IFA
Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung

0421

Focus on IFA's work

Issue 10/2021 617.0-IFA:617.81

Musculoskeletal loads arising during floor mopping with different types of mop handle

Problem

Building cleaners are exposed to high physical workloads. This is due in part to many activities still being carried out manually, despite developments in technology and the digital transformation of the world of work. Floor cleaning, in this case wiping of the floor with a mop, must be regarded as one of the tasks associated with higher workloads. Since this activity accounts for a considerable proportion of the cleaners' working time, manufacturers are endeavouring to develop ergonomically optimized products for manual floor cleaning in order to reduce the cleaners' physical workload. What however are the characteristics of a floor mop handle that help ease the workload?

Test person during the laboratory test

Activities

The IFA was tasked by the German Social Accident Insurance Institution for the building trade (BG BAU) with examining a range of floor mop handle types. During performance of a standardized task in a laboratory study, the body posture and various joint angles of the hands, arms and shoulders were recorded by means of an optical measuring system. The test persons were subsequently questioned concerning their subjective assessment of use of the handles.

The focus lay on three mop handles with telescopic adjustment, differing in their design and handling characteristics. They comprised designs with a standard straight handle, a straight handle with rotating end grip, and an S-shaped handle with rotating elements.

Seventeen professional cleaners took part in the study. Their task was to damp-mop two strips of floor, each 4 metres in length and 1.5 metres in width, walking backwards at their normal working pace. A camera-based 3D measurement system recorded their body postures and movements, enabling the parameters of trunk inclination and joint angle of the hands and shoulders (raising of the arms) to be assessed. How the handles were used was partly specified, partly the workers' own choice; the intention was to determine potential effects of the different handle types. The test persons were then asked to provide their own assessment of the different mop handles by means of questionnaires.

Results and application

The length of each mop handle was adjusted to the height of each test person in line with the applicable recommendations (end of the mop handle at a height approximately between shoulder and chin). The effect of this was that virtually all the workers adopted the desired, almost upright upper body posture during mopping.

Provided the floor mops are used correctly, certain handle geometries can reduce the workload on the joints, especially the wrists. In contrast to the traditional straight "broomstick" handle shape, a knob-shaped grip, for example, offers a range of options for holding the upper end of the handle and thereby reducing imbalanced and repetitive loads.

At the same time however, unconventional handle geometries may require habitual movement patterns to be changed. Should the handles be used incorrectly, the effect may be the opposite of that intended and may even lead to dissatisfaction and frustration during use, as was shown by assessment of the questionnaires.

The results of the study are documented in detail in an IFA report. They have also been incorporated into guidance for manual floor cleaning and into design criteria for floor mop handles satisfying the requirements for the BG BAU's OSH subsidy.

User group

Employees and company management in the building cleaning trade, mop manufacturers

Further information (in German)

- Brütting, M.; Ernst, B.: Auswirkungen auf Muskel-Skelett-Belastungen beim Bodenwischen mit unterschiedlichen Stieltypen (IFA Report 7/2020). Published by: Deutsche Gesetzliche Unfallversicherung (DGUV), Berlin 2020

- Online information on the BG BAU's OSH subsidies

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Published and printed by:
Deutsche Gesetzliche Unfallversicherung e. V. (DGUV), Glinkastrasse 40, 10117 Berlin, Germany

ISSN (Internet): 2190-006X

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