Measurement and risk assessments

International Standard ISO 5349.

*Part 1* General requirements

*Part 2* Practical guidelines for measurement at the workplace

*ISO 5349 is based on the measurement of vibration magnitude (m/s²) and exposure times (hours)*
Measurement and evaluation strategy

- Identifying the vibrating operations
- Evaluation of the daily exposure time
- Selection of operations to be measured
- Measuring the frequency weighted acceleration
- Calculating the 8-hour energy-equivalent acceleration
- Risk assessment
Identifying the operations

Identify the sources of the vibration, operations, machines, tools
Daily exposure time

Evaluation of the daily exposure time

Stopwatch                             Time Study

07 MEASUREMENT AND RISK ASSESSMENTS
A TEACHING GUIDE ON HEALTH EFFECTS, RISK ASSESSMENT AND PREVENTION: OCCUPATIONAL EXPOSURE TO HAND-TRANSMITTED VIBRATION
Duration of vibration measurements

Measurement of vibration exposures from more than one hand-held tool
Choice of accelerometer

Accelerometer weight less than 5% of the mass of that part of the structure on which the accelerometer is mounted.
Accelerometer mounting and position

Example of accelerometer mounting a) screwed b) glued c) hose clamped or d) hand adapters.

Example of accelerometer mounting positions.
Measurement directions
Frequency range and weighting

Frequency range: 5 Hz to 1500 Hz.

Frequency weighting according to ISO 5349-1
Measurement equipment
Eliminating sources of uncertainty

- Most common sources of uncertainty:
  - cable connector problems
  - triboelectric effect
  - DC-shift
Calculating the 8-hour energy-equivalent vibration

The equivalent 8-hour acceleration

\[ a_{eq(8)} = \sqrt{\frac{T}{8}} \cdot a_T \]

\( a_{eq(8)} \) is the 8-hour equivalent acceleration, \( T \) the actual exposure time in hours and \( a_T \) acceleration during the period \( T \) hours.
Risk assessments

- Vibration exposure for predicted 10% prevalence of vibration-induced white finger in a group of exposed persons.