

## Manual Task Risk Assessment Tool

### Xstrata Copper North Queensland

#### The Problem

Workplace injuries sustained while undertaking everyday manual tasks are statistically over-represented in our business. Xstrata Mount Isa Mines classifies a manual task as any activity that uses the musculoskeletal system, including lifting, reaching for, pulling or pushing a heavy object, operating machinery, hammering or screwing in fasteners, climbing a ladder, or typing on a keyboard and using a computer mouse. These injuries have a significant impact on the short and long-term wellbeing of our workers, as well as the productivity and sustainability of our operations. For this reason, raising awareness of the causes and addressing the occurrence of manual task related injury has been identified as a key focus area for injury prevention initiatives across our north Queensland operations.

Strategies used in the past were considered too complex to be effective in the daily task risk assessments conducted by our workforce. Despite significant and ongoing effort, statistics indicate the risk remains, and a more simplistic, accessible solution was required to proactively and creatively address the occurrence of manual task related injury.

#### The Solution

We developed a simple, interactive Manual Task Risk Assessment (MTRA) tool that can be used to assess the risk of sustaining both acute and cumulative injury while carrying out manual tasks. The tool is used to clearly and visually illustrate the risk factors that can lead to manual task related injury. It works as a guide to assess the hazards and better understand the risks associated with manual tasks, and can be applied across all roles throughout our operations, from administrative or office work, to processing and production line tasks and machinery operation.

At Xstrata, we take a positive approach to workplace safety, with a strong focus on accountability. We believe the adoption of punitive compliance methods breed negativity and resistance against workplace health and safety standards and procedures. Instead, we aim to empower our people at all levels of our operations to take ownership of ensuring the safety of their environment at home and at work.

The first step we take in implementing any occupational health and safety initiative is to educate our people. We understand that individual awareness of manual task risk is our main defence against injury and that understanding the risks inherent to tasks is likely to support decision making. We believe a self-aware workforce operating with a fully-developed understanding of the potential hazards they may encounter in their work, and with the knowledge required to control these hazards is much more likely to observe, account for and mitigate potential risks before they actualise. Essentially, the MTRA tool aims to increase awareness of the risk factors associated with manual tasks, and thus influence the way our workers behave. Considering the Hierarchy of Controls (refer to Appendix A) "Managing worker behaviour" is at the lower end of the scale. However, we recognised that where there is a need for human involvement in a task there is an inherent injury risk, and that our last and most important lines of defence against injury are the behaviour of and decisions made by the person performing that task.

#### Design

During the design phase, we determined to be most effective the MTRA tool must meet a defined set of objectives.

It must:

- Be creative, interactive and attractive to users Use simple language and operate with minimal instruction
- Be applicable to all operational areas and roles
- Be available in various formats and sizes
- Be tactile and provide immediate feedback
- Deliver outcomes in line with best practice knowledge regarding the risk factors associated with manual tasks
- Ensure inclusion in existing personal risk identification strategies is achievable without the addition of further documentation or reporting.

A concept design was developed by Xstrata North Queensland's Safety and Health, Health Risk Management and Occupational Therapy team, which was subsequently manufactured in prototype form.

The prototype clearly defines the risk factors for both acute, or immediate injury (*refer to Appendix B*) and cumulative, or long-term injury (*refer to Appendix C*). These risk factors include weight of load and speed of movement (*refer to Appendix D*), body position and posture (*refer to Appendix E*), and repetition of movement, or "How often/How long?" (*refer to Appendix F*).

To use the MTRA tool the operator simply identifies the weight being handled or the speed of movement and postural requirements of a task they are about to undertake. The operator moves the appropriate dials on the tool face and the mechanically gearing within

automatically moves the risk indicator dials to display the immediate (acute) risk level associated with performing that task (refer to Appendix G, 1). By then indicating the repetitiveness of the task on the “How often or How long” dial, the tool will automatically display the risk of long-term (cumulative) injury associated with undertaking that task consistently over a prolonged period of time (refer to Appendix G, 2). The operator can then consider control options to decrease the risk of injury associated with this task based on the risk factors identified.

With application directed towards increasing the knowledge and awareness of individuals this innovation is clearly at the lower, “behavioural” end of the hierarchy of controls. Acknowledging that the highest potential ongoing influence on manual task risk and control sits with the individual performing the task, it has been deemed appropriate to direct some of our strategic effort at this level. The higher level design control of manual task risk relies on the identification of risk; therefore, increasing knowledge and awareness at this level ensures appropriate allocation of resources to those areas of highest risk and therefore greatest need. Empowering and up skilling our people to better protect themselves is certainly something to which we are happy to commit.

