

Project:

File: Revision:



Input by: RKM Revised by: Checked by: Approved for construction by:
Date: 10.4.18 Date: Date: Date:

Vibration Assessment

Rig **KT3** Structure Details: **Railway approx 15m from nearest pile location**
Hammer Weight **3.00 Tonnes**
Drop Height **0.40 m**
Hammer Efficiency **55.0 %**
Separation of pile toe and structure **17.00 m** Founding material: **Glacial Till**
Pile Type * **200mm sq PCC**
Anticipated toe level **7m**

Piling system energy = 0.66 Tm (6474.6 j)

From BS5228-2:2009

$$v_{res} = k_p \left[\frac{\sqrt{W}}{r^{1.3}} \right] \quad \text{where; } v_{res} = \text{resultant PPV (mm/s)}$$

W = hammer energy (j)
 r = slope distance from pile toe (m)
 k_p = driving resistance factor

driving conditions characterised by **stiff cohesive soil** hence k_p is taken as 1.5

Therefore projected vibration = 3.03469 mm/s

From ENV 1993-5 (1998)

$$v = C \times \frac{\sqrt{W}}{r} \quad \text{where; } v = \text{peak particle velocity at } r$$

W = source energy per cycle **
 r = radial distance between source and receiver
 C = ground dependant factor

Worst case*** material considered as **stiff cohesive soil** hence C is taken as 0.75

Therefore, projected vibration = 3.5 mm/s

Notes:

* Steel piles exhibit 10 - 15% less vibration than precast - based on previous experience

** Although different calculation methods use different wording and notation, these values are the same as the piling system energy

*** greatest competency

Summary

Projected Vibration, as per:	BS5228-2;2009	=	3.0 mm/s	Recommended Limits:	BS5228-2;2009	=	12.5 mm/s
	ENV 1993-5;1998	=	3.5 mm/s				