Applying ergonomic principles to control a long term manual handling risk: Installation of Rio Bars

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1. Scope - level heading

This presentation describes the assessment tools used to quantify ergonomic risk factors associated with the installation of concrete reinforcement bars during a local bridge construction. It has been identified that “Steel fixers” within the construction industry who are employed to perform this task are exposed to significant ergonomic risks and have the highest frequency for reporting MSD’s across occupational group (Abers & Huddock 2007).

In order to quantify the ergonomic issues pertinent to the installation of reinforcement bars in concrete construction, three standard assessment tools were applied: the quick exposure checklist (QEC); Rapid Upper Limb Assessment (RULA); and the HSE Risk Assessment Worksheet.

Assessment results rated the manual task of steel fixing as high risk for sustaining musculoskeletal or soft tissue injuries. The main risk factors included high repetition frequency, non-neutral posture, static muscle forces, high forces resulting from pushing, pulling, lifting heavy reinforcement bars and long durations of force execution.

The aim of the risk control strategy was to reduce the frequency and duration of postural mechanical loading. Recommendations were proposed to mitigate risk of MSD’s based on the hierarchy of controls. For example, it was identified that the manual process of tying the reinforcement bars using pliers and side cutters in a prolonged forward-flexed posture can be eliminated by using an automatic “rebar tying” a powered tool which is operated from a standing position. The standard assessment tools clearly quantified the reduction in manual handling risk from high risk to low risk.

2. Project organization:

The risk assessment of the “Rio-Bar” installation process was completed to fulfil subject learning outcomes of the “Ergonomics Essentials” subject in the Masters Level OHS course at the University of Wollongong, 2014.

3. Human Factors topics covered

Industry case study; physical ergonomics; risk assessment processes; engineering controls.

4. Project phases:

Risk Identification – observation and hierarchical task analysis
Risk Assessment – measurement of risk using 3 assessment tools
Risk Control – recommendations for mitigating risk

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References


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