### **Trial and feedback**

The MTRA tool prototype was trialed across Xstrata’s north Queensland underground mining, maintenance, and metallurgical processing, smelting (refer to Appendix H) and refining operations by Occupational Therapists in order to determine the efficacy of the tool against expected outcomes and use.

The assessment tool was presented to operational staff during daily, pre-work Positive Attitude Safety Sessions (PASS) followed by hands-on trial and assessment of upcoming tasks (refer to Appendix I). Senior staff were introduced to the tool in order to gather feedback with regard to area-specific use.

Comment was sought directly from workers in terms of:

- Usability
- Practicality in existing risk assessment procedures
- How it would be most effectively applied in their work area
- Suggested changes or improvements they would make to the tool

Feedback received across all operational areas was positive. The easy-to-use and interactive design of the tool, and its intended purpose as a method of simply assessing risks and increasing awareness without additional paperwork or administrative requirements was seen as particularly attractive. Discussion around how the tool could contribute to existing risk identification and mitigation strategies was clear and well described by all participants. Employees who trialed the tool commented that it would enable detailed description of specific manual tasks and the associated risks, without having to guess the level of potential risk and the effectiveness of controls. This was particularly relevant in assessing the risk factors for cumulative, or long-term injury.

All participants in the trial were engaged and willing to provide specific detail as to how they would use the tool, and the formats in which they would prefer it presented. This will allow for tailored implementation dependent on area-specific need.

Following is a summary of the key feedback received:

1. Workers in areas where task requirements were varied within and across shifts highlighted the value in having access to the tool for use when approaching a new task while “on the job”.
2. In high traffic areas where large numbers of workers meet suggested that a large wall mounted version (1200mm x 1000mm) would be beneficial and would encourage use both due to novelty and access.
3. All workers identified the requirement to have access to the tool for pre-shift PASS and other such meetings. This could be either a large wall mounted or desk sized tool (370mm x 235mm).
4. Operational areas where task requirements are predictable (Eg. various roles at Xstrata’s Townsville Copper Refinery and Refractory Maintenance), identified that large wall mounted versions located strategically across the site would be used. Smaller areas also acknowledged the value of a desk sized version for similar reasons.
5. Many workers commented that they would like to pursue procedural means of reporting tasks identified as an unacceptable immediate or long term risk (via use of the tool) through the management structure in order for controls to be investigated and implemented. A validation tool in line with best-practice knowledge such as this would prove useful.
6. The development of the tool in electronic format, accessible via the Xstrata intranet was also suggested, and has since been completed by Xstrata’s IT Department (*refer to Appendix J*).

## Introduction into our business

The final design and mechanical development of the assessment tool was undertaken in collaboration between Xstrata Occupational Therapist, Joel Edson, and Michael Farrell of Calculated Engineering.

To provide opportunity for evaluation, specific sites across Xstrata's north Queensland operations were selected for the initial roll out of mechanical versions of the assessment tool, with the electronic version being made available via the Xstrata intranet across all of our north Queensland sites.

Implementation and further development of the assessment occurred in a step by step fashion as an adjunct to current processes. As the initial roll out was undertaken, further data gathering occurred to ensure subsequent strategic planning was in line with uptake and demand. Initial implementation occurred with the direct input of relevant Managers, Superintendents, Supervisors and Safety Advisors and was driven locally rather than as a standard process across operations. It was acknowledged that the needs of different operational areas varies as does the use and requirements of the assessment. This process included the development of procedures for reporting and use, both formally and informally, in personal and other risk assessment frameworks; development of electronic recording mechanisms; and, integration with existing electronic reporting formats. Planning for the delivery of the assessment across Xstrata's operations globally is currently underway.

## Benefits

Along with awareness and engagement, we expect that workplace understanding of specific manual task risk factors, and therefore control options, will naturally develop as use of the assessment increases. The driving intent for the development of this tool is to protect our workers and reduce injury.

All General Managers, Managers, Superintendents, Supervisors, Safety and Training Advisors and Sustainable Development committees across our Mount Isa operations, as well as two primary and secondary smelting crews at our Copper Smelter, crushing and conveying, ore handling, and infrastructure crews within our Mount Isa Copper Operations (which encompasses our Enterprise and X41 copper mines' underground and surface infrastructure, and our Copper Concentrator), and all crews at our Zinc-Lead Concentrator have been trained in the use of the tool and are currently using it in their daily risk assessments. Given the size of our operations, the roll out of the MTRA across our Mount Isa Operations, and its value as a simple and engaging way to increasing awareness of manual task risk, has the potential to improve the wellbeing and safety of work practices for almost 5000 people.

