COST Action FP1004

Final Meeting

15 April – 17 April 2015 – Lisbon, Portugal

Lateral vibration in a multi-storey timber building

Thomas Reynolds

University of Cambridge, UK

Building tall in timber

Stadthaus, London
9 storeys, 8 timber

Bridport House,
London 8 storeys

Forté, Melbourne
10 storeys, 9 timber

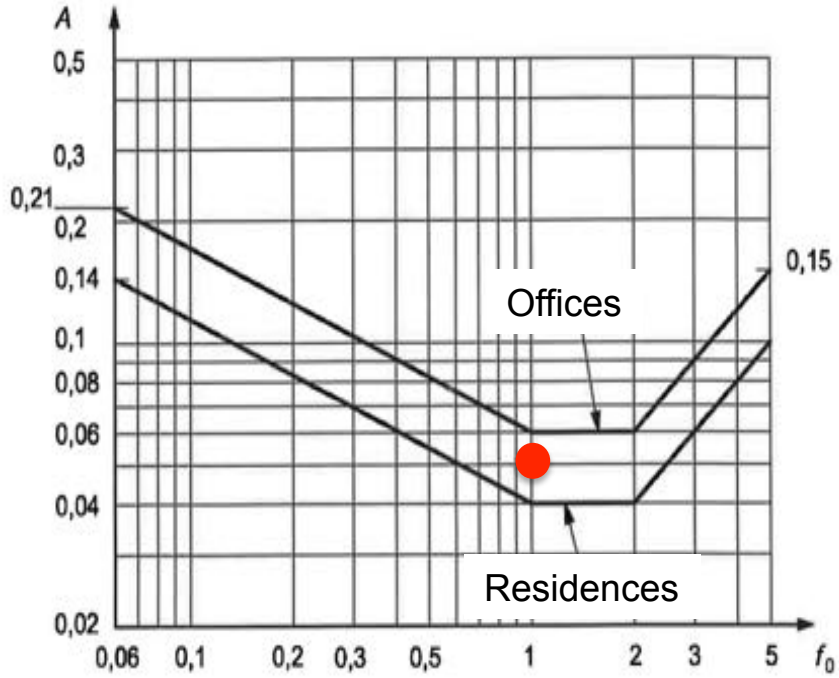
Treet, Bergen,
Norway 14 Storeys

Number of Storeys

2008 2010 2012 2015

Lateral vibration

Acceleration (m/s^2)



Frequency (Hz)

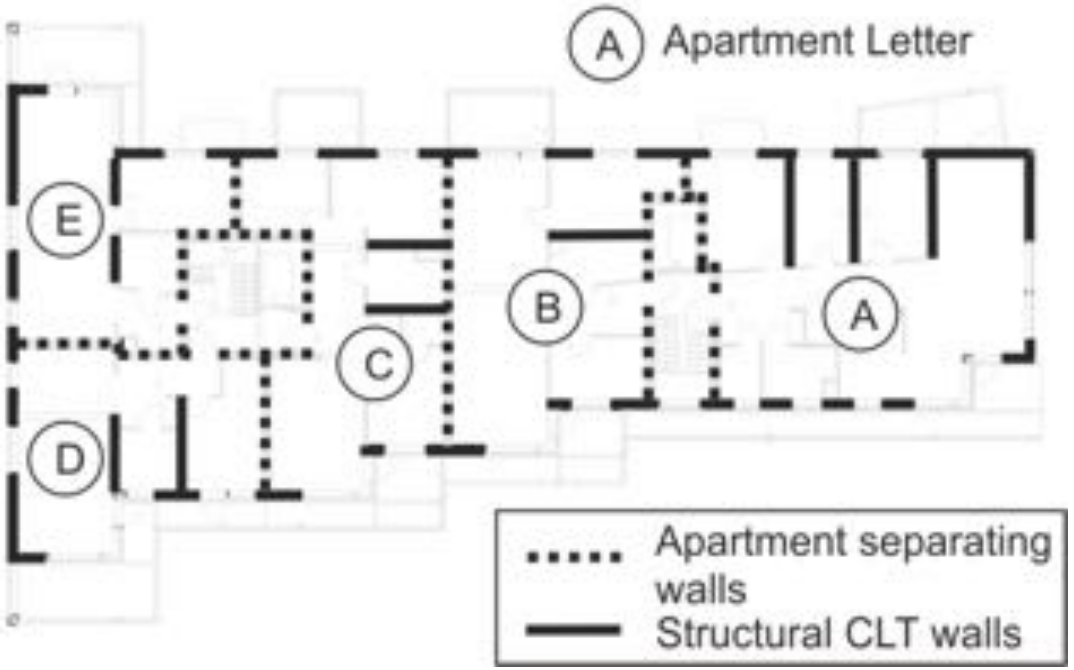
(Ingunn Utne, 2013)

