

# **Embracing Seven Years of Functional Testing at a Mine**

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If people's health, safety and livelihoods are being affected by decisions made from the results of Pre-Employment Functional testing, then we need to make sure that we have got it right!

## **Introduction**

This commitment to 'doing the right thing and making sure that we have got it right' led Ms Legge to the development of the JobFit System and researching the validity of pre-employment functional testing. The research results presented have been partly funded by the Australian Coal Association Research Program (ACARP Project C14045).

There are a number of questions that will be addressed in this paper, some of which the reader may have heard and thought about before. However, it is intended that it will be presented in a way that will encourage the reader to think about it from a different perspective.

The questions to be addressed are:

- How big is the problem of sprains and strains and who's problem is it?
- How have we tried to fix it in the past and did it work?
- What does a JobFit System PEFA look like and what does it tell us?
- How has it been researched and what are the results?
- What do the results mean to us and what can we learn from the experiences of others?

## **How big is the problem of sprains and strains and who's problem is it?**

The Minerals Council of Australia (2008) report that the Lost Time Injury Frequency Rate (LTIFR) has steadily declined over the past decade from 17 to 5 with a plateau for the last twelve months despite increasing employee numbers. The highest rate (19) is in the underground coal sector with all other sectors (open cut coal and open cut and underground metalliferous) recording LTIFR rates between 4 and 5. During the same time period 2006-07, both the underground (8.0) and open cut coal

operations' (3.6) LTIFR performance in Queensland is better than the national average (Queensland Government, 2008).

There is a second factor driving the demand for safe workplaces - workforce retention. A study conducted by the National Institute of Labour Studies (2008) for the Minerals Council of Australia, reported on the labour force outlook for the Australian Minerals Sector from 2008 to 2020. They project, based on current productivity, that an additional 68% (86,000) more workers will be required during that time period, with just over half of that demand required in the coal mining industry. They stress that these are for new positions and does not include turnover for ongoing positions. Minimising employee turnover will therefore be critical for the industry to maintain production and its expected growth. Providing safe workplaces and reducing workplace injuries by matching workers to jobs and jobs to workers will play a key role in the growth of the industry.

Due largely to the higher wages costs of the industry, the mining industry ranks first against all other industries, with the average workers' compensation claim cost of \$30,413, which is up 33.5% from the previous year (QComp, 2009). The impact of the high salaries is also reflected in the average unit cost per case in direct and indirect costs of \$211,300 which is almost double the national average \$125,500 (ASCC, 2009). As an example, by multiplying this figure, (\$211,300) by the number of lost time and disabling injuries in Qld mining in 2009/10, (19,641), we reach an estimated total of more than \$4.1 Billion in direct and indirect costs for a single year.

The Queensland Workplace Health and Safety Act 1995 Section 28 (1) states "An employer has an obligation to ensure the workplace health and safety of each of the employer's workers at work". Other jurisdictions within Australia and around the world, have equal requirements. In relation to manual tasks, this is typically achieved by modifying tasks and equipment in an effort to match the task to the worker. Sometimes, due to technical or cost considerations, this approach becomes impractical and the shift then changes to matching the worker to the task. A combination of both matching tasks to workers and workers to tasks is also practised. The latter is the approach taken in this study.

As a reference point, the economic cost of workplace injuries of \$57.5 Billion is 5.9% GDP (ASCC, 2009) compared to the mining industry's 8% contribution (Minerals Council of Australia, 2007). This comparison begins to illustrate the full magnitude of the problem. But who really bears the cost?

Employers only bear 3% of those costs (Workers Compensation premiums, Productivity loss, Recruitment & retraining costs, Fines and penalties). The community wears 43% (Social welfare payments, Medical and health scheme costs, Loss of potential output and revenue) with injured workers bearing the largest proportion being 49% (Loss of current and future income, Non-compensated medical expenses). And they feel the pain!!!

It is clear from this distribution, that the real costs of workplace injuries are not borne by employers who have the primary responsibility of providing a safe place to work, but rather by the injured workers and community themselves who have a joint

responsibility for being fit for work and ensuring that employers are fulfilling their duty of care.

### **How have we tried to fix it in the past and did it work?**

Sprains and strains are multi-factorial. That means that many things combine to contribute to an injury - the work, the environment and the people. A multi-factorial problem requires a multi-factorial approach.