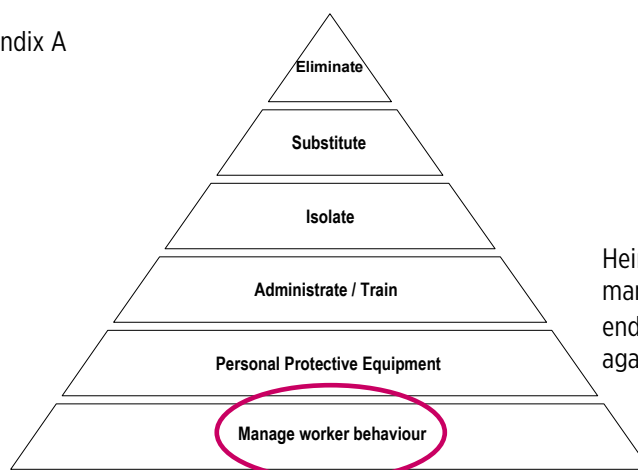
## Transferability

The Manual Task Risk Assessment has application potential not only across the resources industry but any industry where manual tasks pose an injury risk and where greater understanding of risk factors, and therefore control options, is desired. The key element here is the focus on individual understanding and awareness of manual task risk and its contributing factors. Much of the information made available to operational personnel is derived from academic biomechanical and ergonomic material and is presented in a way that is too technical and complicated to be effective. This assessment tool has applied the relevant academic knowledge, in a format guided by the workers who will be using it to ensure clarity, relevance and effectiveness.

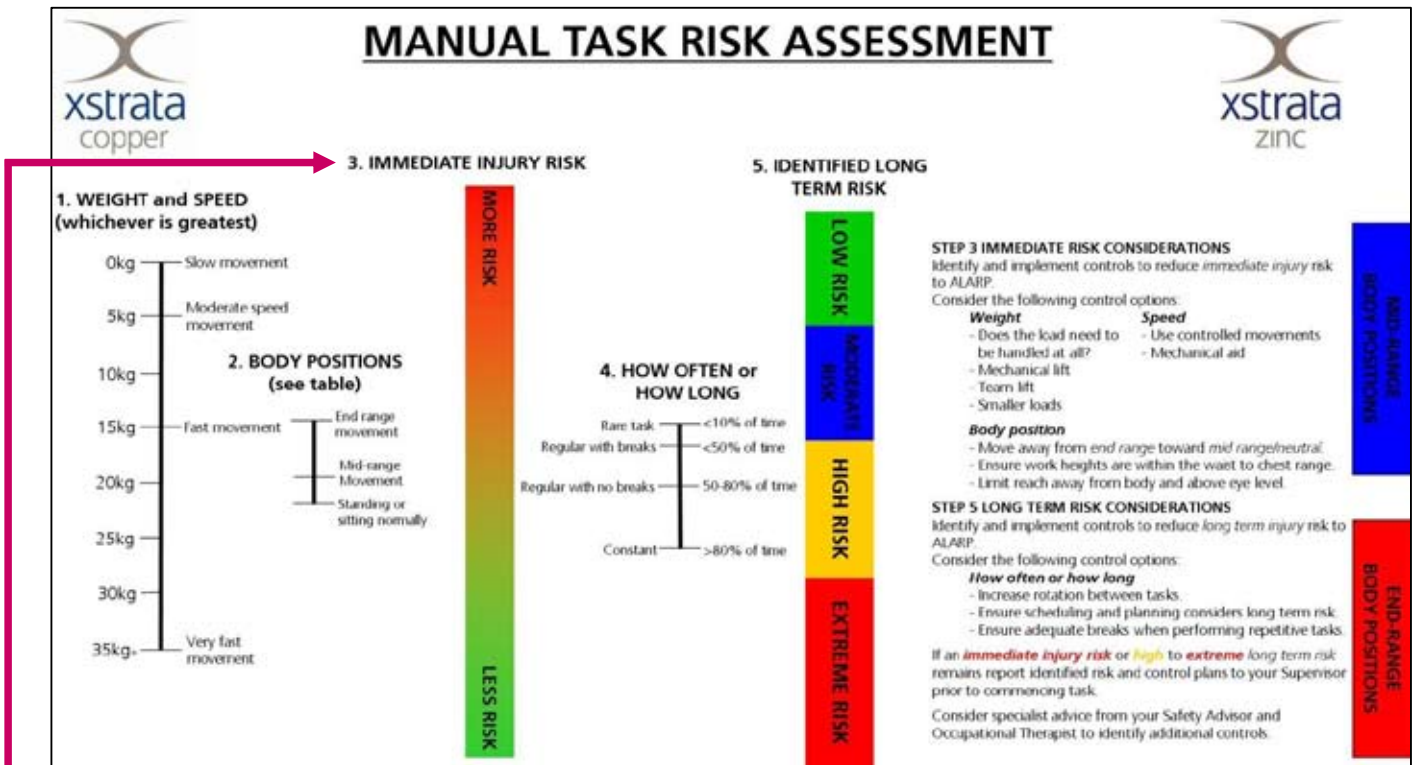
## Innovation

Although the design is based on the existing "tie-line" principle, the application to manual task risk is unique. There have been valid and effective attempts by various companies across a range of industries to mitigate manual task risk however, based on the research conducted, this assessment tool has addressed the issue in a new, creative and innovative way.