Treet (Image by BOB)

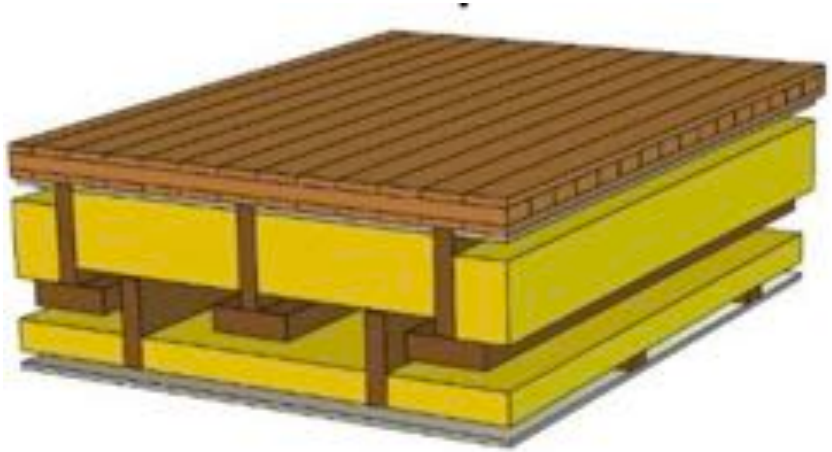
Limnologen

Limnologen
7-storey, Sweden

Limnologen


A Apartment Letter
E
B
A
C
D
Apartment separating walls
Structural CLT walls

Limnologen



Jarnerö, K., Brandt, A. & Olsson, A., 2010. Vibration properties of a timber floor assessed in laboratory and during building construction. In Internoise. Lisbon, Portugal, pp. 337–346.