Using a risk management approach and the hierarchy of control we continue to make improvements in equipment design and work practices. Research shows that a participatory ergonomics approach can make lasting changes in a workplace. We have also looked at training and behavioural change, but these are only administrative controls and are a short term solution. We have also looked at how we can reduce or predict risk factors in workers with medicals and X-rays but there is limited scientific evidence of their success. Musculoskeletal screens may only identify a current injury and WC history shows past history but neither predict performance.

In recent times, our industry has moved toward functional testing as a way of identifying a worker's capacity to perform a role and therefore reduce the risk of injury.

### **What does a JobFit System PEFA look like and what does it tell us?**

PEFA is an acronym for Pre- / Periodic- / Post-Employment Functional Assessment. It is a job-specific short form functional capacity evaluation that measures a person's capacity to perform work at that time. It is a snapshot of a worker's demonstrated capacity to identify their individual risk of injury of performing manual tasks in the workplace. The assessment criteria are based on the inherent requirements of the job to meet anti-discrimination requirements and provide useful information.

It is an assessment conducted by a physiotherapist or occupational therapist trained in the standardised JobFit System PEFA method. Previous scientific research has demonstrated Good to Excellent Reliability of the JobFit System PEFA (Legge & Burgess-Limerick, 2007) which means that regardless of which trained therapist does the assessment, it will be done the same way every time so there is lower risk of discrimination or bias.

Each PEFA consists of the following:

- Informed consent
- Medical history questionnaire to identify exclusion or cautionary factors
- Musculoskeletal screen to identify any current injuries or restrictions that may effect test delivery
- Aerobic fitness test
- Postural tolerance tests (job-specific)
- Lifting and carrying (job-specific)

The assessment takes approximately one hour. At the conclusion of the testing, the worker is provided with feedback for the dual purpose of providing value to the worker for their participation and to enable them to make an informed decision regarding improving their abilities.

The worker's performance is compared to the job demands and they are provided with a score between 1 and 4 with 1 being the highest, meaning that they met the job demands.

To establish the assessment criteria from the job demands and subsequently determine the worker's PEFA score, the JobFit System software was used. A therapist had recorded the functional demands of all tasks at the workplace. These were combined into job demands. The high risk components (ie those associated with an increased risk of injury, or those associated with injury trends in the workgroup) were identified as assessment criteria. Following the assessment, the worker's performance is objectively compared to those job demands. The degree of mismatch determines the overall PEFA score and highlights the tasks that are affected to identify specific workplace risks.

### **How has it been researched and what are the results?**

A large Queensland coal mine with Open Cut and Underground operations conducted JobFit System PEFAs as part of their recruitment process. Demographic data was analysed. Overall PEFA scores were compared to worker age, department, job and length of employment. Injury data was analysed. Overall PEFA scores were compared to injury type, body location and mechanism of injury. Injury statistics were collected from December 2002 to December 2009. Injury statistics supplied included date, type, severity and cause of injury, body location and task performed at time of injury. Only sprains and strains data was used.

#### *PEFA score and age*

PEFA records were collected at time of assessment. One thousand and nineteen PEFAs were completed between December 2002 and December 2009. Only records for employed workers and only those that had completed an assessment for the position in which they were employed were used for the study. Records from female participants were excluded to eliminate any gender bias in the results. A total of six hundred records remained. The average age was 37.3 years (min 17.0, max 62.5). Workers were categorised by their department and occupation. Participants from the Open Cut operations (39.2 years) were significantly older than the other departments, and Tradespersons (33.7 years) were significantly younger than all other occupations. The largest proportion of workers were production workers (44%) and workers from the open cut operations (47%).

Across all jobs, four hundred and twenty-seven workers met the job demands and scored PEFA 1. One hundred and seven had minimal restrictions and scored PEFA 2. Sixty-six had moderate restrictions and scored PEFA 3. This distribution is illustrated in Figure 1. For the analysis, the PEFA score 2 and 3 were combined and called PEFA>1. This resulted in two groups for the analysis - workers who met job

demands (ie PEFA 1 = 427) and workers who did not meet job demands (ie PEFA >1 = 173).

