

TERRADRIVE PRODUCT PORTFOLIO

PRECAST HOUSE FOUNDATIONS

PRECAST CONCRETE PILING

LOW VIBRATION PILING

RESTRICTED ACCESS PILING

STEEL BEARING PILES



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TERRADRIVE

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Vibration Associated with Driven Piling



"Although vibrations induced in buildings by ground-borne excitation are often noticeable, there is little evidence that they produce even cosmetic damage (such as small cracks in plaster)"

BRE Digest 403

'Damage to structures from ground-borne vibration'



WHAT IS VIBRATION AND HOW CAN WE MEASURE IT?

In its simplest form, vibration can be considered to be the oscillation or repetitive motion of an object around an equilibrium position.

Ground vibration is generally measured in three orthogonal directions by means of accelerometers in the vertical, transverse and longitudinal directions. The *Peak Particle Velocity* is taken as the vector sum of these three direct components. The unit used for the PPV is millimetres per second.

The level of vibration associated with Driven Piling is dependent on several factors:

- Size of hammer and drop height
- Pile size and type (Precast Concrete, Steel Tube, Steel Section, Timber) of Piles driven.
- Pile load
- Ground conditions
- Site layout

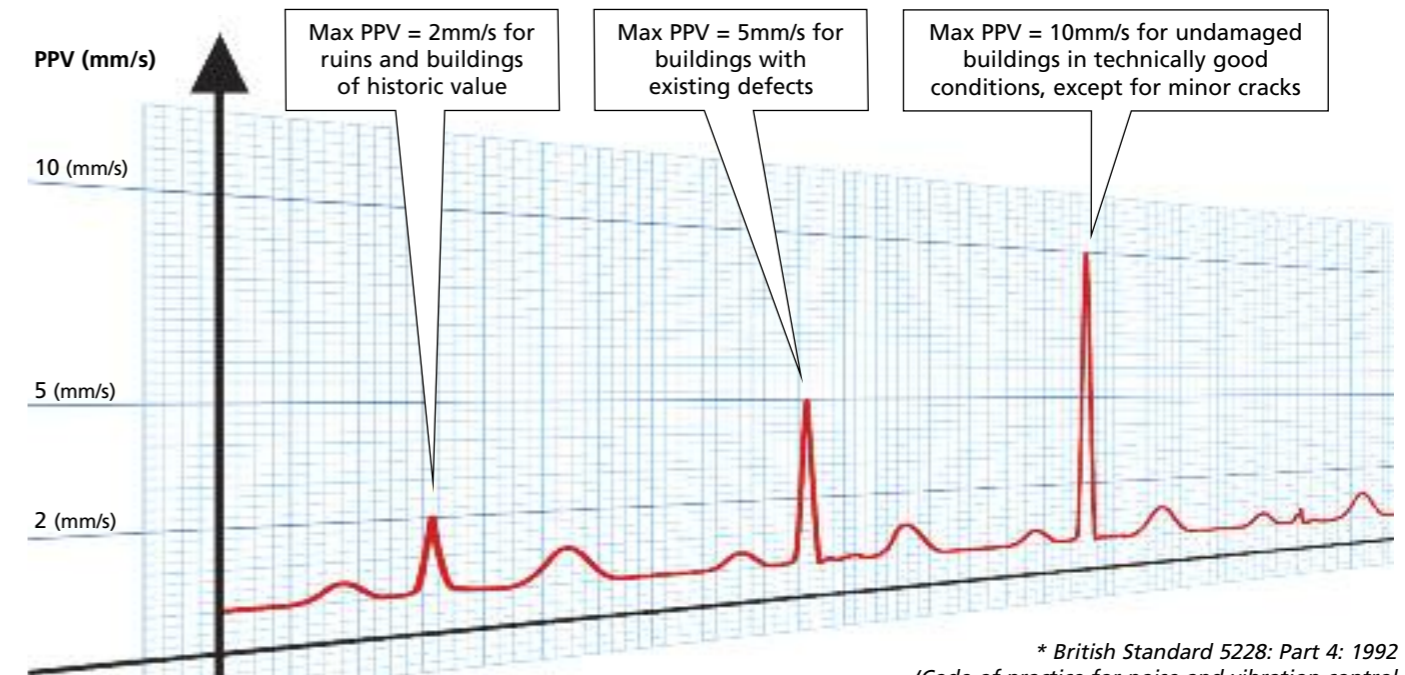
SETTING OUT THE GUIDELINES FOR VIBRATION

It is important at the outset of a piling contract, where there may be a risk due to vibration, that clear guidelines are established between all parties concerned.

These guidelines should clearly indicate at which measurement levels action should be taken – this may include stopping works and changing the system of works or introducing temporary works supports to the structure for example.

WHAT ARE THE VIBRATION LEVELS, WHICH REQUIRE ACTION?*

In general terms, PPV of around 5.0mm/s within a radius of approximately 5m of the pile position may be recorded, which is highly dependent on the particular site factors.



* British Standard 5228: Part 4: 1992
'Code of practice for noise and vibration control applicable to piling operations.'

MONITORING VIBRATION

Position of the monitor:

- at a secure location, where there will be no external interference.
- relevant to the condition of the structure: if there are features such as cracks, or other signs of distress, it is advisable to monitor the levels at these locations.

Prior to piling works starting, background levels should be recorded – this will act as a base level to which future levels during piling operations can be compared against.

In conjunction with vibration monitoring, a **dilapidation survey** of the structure should be carried out and, if required, monitoring points (level points and/or Tell-Tails for example) should also be put in place and recorded during the piling operations.

WHAT TO LOOK OUT FOR ON SITE?

Furthermore, the specifics of each site must be examined, including;

- Condition of adjacent structures, this includes buildings, structures (temporary or permanent), walls, roads, pavements, embankments, waterways, rail lines, excavations.
- Form of construction...
- Location
- Type of foundations
- Nature...

Where the risk of damage due to piling vibrations is considered to be too high, alternatives shall be developed, such as: reduction of driving energy, adjustment of piling method including preboring, isolation of vibrations...