Building mass

Typical reinforced concrete: 250 kg/m^3

CLT student residence: 125 kg/m^3

Typical steel: 150 kg/m^3

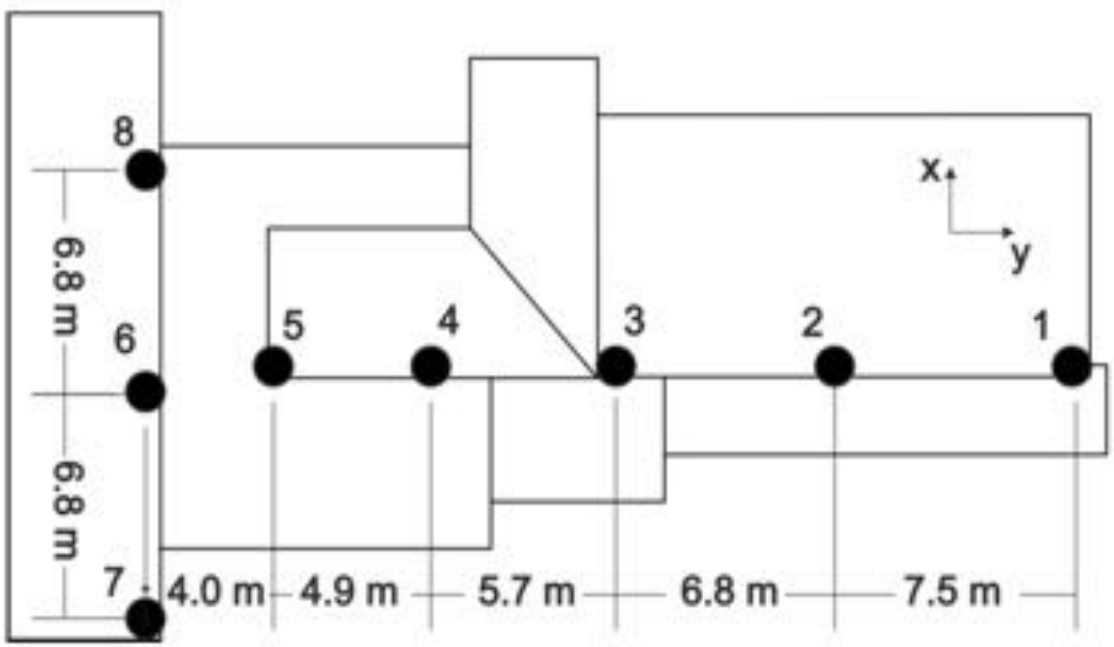
Limnologen: 46 kg/m^3

✓ Mass