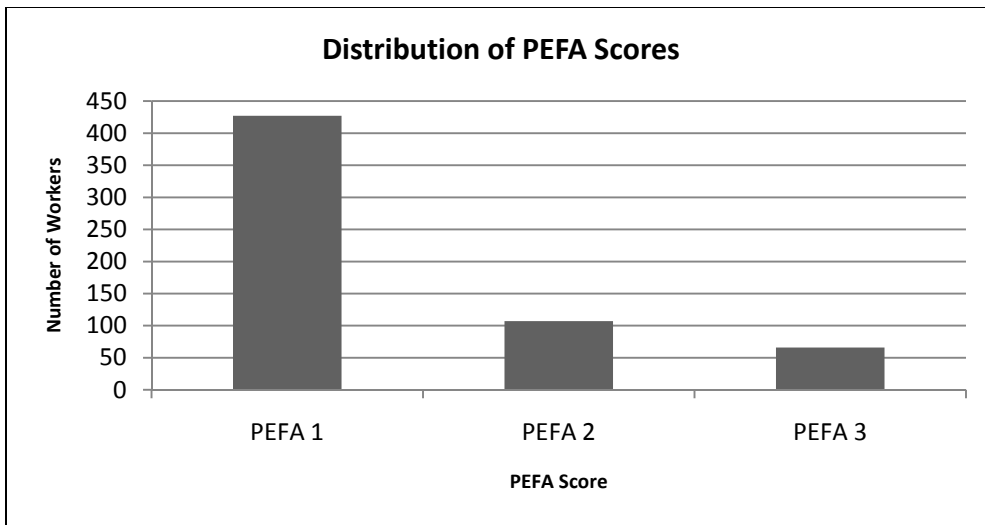


Figure 1: Distribution of PEFA Scores amongst all workers

The mean age for workers who scored PEFA 1 was 36.8 years. Those that did not score 1 were slightly older at 38.7 years but the age difference was not statistically significant. This is an important finding as some people are afraid that older workers may be at a disadvantage doing these assessments. The distribution of age groups by PEFA score is illustrated in Figure 2.

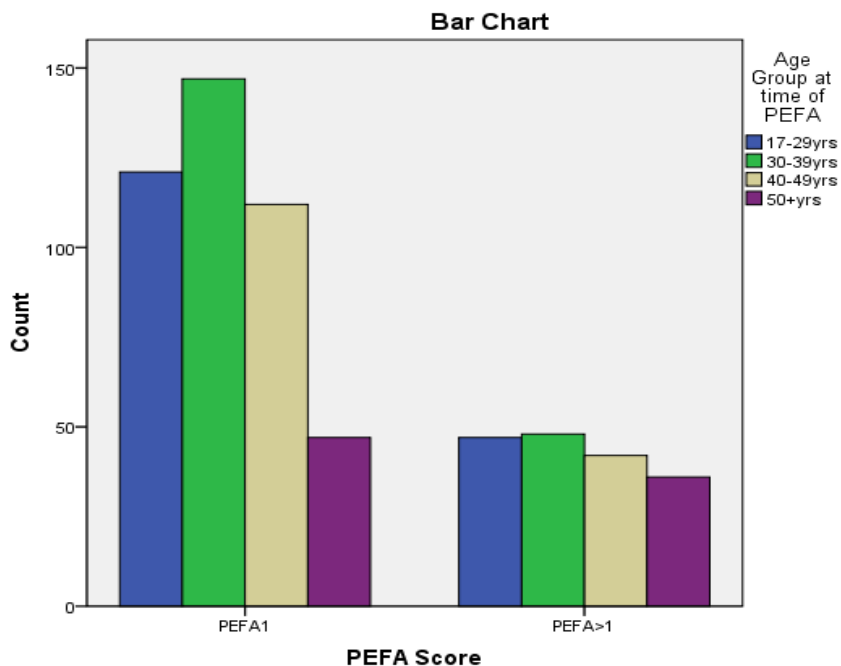


Figure 2. Distribution of age groups by PEFA score

### *PEFA score, department and occupation*

A significant association exists between PEFA Score and Department. Employees in the Underground and CHPP departments are most at risk of not meeting the assessment criteria. This is likely a consequence of the higher job demands for a larger proportion of jobs within these departments.

