
Executive Summary

Health Council of the Netherlands. Adjustment of occupational exposure limits in case of unusual work schedules. The Hague: Health Council of the Netherlands, 2001; publication no. 2001/06OSH.

Committee and request for an advisory report

Pursuant to the widening of the scope for flexible working hours, the State Secretary of Social Affairs and Employment asked the Health Council for an advisory report about the consequences of flexible working hours for the determination of health-based recommended exposure limits and the resulting regulatory exposure limits. The State Secretary wishes to know whether and, if so, how variations in the duration and timing of exposure should be included in the limits. The phrase “variations in the duration and timing of exposure to compounds in the workplace” refers to changes in exposure as a result of a work schedule which differs from the ‘standard schedule’: 8 hours a day, daytime office hours, 5 days a week.

The President of the Health Council asked the Council’s Dutch Expert Committee on Occupational Standards (DECOS) to answer the State Secretary’s question.

Adjustment of limit values

Exposure limits and the health-based values on which they are based can take various forms: a ceiling-value, an average for 15 minutes (time-weighted average –TWA- 15 minutes) and an average for a working day (TWA 8 hours).

Acute toxic compounds

If the limit value is expressed as a 'ceiling-value' or as a 'TWA 15 minutes', the committee does not believe that adjustments are required for unusual work schedules. These situations involve exposure to substances with very acute toxic effects in which the number of hours worked per day is not of immediate importance. An example of this is irritation of tissues as a critical effect. In more general terms, the committee believes that adjustment of the limit value is unnecessary when the half-time is less than 3 hours. (The half-time of a compound is the time necessary to eliminate 50% of the compound from the body.)

Compounds with cumulative exposures

In the case of substances that remain in the body for relatively long times (half-times in excess of 400 hours) and for carcinogenic substances (with a stochastic action), adjustments may not be required since cumulative exposure is the factor which is particularly important here. In practice unusual work schedules will not lead that a total number of hours worked (and consequently exposure time) over periods of many months that differs much from the standard schemes that have been used in deriving exposure limits. The committee proposes that the safety, health and welfare service should determine whether adjustment of the limits is warranted, given the actual exposure of the workers. That might be the case when employees would structurally work longer hours than standard, e.g. in case employees are seconded to various companies.

Other compounds

In all other cases, the safety, health and welfare service should use information about actual exposure of the employee to determine whether a change is required to the limit value.

The committee proposes a standard approach for adjustments. This approach takes into account the extension of the 'working day' and the subsequent reduction in recovery time between two working days. The committee advises using the 'Brief & Scala' model for this purpose. In general, this results in limit values which are slightly lower than when the method referred to in the National MAC list is used. If reliable models are available for describing the kinetics and dynamics of substances in the body, they could be used to derive an adjustment factor for the limit value. However, in general, the use of models of this kind is not straightforward.

In its advisory report, the committee looks only at the amount of time worked. Research has shown that the response to exposure to substances can vary according to the time of day. Current knowledge in this field is still inadequate as a basis for general recommendations for changes to the limit values.