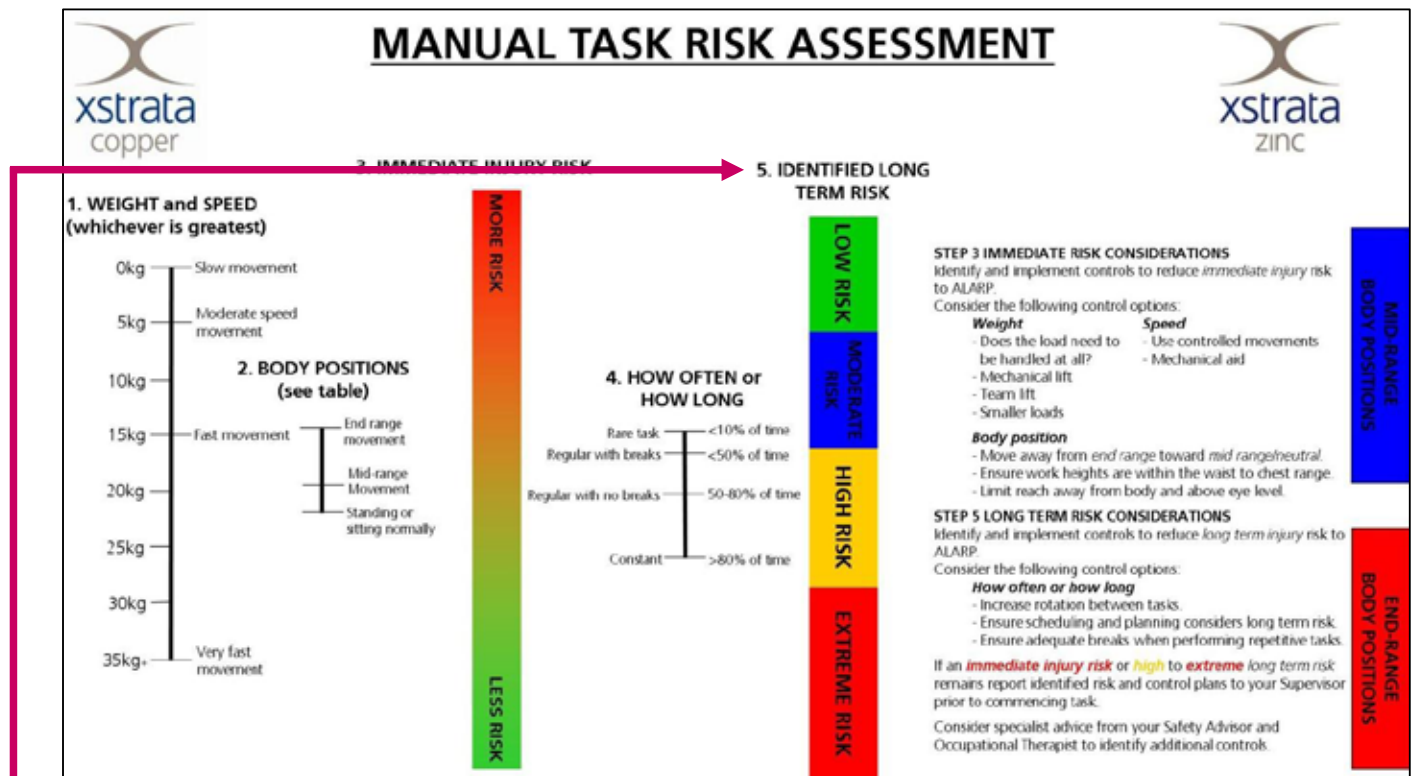
Appendix A



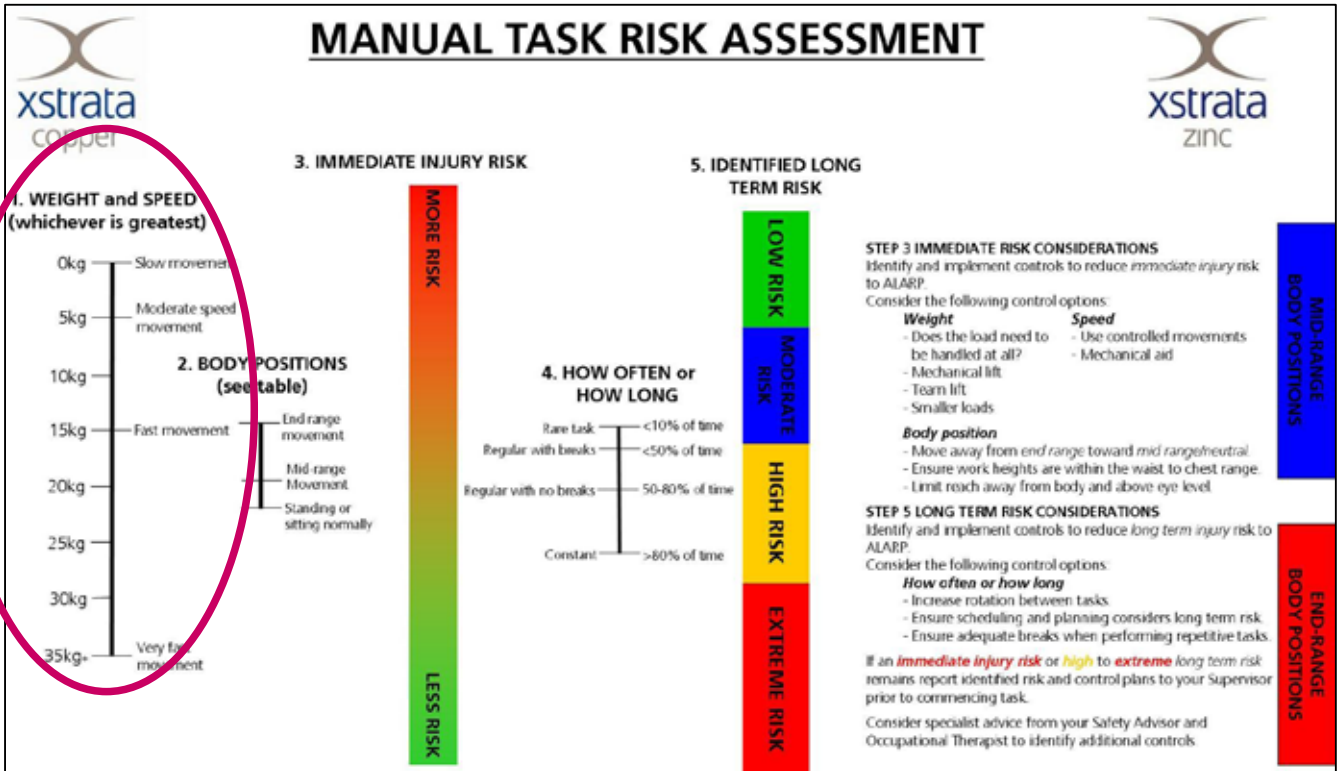
Heirarchy of Controls – behaviour management, while on the lower end of the scale, is the last line of defence against a manual task injury.