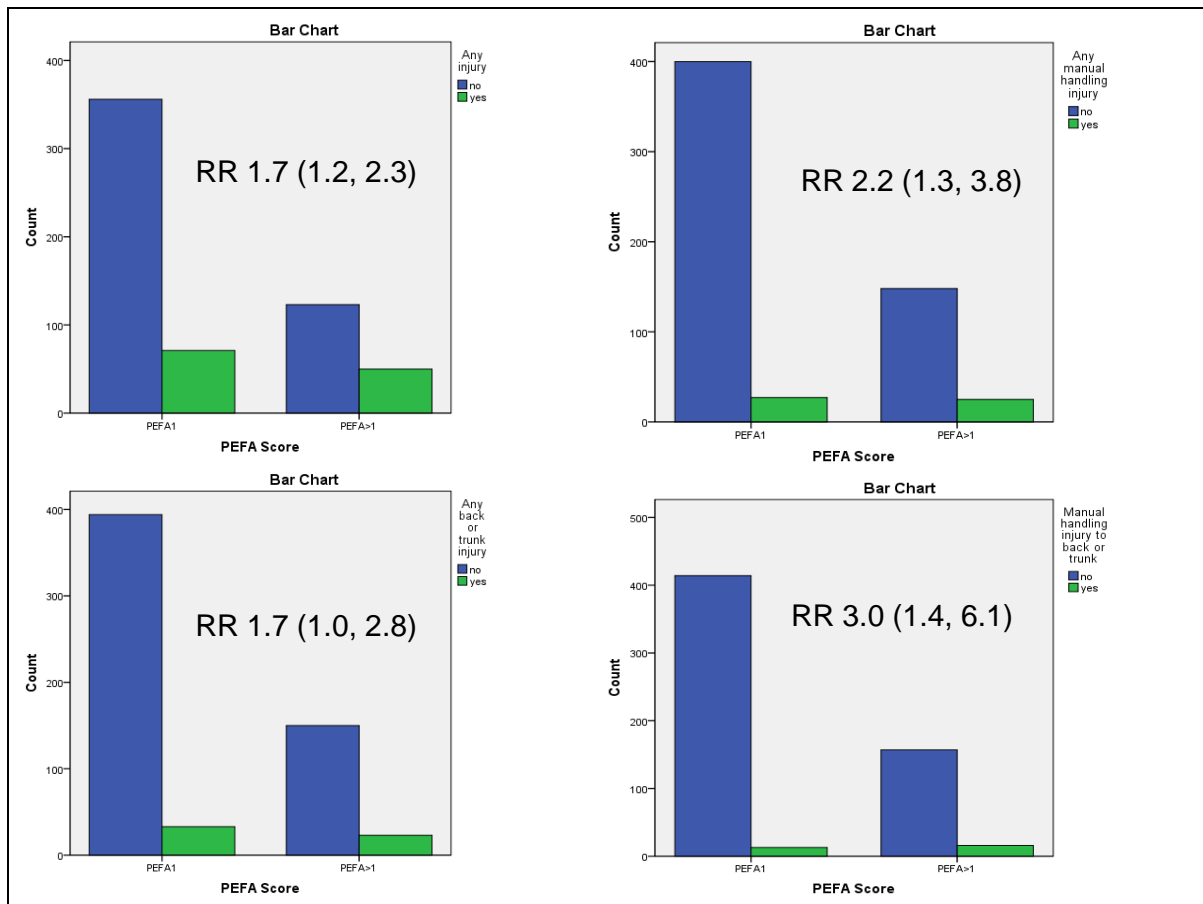
Similarly, there was an association between PEFA score and the participant's occupation. The more sedentary jobs of production workers and professionals have lower job demands and so workers are more likely to meet them and Score 1. Naturally then, the more demanding roles of tradespersons and labourers are more likely to not score 1.

### *PEFA score and injury risk*

During the seven year study period from December 2002 to December 2009, a total of 196 sprain / strain injuries were reported by 121 workers. Injury records were coded by body location and mechanism of injury. The highest injury rate by body location was injuries to the back / trunk (0.037 injuries per person year). When combined, lower limb injuries had an injury rate of 0.027 and neck and shoulder injury rate was 0.021 injuries per person year. Manual handling had the highest injury rate by mechanism of injury at 0.040 injuries per person year. This was nearly twice the rate of those caused by ground conditions (0.022), and 2.5 times those caused by operating or climbing (0.016). Back and trunk injuries associated with manual handling were the largest subgroup (0.018 injuries per person year), followed by back and trunk injuries associated with operating (0.011). In combination, lower limb injuries from ground conditions (n=31) had the second highest injury rate (0.016 injuries per person year).

