The Human Factor in
Workplace Safety

Executive Summary

According to research, most workplace accidents involve "human factors." Prior research and this study also show that a small percentage of workers account for a disproportionate number of accidents that do occur.

By assessing competencies that reflect Cognitive Ability and behavioral tendencies, it is possible to predict a candidate's propensity for exhibiting safe behaviour on the job, and likewise identify "high risk" candidates who are more likely to be involved in a workplace accident or injury. The present study demonstrates that competency testing to hire safer employees can reduce workplace accidents and injuries by approximately 40%.

The Challenge
Identifying the human factor in safety

Traditionally, organisations have placed the bulk of their efforts for promoting safety in striving to make the work environment safer. But at some point, they must necessarily reach a point of diminishing returns. Because no matter how much they invest to improve their work environment, processes and training, there will still be human error. In fact, some estimate that human factors are involved in up to 80% of all workplace accidents (Perrow, 1984) and that these accidents may be avoidable.

If human factors are involved in such a large proportion of workplace accidents, is it possible that some workers are safer and some are more accident prone than others? And, if that is the case, can competency-based assessment testing allow organisations to distinguish between the two? These are the questions this research study was designed to answer.

Objectives

The objectives of this study were:

1. to investigate the existence of more accident-prone workers, and
2. to identify candidate characteristics capable of measurement that could serve as predictors of a worker's likelihood to be involved in an accident.

The Study

To investigate the characteristics of individuals involved in workplace accidents and the characteristics of safe workers, Talegent worked with a leading agricultural organisation which employs a large number of casual workers over their summer harvest period. Although every effort is made to assure that the environments within which these employees work is safe, some individuals are still involved in workplace accidents.

A predictive longitudinal validity study was undertaken where the organization assessed 5,153 applicants for the harvest casual role and hired 1,892 individuals who joined their existing casual workforce to make up a total of 11,847 casual employees. The casual employees worked over the summer harvest period which lasted 4-5 months (depending on the region). Comprehensive accident and injury data were captured for all casual employees over the harvest period with 345 individual accidents recorded for the harvest period.

Following the summer harvest period, managers were asked to rate the work behaviour of their casual employees across six competency areas including their safety behaviour. In addition to work performance managers rated harvest casuals on how well they embodied the values of the organisation, including the organisational value of creating a zero harm working environment for everyone. Manager ratings we provided for 714 harvest casuals with 489 of those employees having also completed the assessment.
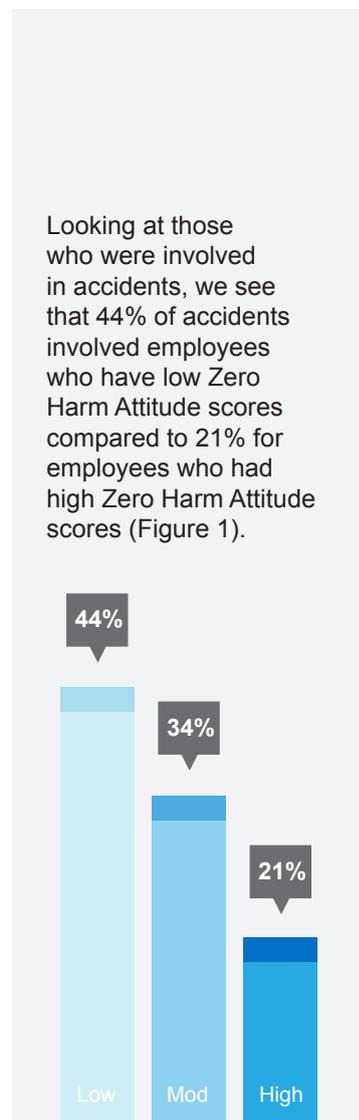
Findings

