

Product: Pneumatic tools: Paving breakers and Pickhammers  
Action: 3-axis vibration measurements  
Start date: 13/04/2006  
Countries: UK

Ingersoll Rand has completed the 3-axis vibration measurements for its main pneumatic demolition tools by mid of April 2006. The test was carried out on the ball-bearing device in the factory. This methodology was already qualified in the industry as the most reproducible and sound way of measuring the vibrations.

The measurements were certified by the TÜV control organisation. Knowing the high output of our demolition tools, we are quite satisfied by the relatively low values of the vibration damped tools. One should nevertheless pay attention that they are average values of measurements performed with 3 different users with different tools. This means that the real vibrations are sometimes lower, sometimes higher, depending on the user and other parameters.

From the users' point of view, the key aspect of vibrating tools is the allowed daily *Operating Time* before reaching the ELV: Exposure Limit Value. In UK, the maximum daily *Trigger Time* before reaching ELV is calculated with the basis of A (8) limited at 5 m/s<sup>2</sup>: i.e. the limit is equivalent to working for 8 hours with a tool featuring 5 m/s<sup>2</sup>.

Therefore, it is possible to calculate for each tool its maximum daily *Trigger Time* using the formula below.

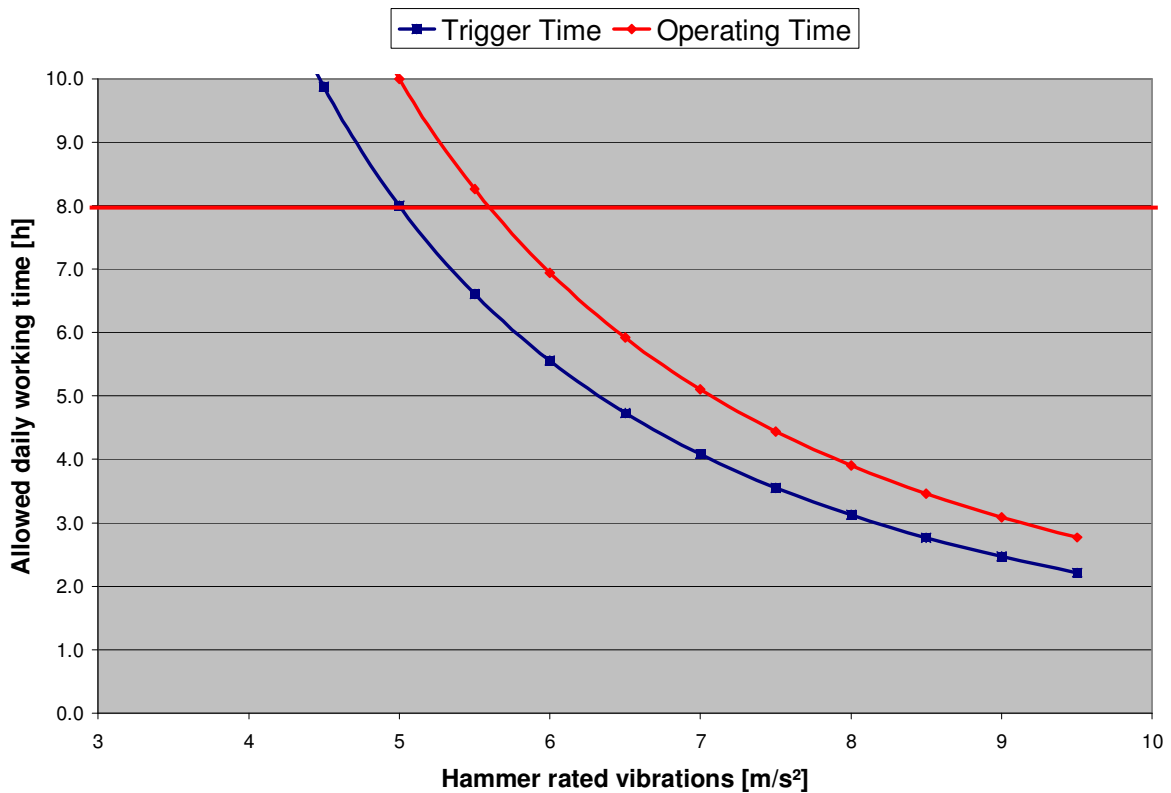
$$TriggerTime = \left( \frac{5}{VibValue} \right)^2 * 8$$

The *Trigger Time* is assumed to be at most 80 % of the *Operating Time*:

$$OperatingTime = \frac{TriggerTime}{0.8}$$

The chart on the next page gives the maximum daily *Trigger Time* and maximum daily *Operating Time* as a function of the rated vibration values.





For Ingersoll Rand most popular hammers, we have the following results:

Model	3-axis Vib [m/s²]	Trigger Time [h]	Operating Time [h]	Risk colour code
IR2PS	6.9	4.2	5.3	MEDIUM
IR3PS	2.9	23.8	> 24	LOW
IR5PS	6.7	4.5	5.6	MEDIUM
IR10PV	6.1	5.4	6.7	MEDIUM
IR12PV	5.6	6.4	8.0	LOW
IR15BV	4.1	11.9	14.9	LOW
IR25BV	5.2	7.4	9.2	LOW
IR30BV	5.3	7.1	8.9	LOW

We can observe that 3 hammers have *Operating Time* values below 8 h. Therefore these ones require more attention when they are used intensively: the user should make sure that he doesn't overpass the maximum allowed *Operating Time*. The other tools all belong to the "low risk" group and they can therefore be used without risk for a normal working shift of 8 hours.

More information about HAVS can be found on <http://www.hse.gov.uk/pubns/indg175.pdf>.

Let's work safely.