

# Evaluation of the effectiveness of tool timers for estimation of daily exposure time to hand-arm vibration

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## Introduction

Tool timers are devices that have been developed to quantify the worker's exposure time to vibration. A variety of devices are available ranging from simple designs which work like a stop watch, to more complex devices which measure the vibration magnitude as well as the exposure time. These timing devices are triggered to start recording when the tool is switched on or when they sense vibration. They are marketed as a method for employers to track and quantify worker's exposure times to hand-arm vibration.

## Methods

HSE undertook laboratory tests and site visits to assess the timing ability of six devices in order to determine the effectiveness of these devices as part of a vibration control programme. For devices that also measured vibration, this was also assessed. For all measurements video footage was recorded to provide a reference measure of the time for which a power tool was in use.

A triaxial accelerometer was attached to the handle of the power tool which was connected to either a hand held vibration meter (on site tests) or a Brüel & Kjær Pulse Analysis system (laboratory tests). For all vibration measurements an initial 30 second continuous measurement was made to obtain an approximate vibration value.

**Tool timers should be used with caution.**

**Continual monitoring and recording of vibration exposure is not a requirement of the Control of Vibration at Work Regulations.**

**Employers should devote their effort to trying to eliminate or reduce vibration exposures rather than monitoring them.**

Device	Features
A	Pre-programmed devices in two parts which is mounted onto the tool. Measures time only
B	Worn between the fingers, measures time and vibration
C	Worn on the wrist, measures time and vibration
D	Pre-programmed device mounted onto the tool, measures time only
E	Pneumatic in-line timer, measure time only
F	Electric in-line timer, measures time only

Device	% difference to reference time
Device A	No data was able to be collected for Device A
Device B	+35%
Device C	+10%
Device D test 1	+8%
Device D test 2	-14%
Device E	-11%
Device F	-18%
Device D test 3	-18%
Device D test 4	-20%

## Discussion

In a small sample of 25 comparisons of tool timer measurements with a time reference, 15 of these measurements were within -10% to +10% of the reference time. However, normal operating circumstances were found to give timer measurements that were between -28% and +150% of the reference time.

Device A was concluded to be unusable and in need of significant improvement.

A brief assessment of the vibration recorded by some tool timers showed that these devices do not usually provide accurate values for the vibration of the tool.

These findings support HSE guidance which says:

- Tool timers should be used with caution.
- Continual monitoring and recording of vibration exposure is not a requirement of the Control of Vibration at Work Regulations.
- Employers should devote their effort to trying to eliminate or reduce vibration exposures rather than monitoring them.

This poster and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.