1. Accidents cluster in individuals

We hypothesised that accidents would cluster in individuals rather than occurring randomly and uniformly across a population of workers. The evidence indicates that this is the case. Research has shown that a small number of individuals are involved in a disproportionate number of incidents. (Visser, Pijl, Stolk, Neeleman & Rosmalen, 2007). We saw this confirmed by the data recorded for the agricultural organisation in our study. Accidents clustered around individuals with 50 particularly accident-prone employees (0.5% of the casual population) involved in multiple accidents and contributing to 34% of all recorded accidents.
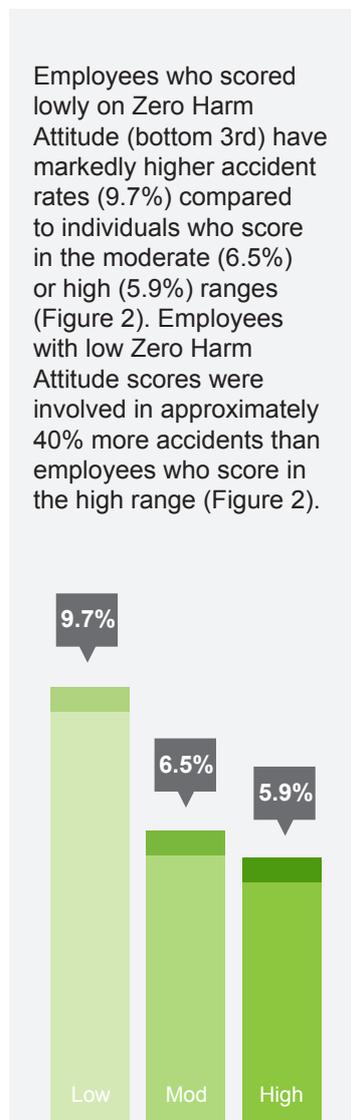
2. Predictors of workplace safety

When analysing the characteristics of employees who were involved in accidents or injured, it was found that these employees had scored significantly lower on tests for a number of personality characteristics:
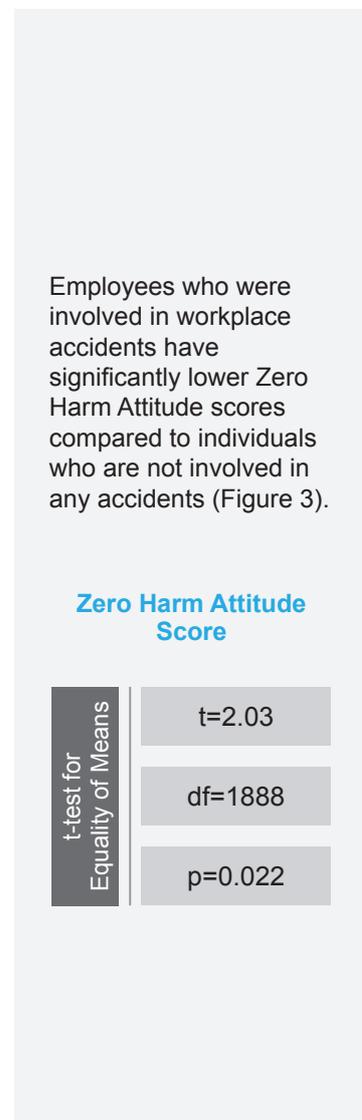
- **Zero Harm Attitude**
- **Stress Resilience**
- **Compliance**
- **Reliability**

Looking at those who were involved in accidents, we see that 44% of accidents involved employees who have low Zero Harm Attitude scores compared to 21% for employees who had high Zero Harm Attitude scores (Figure 1).

Employees who scored lowly on Zero Harm Attitude (bottom 3rd) have markedly higher accident rates (9.7%) compared to individuals who score in the moderate (6.5%) or high (5.9%) ranges (Figure 2). Employees with low Zero Harm Attitude scores were involved in approximately 40% more accidents than employees who score in the high range (Figure 2).

Employees who were involved in workplace accidents have significantly lower Zero Harm Attitude scores compared to individuals who are not involved in any accidents (Figure 3).

