

## Measuring wrist and forearm physical workload at an assembly line

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### 1. Introduction

Assembly work in the manufacturing industry is regarded as forceful and repetitive and may increase the risk of work related musculoskeletal disorders (WMSD). The aim was to analyze, with technical measurements, the work load at a semi-automated production line at a company in southern Sweden, producing oil separators for diesel vehicles.

### 2. Methods

Wrist postures and movements were recorded with goniometry and muscular peak load and time for recovery were registered with electromyography in the forearm extensor muscles. Ten right handed women were measured during a typical workday.

### 3. Results

Compared to other types of work in general, the repetitiveness, as characterized by angular velocity (19 °/s), was relatively high. Moreover, muscular peak load (30 % of maximal capacity) was relatively high (Figure 1), and time for muscular recovery (4.5 %) was relatively low. In comparison to other industrial work no remarkable differences were seen. Task exposure, i.e. job exposure categorized into the seven tasks that constitute the work, showed considerable differences between the tasks. Breaks and meetings showed, as expected, the lowest loads. Final assembly had the highest loads, in both right and left side, regarding both repetitiveness and peak load. In earlier studies the relationship between technical measurements and complaints has been investigated (Nordander et al). An increase of 10 % of maximal capacity means an increase of 9 % of the prevalence of complaints in elbow/hands the past seven days, to bear mind when planning for improvement in the production line. The quantitative information obtained with technical measurements cannot be achieved with observations or self-assessments.

### Reference

Nordander C, Ohlsson K, Åkesson I, Arvidsson I, Balogh I, Hansson G-Å, Strömberg U, Rittner R, Skerfving S. Exposure-response relationships in work-related musculoskeletal disorders in elbows and hands – a synthesis of group-level data on exposure and response obtained using uniform methods of data collection. *Appl Ergon* 2013;44:241-53.