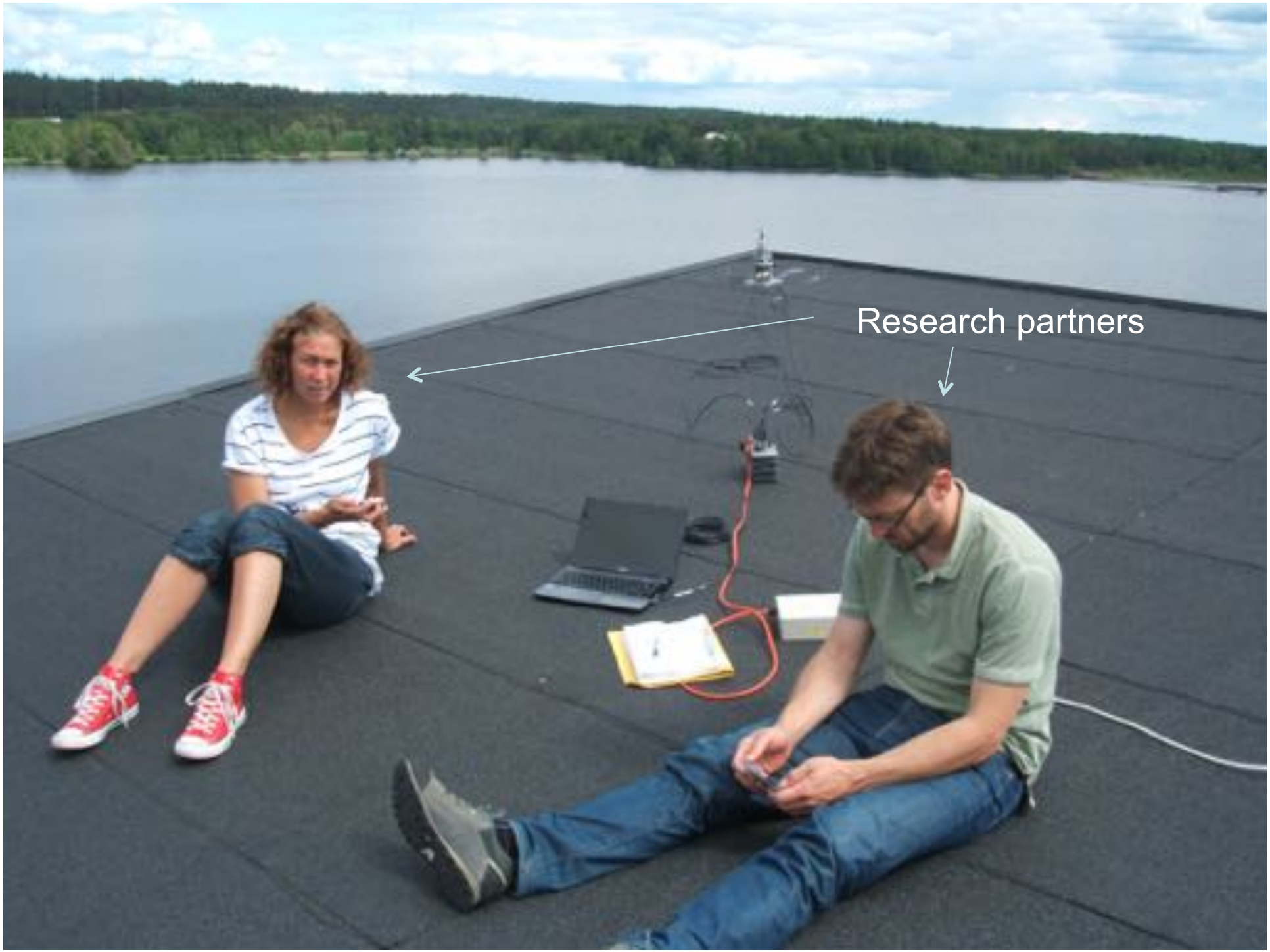
Natural frequency

Damping

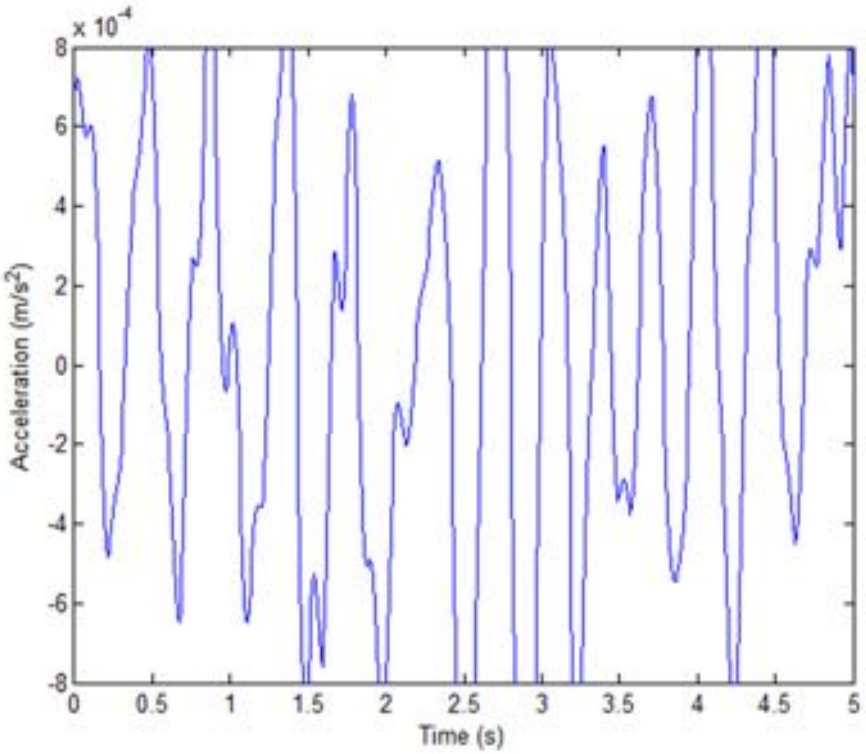
Modal analysis



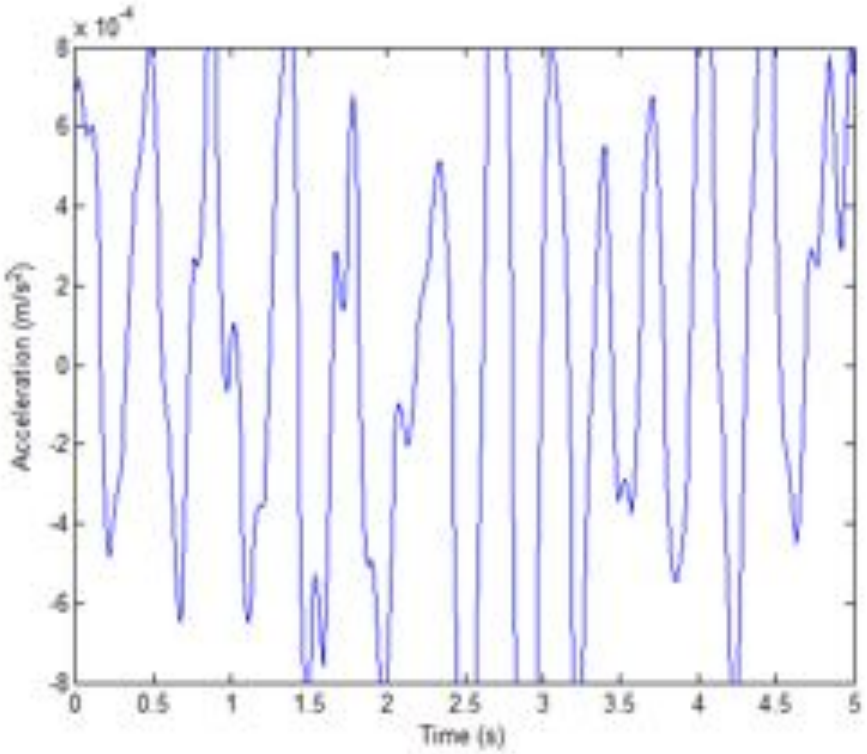

Accelerometers