44% **34%** **21%**

Low Mod High

(Figure 1)

9.7% **6.5%** **5.9%**

Low Mod High

(Figure 2)

Zero Harm Attitude Score

t-test for Equality of Means

t=2.03

df=1888

p=0.022

(Figure 3)

This pattern of low scorers being involved in more accident than high scorers was similar across the Stress Resilience (Figure 4), Compliance (Figure 5) and Reliable (Figure 6) scales. On average low scorers on these scales were involved in 40% more accidents than high scorers.
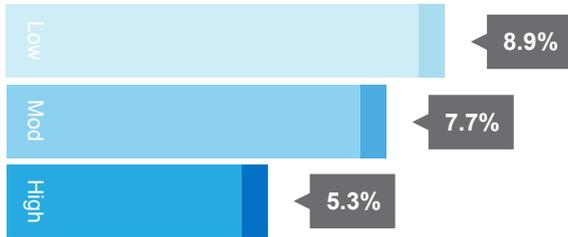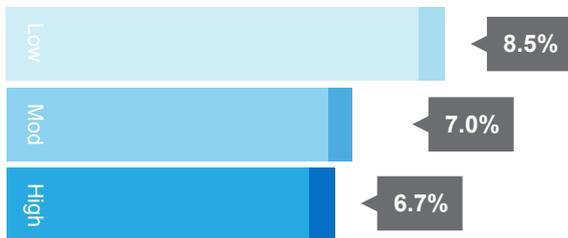

Figure 4 - **Stress Resilience scale**

- Low: 8.9%
- Mod: 7.7%
- High: 5.3%

Figure 5 - **Compliance scale**

- Low: 8.5%
- Mod: 7.0%
- High: 6.7%

Figure 6 - **Reliable scale**

- Low: 8.5%
- Mod: 7.0%
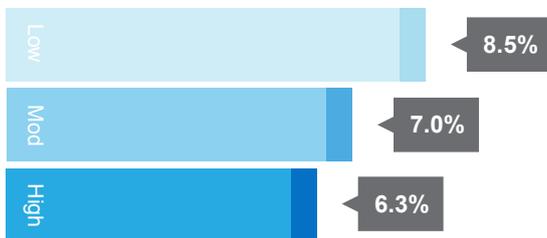- High: 6.3%

The Talegent Safety Solution Assessment

Only Talegent combines measures of cognitive ability and personality tendencies that are together required to most accurately predict whether a given candidate will exhibit safe behavior on the job, or be likely to be involved in an accident.

Understanding Safety Instructions: 10 minutes
The ability to understand safety instructions, processes and procedures. High scorers are likely to understand safety information readily.

Zero Harm Attitude: 2 minutes
The tendency to take responsibility for the safety of oneself and others. High scorers are likely to be committed to their own safety and strive to help others stay safe at work.

Reliability: 2 minutes
The tendency to be responsible and reliable at work. High scorers are likely to act responsibly when unsupervised and follow through with commitments.

Compliance: 2 minutes
The tendency to appreciate rules and follow set procedures. High scorers are likely to diligently follow set processes and procedures and avoid breaking rules.

Risk Consciousness: 2 minutes
The tendency to be cautious and vigilant of hazards. High scorers are likely to avoid taking risks.

Stress Resilience: 2 minutes
The tendency to stay calm and composed in stressful situations. High scorers are likely to be resilient to work stress and stay composed under pressure.

Conclusions

The results of this study suggest that there are accident prone workers who are involved in a disproportionately high number of accidents and that these accident prone workers can be identified by their personality traits (Zero harm attitude, Compliance, Reliability, and, Stress Resilience). By identifying these accident prone individuals during recruitment organizations can potentially reduce their accident rates by approximately 40%.

References

Perrow, C. (1984). *Normal Accidents: Living With High Risk Technologies.* (Revised edition, 1999). Princeton, NJ: Princeton University Press.

Visser, E., Pijl, Y., Stolk, R., Neeleman, R., & Rosmalen, G. (2007) Accident proneness, does it exist? A review and meta-analysis. *Accident Analysis and Prevention*, 39. 556-564.

Talegent