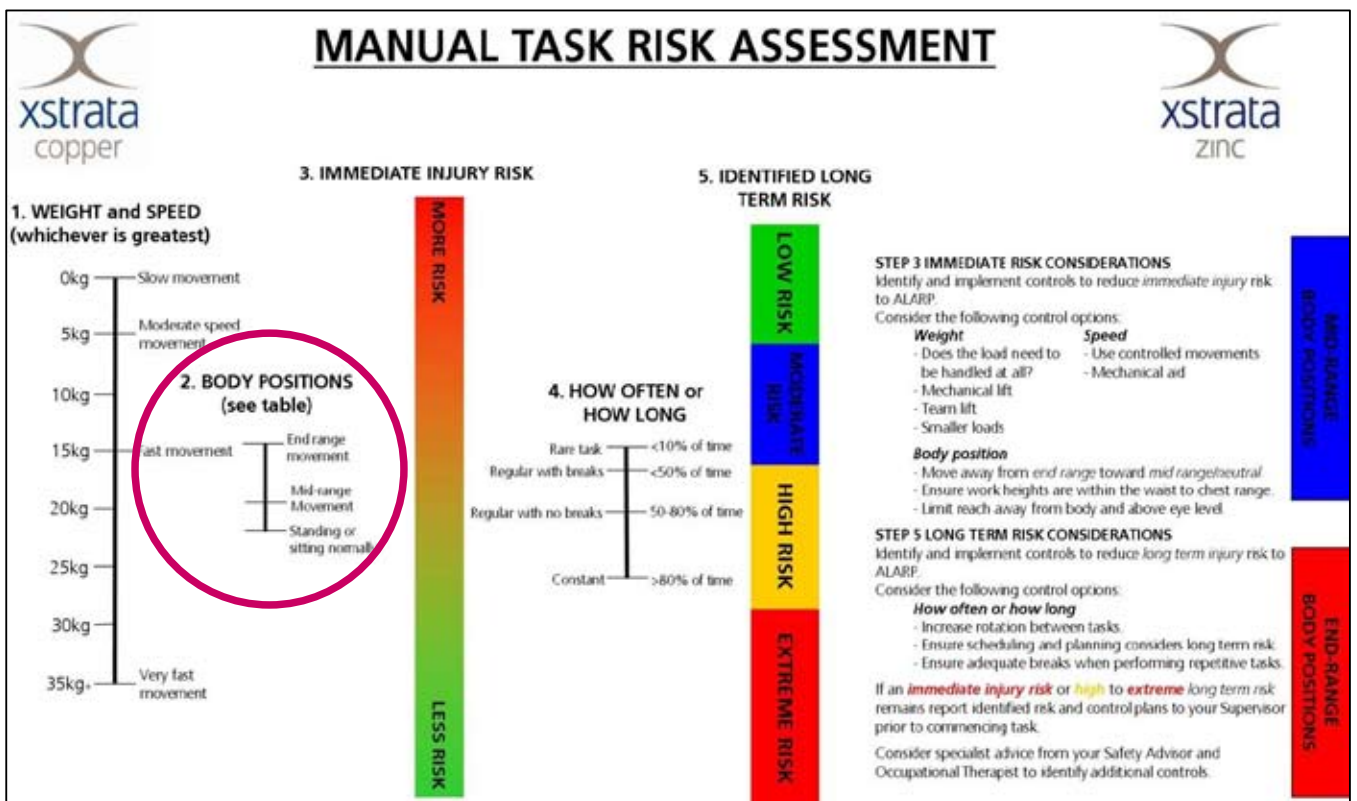
The combination of weight and speed and body position equates to the risk of acute, or immediate, injury.



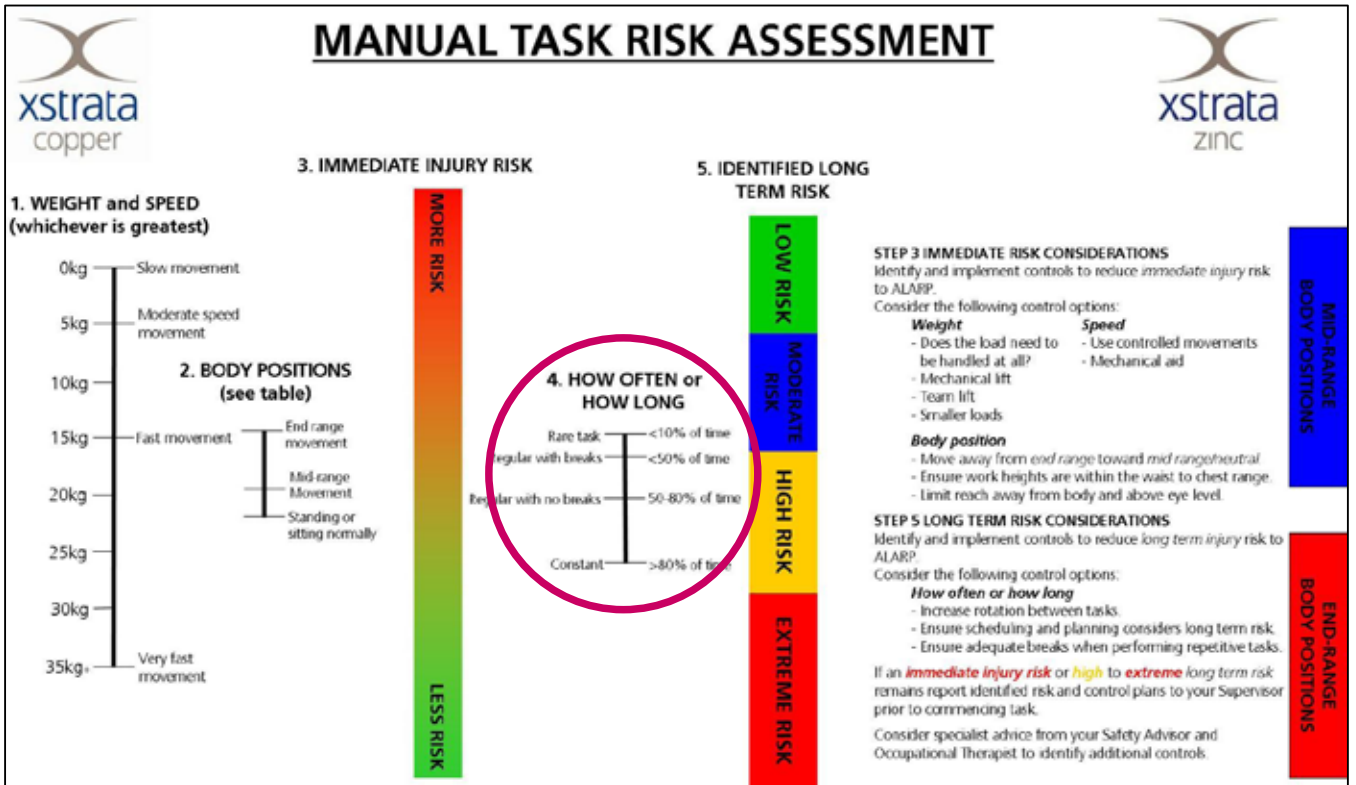
The combination of all three direct risk factors (weight and speed, body position, how often/how long?) equates to the risk of cumulative, or long-term injury.