Data acquisition system


Research partners

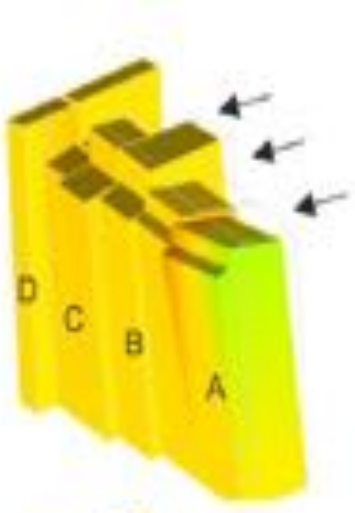
Modal analysis



The Random Decrement Technique



Modal analysis



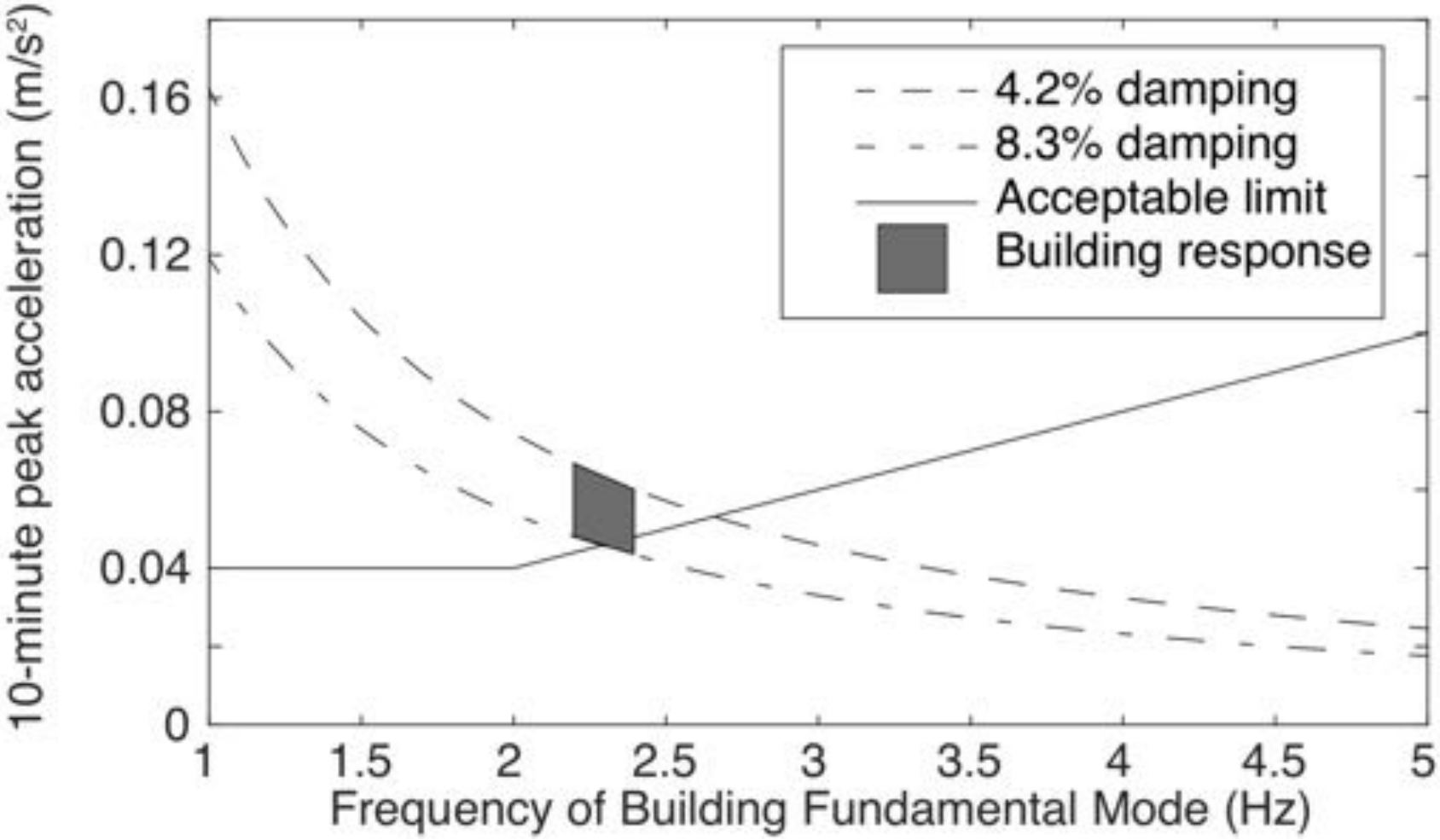