Relative Risk was calculated for PEFA Score and each injury type. A significant increase in risk exists for workers who score PEFA>1 for any injury (RR 1.7, 95% CI 1.2, 2.3), any manual handling injury (RR 2.2, 95% CI 1.3, 3.8), any back injury (RR 1.7, 95% CI 1.0, 2.8) and any back injury from manual handling (RR 3.0, 95% CI 1.4, 6.1). These are illustrated in the four graphs in Figure 3.

This increase in risk for workers who do score PEFA 1 demonstrates that the JobFit System PEFA is predictive of manual handling injury. Workers who do not meet the job demands are twice as likely to sustain any manual handling injury and three times as likely to sustain a back injury from manual handling.



**Figure 3. Relative risk of injury for workers who score PEFA >1 compared to workers who score PEFA 1**

Top row, L-R: Any injury, Any manual handling injury.

Bottom row, L-R: Any back or trunk injury, Manual handling injury to back or trunk

### *PEFA score and time to injury*

Workers who did not meet job demands (PEFA>1) have a shorter survival time to any injury (4.5 years) compared to workers who met the job demands (5.7 years). They also have a shorter time to any manual handling injury (5.4 years compared to 6.6 years).

### **What do the results mean to us and what can we learn from the experiences of others?**

Even though the functional testing protocol was objective and used technology to identify areas of risk, it is important to remember that people are involved in the decision-making. These tools are designed to support not rule. The health professional's responsibility is to identify the areas of risk. The employer and worker are responsible for determining if that risk is acceptable to them.

Based on experience from more than 5000 PEFA's, some common mistakes, misunderstandings and misinterpretations have presented. These are summarised as follows:

### *1. Pass / Fail assumptions*

The main one is the question of “Did I Pass?”, or the employer saying “You failed your jobfit”. JobFit System PEFAs are not designed to pass or fail. They are designed to identify the injury risks of an individual in a particular role. It is then up to the worker and employer to determine what is an acceptable level of risk for them and what control measures can be put in place to manage those risks. Communication of accurate information to the worker so that they can understand their injury risk and what they can do about it is key to a positive outcome.

### *2. Poor planning*

Before commencing a pre-employment testing program, or even one for contractors coming to site, employers need to be clear on what they are going to do with the results and how they are going to manage the identified risks. Planning with regards to logistics and timing is also critical to ensure minimal interruption to recruitment and mobilisation.

### *3. Test criteria not matching job demands*

One of the major mistakes is inaccurate job demands or artificial assessment criteria. Employers who artificially lower assessment criteria below the real job demands are not able to get the real measure of a risk. Risk Management 101 - consider a PEFA the same as any other risk assessment and be honest with the input to get realistic output. If employers don't measure their risks, they can't manage them.

### *4. No follow-up*

Once the assessment has been done and a placement decision has been made, it's not the end of the story. Workers need, and deserve, to be provided with information from their assessments and the opportunity to improve. Many companies now are providing health and wellness programs to their employees, but unfortunately are not using the results from the PEFAs to provide targeted programs and monitoring change. This is a waste of baseline data to measure the effectiveness of their initiatives.

### *5. No job modifications*

If the industry really wants to make a lasting change, then they have to make a lasting change. Behavioural safety, wellness programs, training and supervision are administrative controls. To make a long term difference the industry has to continue to invest time and resources into equipment and task redesign. “Think of the story of Humpty Dumpty... If we just got rid of the wall in the first place, we wouldn't all have to keep running around putting him back together again.”

JobFit System PEFAs identify the risk. Employers and workers accept the risk. All stakeholders have to work together to manage the risk. The industry is encouraged to think of sprains and strains in the workplace, not as an individual worker's problem that results in caring for an individual in a doctor:patient relationship type of way, but think of sprains and strains in the workplace more as a public health problem and that the industry is a community. Workers and employers need to protect each other to protect themselves.



Sprains and strains injuries affect all stakeholders in some kind of way... “Whether we are the one that is suffering the pain, or the person taking care of them, or the one taking the extra load whilst they are away ... Whether it is our taxes paying for their disability payments, or our budgets out of whack because of WC costs, or our team’s productivity reduced because we are a person down ... Whatever our relationship is to workplace injuries... We are all part of it whether we are at work or at home ... And because we are all part of it, we are all part of the solution.”

JobFit System PEFAs are a validated predictor of risk and are a critical component in preventing sprains and strains in the mining industry.

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