Risk factor 1: WEIGHT (0 – 35+ kilograms) and SPEED (slow – very fast movement) dial



Risk factor 2: BODY POSITIONS (end of range movement - standing or sitting normally) dial

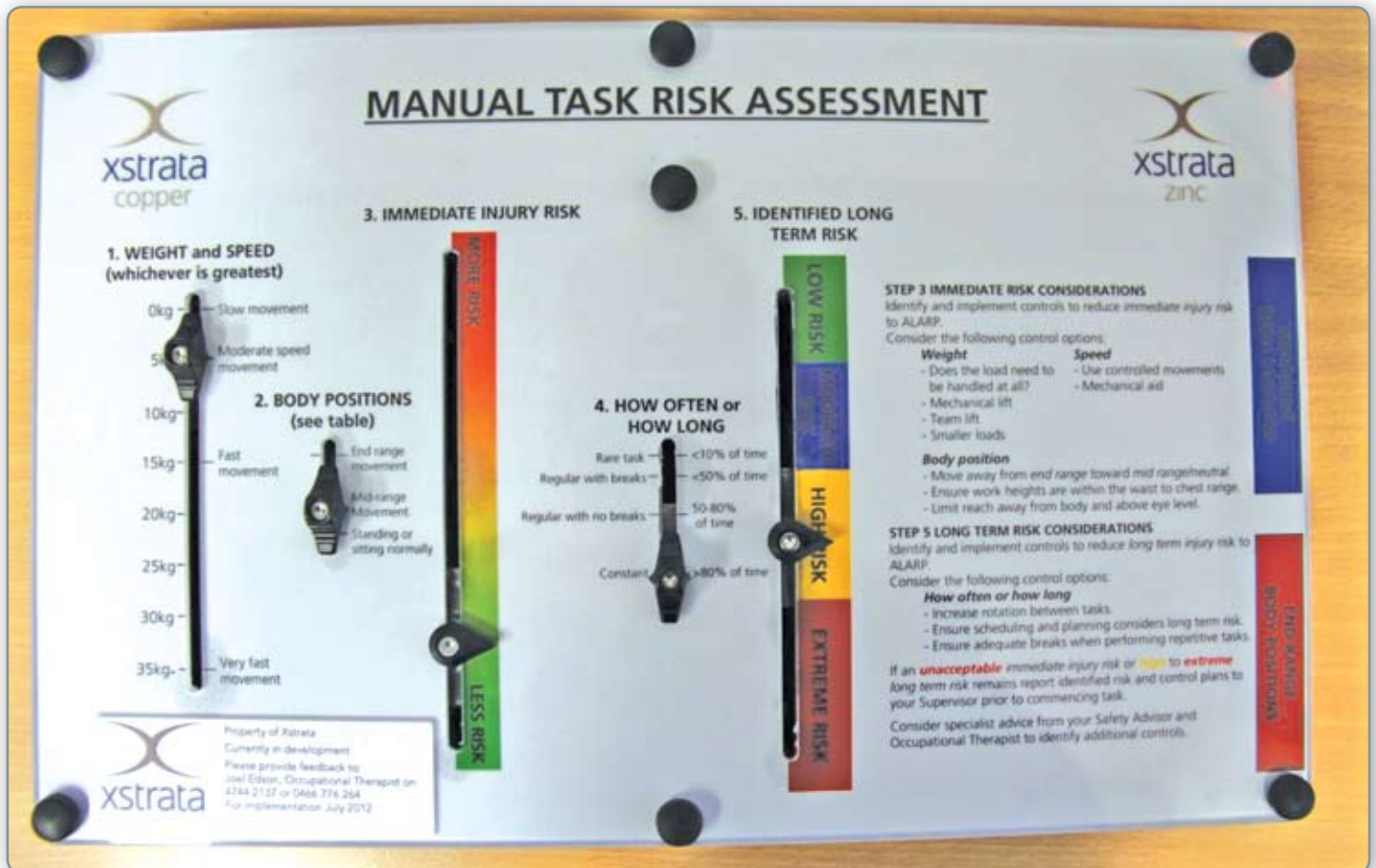


Risk factor 3: HOW OFTEN (rare task – constant) or HOW LONG (less than 10 per cent of the time – more than 80 per cent of the time)

