IFA
Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung

0343

Focus on IFA's work

Edition 4/2013 617.0-IFA:638.81

Back strain campaign: Development of the CUELA back monitoring system

Problem

Back strain and the associated backache are a widespread problem in our society. In their prevention campaign "Think of me. Love, your back", the social accident insurance institutions and their partners are focussing to reduce back strain at work, at school and during free time. It is hoped that illustrative exhibits at events like the "health days" and trade fairs will heighten people's awareness of work-related back strain.

To this end, the proven CUELA[1] measuring system was to be further-developed at IFA into a CUELA back monitoring system to directly illustrate the stressing of the back during typical activities.

Activities

In advance of the prevention campaign, the IFA developed sensors to measure the postures of the trunk and arms. A concurrently developed biomechanical model uses the data thereby obtained to calculate the compressive force acting upon the lowest intervertebral disc (L5/S1). It is also possible to simulate the weight of a load and calculate the stressing of the back from handling this load.

CUELA back monitoring system – test subject wearing sensor jacket, and virtual rendition

Results and Application

The CUELA back monitoring system consists essentially of a jacket with integrated three-dimensional inertial sensors. This way, test subjects can be quickly equipped with the necessary measuring

[1] German acronym for "computer-based measurement and long-term analysis of muskuloskeletal workloads"

gear. Via a USB cable connection, the sensors are linked to a notebook containing the simulation software.

At events, interested persons can don the sensor jacket and complete a short course replicating everyday situations like the simple lifting of a load, the removal of an item of luggage from the boot of a car or working bent forward. Simultaneously, the compressive forces acting on the intervertebral discs during the various activities are displayed on the monitor. Load magnitudes are indicated with different colours (on the traffic light principle).

In return for their volunteering, the test persons receive a printout of their readings and general instructions on how to prevent back strain. As well as being a source of information and a means of acquiring first-hand experience, the module can also be used competitively to find out who can complete the course with the lowest readings.

The entire event module consists not only of the sensor jacket (in two sizes), but also of the associated measurement computer, a printer, a display wall with a large screen and roll-ups, information material and elements for the course.

The use of the event module calls for supervision. Training and instruction of supervisors in how to use the system are available during the campaign. The module can be booked via the campaign website (www.deinruecken.de).

Area of Application

Social accident insurance institutions, companies

Additional Information

- www.deinruecken.de – Verleihangebote – Veranstaltungsmodule – CUELA-Rückenparcours

Expert Assistance

IFA, Division 4: Ergonomics – Physical environmental factors

Literature Requests

IFA, Zentralbereich

Published and printed by:
Deutsche Gesetzliche Unfallversicherung e. V.
(DGUV), Mittelstrasse 51, 10117 Berlin

ISSN (online): 2190-006X
ISSN (print): 2190-0051

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