations Reasoning test should be included in a selection battery.
- 3. Based on these results it is recommended that a Conscientiousness and Neuroticism measure be included in the selection assessment battery.
- 4. The selection battery should include a personality measure of distractibility. The Web Neuro Digit Span test could be used but its practicality will be an issue.
- 5. The assessment battery should include some measures of lifestyle which address distractibility conscientiousness and compatibility.
- 6. The AON battery has several significant correlations with the various indicators and may be a useful additional tool.