

# Focus on BGIA's work

Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung

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## Ergonomic study of specific dynamic office chairs

### Problem

In recent years, the incidence of back disorders has increased dramatically. At least 90% of Germans now suffer, at least some of the time, from this common illness. Longer periods spent in a predominantly static seated position may lead both to static overloading (tension) in the muscular system, particularly in the neck and shoulder region, and to functional underloading of certain muscle groups, such as the back and abdominal muscles.

Many manufacturers present a remedy in the form of office chair models which are claimed to promote "active" sitting in various ways. These "dynamic" office chairs exploit mechanisms such as synchronous mechanics, which permit simultaneous inclination of the seat pan and backrest. Additional functions such as lateral inclination of the seat pan, variation of the contact pressure, or even active inherent spin of the seat pan characterize the particular dynamic properties of such chairs.

### Activities

In conjunction with the BGIA and the Dutch TNO Work and Employment institute, the Verwaltungs-Berufsgenossenschaft (the institution for statutory accident insurance and prevention in the administrative sector – VBG) conducted a comprehensive ergonomic evaluation of dynamic office chairs. Laboratory and field studies were conducted on test subjects with the objective of quantifying the benefits obtained by substitution of a standard office chair by a dynamic office chair.



Measurement at a simulated office workplace in a laboratory environment; display in the WIDAAN software

A measurement system based upon the CUELA system was developed and employed for the measurement of seated activities.

### Results and Application

To summarize, analysis of the measured data from the laboratory and field studies revealed that the task performed had a greater positive influence upon the individual seating dynamics of the subject than the choice of chair. The results show that the chairs differed in their dynamic characteristics, but also that these differences do not directly result in greater physical activity on the part of the seated person.

Instead, the measured values suggest that the chair's movement has no significant influence upon the muscular activity and the body dynamics.

Interviewing the test subjects with regard to their subjective impressions revealed major differences between the individual chairs. Two of the special chairs failed to satisfy the expectations placed upon them, and were in fact considered by the test subjects to be detrimental to their health. One special chair and the reference chair met the expectations, and only one of the special chairs surpassed expectations and was rated positively by a majority of the test subjects.

#### **Area of Application**

All industrial sectors involving occupational activity which is primarily performed seated at office and VDT workplaces

#### **Additional Information**

- Ergonomische Untersuchung besonderer Büroarbeitsstühle. BGIA Report 5/2008. Ed.: Deutsche Gesetzliche Unfallversicherung (DGUV), Sankt Augustin 2008, [www.dguv.de/bgia](http://www.dguv.de/bgia), Webcode **d18885**

#### **Expert Assistance:**

BGIA, Division 4: Ergonomics – Physical environmental factors

#### **Literature Requests:**

BGIA, Central Division

#### **“Focus on BGIA's Work”**

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