1. The images below illustrate the risks associated with lifting a load (5 kilograms, then 15 kilograms), using mid-range movements. The task is classified as rare, or not undertaken often. **Note the increase in risk levels (both immediate and long term) as the weight of the load increases.**



2. The image below illustrates the risks associated with the same task (lifting a 5 kilogram load using mid-range movements), however, this time the task is classified as constant, or undertaken more than 80 percent of the time. **Note the low immediate risk level, but the high long-term risk level.**



Appendix H



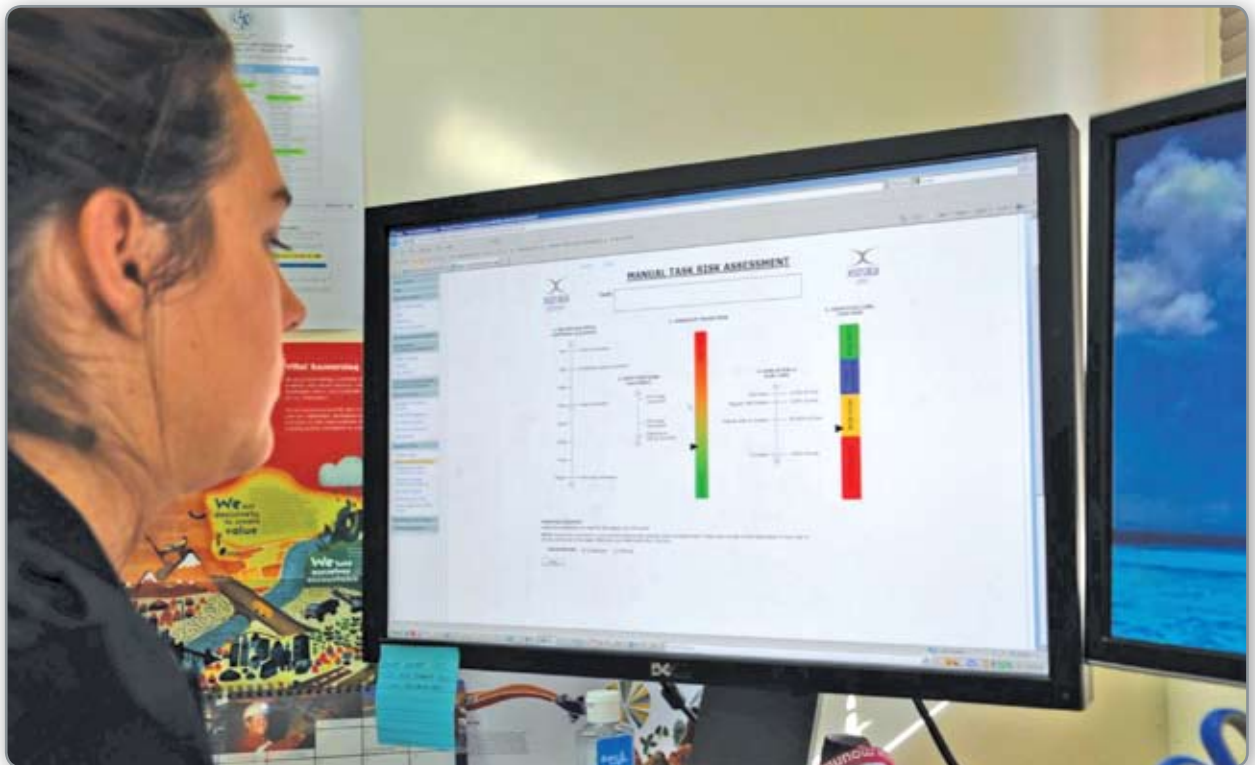
Joel Edson, Occupational Therapist, Xstrata North Queensland using the MTRA to conduct a Manual Task Risk Assessment with Shayne Dunbar, Anode Production Supervisor, Copper Smelter

Appendix I



Joel Edson, Occupational Therapist, Xstrata North Queensland (top right) overseeing Crushing and Conveying team from our underground copper mine using the MTRA in a pre-start risk assessment

Appendix J



Jessica Edwards, Graduate Community Relations Advisor, Xstrata Mount Isa Mines, trialling the electronic MTRA, available via the Xstrata Mount Isa Mines intranet