

## Focus on IFA's work

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# Selection of hearing protectors for extreme shots on indoor shooting ranges

## Problem

On shooting ranges, marksmen and women, trainers, and supervisory and cleaning personnel are exposed to airborne pollutants and to noise. Exposure is greater on indoor than on outdoor shooting ranges.

The specific exposure to hazards of persons on indoor shooting ranges was measured in a research project conducted by the German Social Accident Insurance Institution for the administrative sector. The requisite noise measurements were performed by the IFA, and the results formed the basis of analyses for the selection of suitable hearing protectors.

## Activities

The noise emitted by individual firearms was first measured. The human hearing can be damaged both by single shots with high peak values and by exposure over many years to continuously low noise. Values must therefore be observed for both types of sound. Limits for peak values and for noise values averaged over time must therefore be defined and observed. Special equipment is required for measurement of the peak values. Time averaged values are difficult to determine, as they are influenced by local conditions.

A computer model was developed in order to predict the noise exposure caused by several firearms. The model also took the influence of the



Marksman on a shooting range

room into account. The predicted values deviate only marginally from the data measured during normal shooting activity.

## Results and Application

The noise exposure experienced by a marksman, trainer or supervisor on an indoor shooting range can be predicted mathematically for the handguns or long-barrel weapons typically used in sports shooting. The arithmetic model developed for this purpose is suitable for calculation of the noise exposure for a number of locations and different shooting situations. A noise work sheet (*Lärm-schutz-Arbeitsblatt* [LSA]) has been produced containing recommendations for the selection of suitable hearing protectors.

### **Area of Application**

Persons present during shooting with portable firearms on indoor shooting ranges, such as supervisors, trainers, security company personnel, gunsmiths

### **Additional Information**

- Lärmschutz-Arbeitsblatt LSA 01-831: Gehörschützer für das Schießen mit Handfeuerwaffen in Raumschießanlagen (BGI 677, formerly ZH 1/564.21) (09.97). Published by: Berufsgenossenschaftliches Institut für Arbeitsschutz – BIA, Sankt Augustin. Carl Heymanns, Cologne 1997 (under revision)

### **Expert Assistance**

IFA, Division 4: Ergonomics – Physical environmental factors

German Social Accident Insurance Institution for the administrative sector, Hamburg

### **Literature Requests**

IFA, Central Division