

INKJET – ELIMINATION OF RISKS ARISING FROM REPETITIVE LIMB MOVEMENTS

1. Organisations involved

Olivetti Tecnost Group

2. Description of the case

2.1. Introduction

The Olivetti Tecnost Group promotes a policy of respect for people and for the environment, a time-honoured legacy of the Olivetti culture. In view of this, the company places a high priority on prevention-related activities in the field of environmental health and safety. One way it does this is by undertaking intensive research into conditions that may potentially impact on its workers.

Many production processes at the group require activities involving repetitive movement of the upper limbs. To tackle this, the company has a policy of:

- informing management about WRULDs-related issues;
- providing information and targeted training for key staff such as occupational physicians and technicians working for the Prevention and Protection Service on assessing risk by determining the OCRA index and applying the workstation checklist;
- identifying, in collaboration with occupational physicians, the potentially more critical movements that contribute to the WRULDs risk, with monitored assessment of the relevant risk indexes and definition of the preliminary corrective intervention measures;
- systematically examining the various productive settings, with analysis/evaluation/ definition of corrective intervention measures;
- planning information and training interventions for employees;
- compiling a database containing medical information about employees and the risk indexes for individual workstations.

In order to carry out an analysis of risks attributable to repetitive movements, the methods fine-tuned by the EPM (Ergonomics of Posture and Movement) Research Unit were applied:

- slow-motion analysis of film footage by technicians in collaboration with the occupational physician detailing the workstations deemed to be at risk;
- calculation of the OCRA index;
- correlation with medical history data;
- redesign project.

An analysis was conducted into the activity of testing inkjet heads. The workstation examined (Figures 1, 2 and 3) is a rectangular plan; positioned on this area are three printers, one PC and two trolleys located to the left and the right of the female operator, on which are arranged containers containing the heads to be tested and those already tested. The activity involves inserting the heads into the carriage of each printer in succession. The tester presses a button which 'instructs' the PC to print out a special text on each printer. The operator visually monitors the printer output to verify that the printer is functioning correctly and the printed text is of the required quality. If so, the head is functioning correctly. The heads are then placed in different trays, depending on the result of the test, and sorted for the next stage of processing.

The distance of the printer from the operator requires the shoulder to be bent and (for shorter operators) the trunk to be pushed forward. Taking (Figure 3) and repositioning the heads in the

CASE STUDIES

last rows of the blister pack involves the abduction of the shoulder and in some cases the lateral inclination of the trunk. A raised-arm posture is maintained for over one third of the working cycle. The turnover of employees is very low because of the long induction phase required to become proficient in the testing standards. Most workers doing this activity are women; their average age is 30 years and average length of service five years. Routine employee health surveillance revealed a moderate incidence of pain to the right shoulder among these operators. A more detailed survey was therefore carried out to determine the type and extent of disorders relating to the upper limbs. The data confirmed that the right shoulder was the only clinically involved part of the body. The discovery of a pathology that was likely to be linked to the occupational activity in question triggered the immediate implementation of a plan that the company had already prepared to tackle such problems. Analysis of the activity performed by the operators showed that the most critical factor related to posture. The repetitive movement risk index, obtained through the OCRA checklist, fell within the yellow zone (very low risk).

2.2. Aims

The aim was to redesign the workstation in order to eliminate the risk due to (incorrect) posture and repetitive movements of the upper limbs.

Figure 1. The original layout of the workstation



Figure 2. The original layout of the workstation



Figure 3. Insertion of the head into the printer (original layout)



2.3. What was done, and how?

The workstation was redesigned according to the prototype layout shown in Figure 4. This resolved the relevant problems of posture and, at the same time, reduced production times by eliminating the paper-input phase of the working cycle.

CASE STUDIES

Figures 4 and 5. The revised workstation layout



Semicircular workbenches were used, with proper support for the monitor positioned directly in front of the operator. The printers, following the shape of the workbench, were brought closer to the operator. The shape of the workbench allows the printer carriages to be reached more easily; having the monitor in the centre eliminates the need for the operator to rotate her head (Figure 5). A slide to the right of the central printer automatically discharges the heads to be tested directly from the preceding work phase. Once tested, the heads are moved using a similar slide placed to the left of the central printer, and this is connected with the following work phase. The use and positioning of sliding conveyor belts eliminates the undue abduction of the arms which previously occurred, except perhaps for the act of depositing the heads in the appropriate container for reprocessing. This operation does not occur frequently, however.

The alteration in the working cycle was followed by proper training of the staff, which proved indispensable to help the operators understand and hence accept the need to change an undesirable working method which had become habitual.

2.4. What was achieved?

Following intervention, the index of risk from repetitive movements resulting from the OCRA checklist dropped from the yellow (very low risk) to the green zone (acceptable level of risk). The employees were satisfied with the changes made and there was a general improvement in symptomatology.

Problems faced

Training had the effect of slowing down the rhythm of activity for a few days, but its benefits far outweighed this inconvenience.

2.5. Success factors

The interventions described did not negatively affect productivity in the slightest, and the cost of the product remained the same. The results proved a success in terms of employee satisfaction and improvement in symptomatology: all of this confirms the value of the whole process undertaken and the desire to continue on the same course.

2.6. Further information

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2.7. Transferability

Musculoskeletal disorders of the upper limbs are an issue in many occupational activities involving awkward postures and repetitive movements of the upper limbs. The method applied in this case may be transferred without difficulty to activities and workplaces similar to those described.

3. References, resources:

- <http://osha.europa.eu/en/publications/reports/TEWE09001ENC>