Mode 1

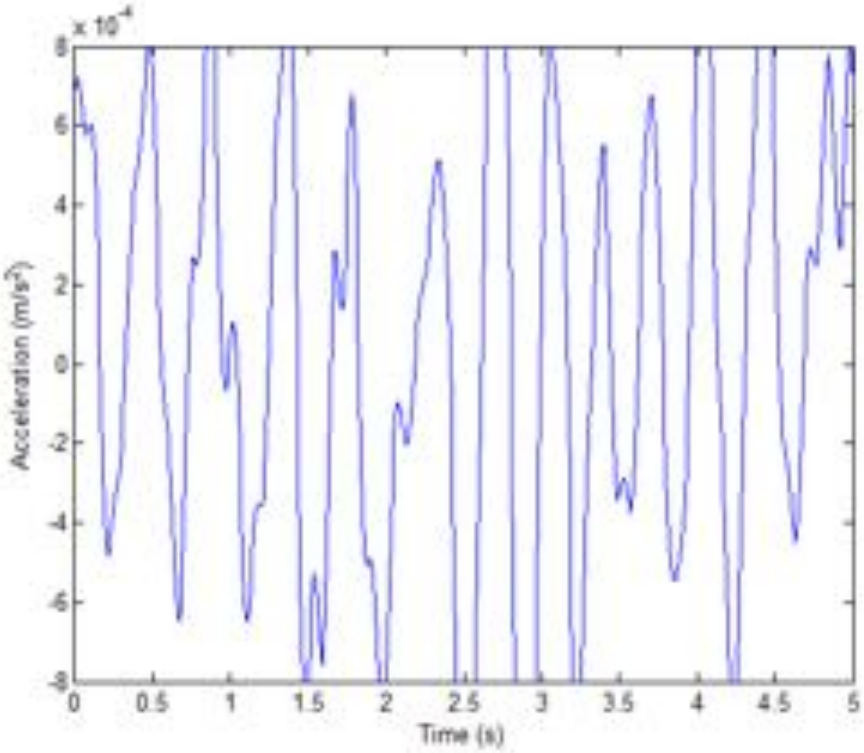
Mode 2

Mode 3

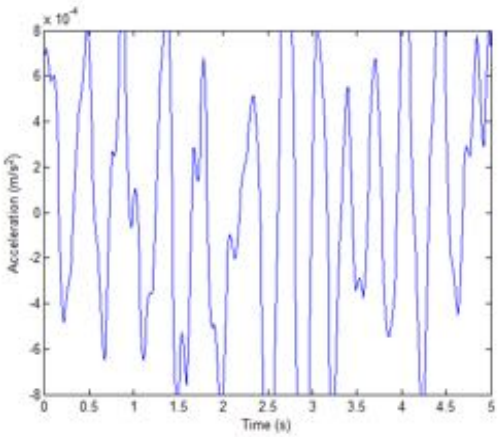
- ✓ Mass
- ✓ Natural frequency
- ✓ Damping

Lateral vibration due to wind load





Linnæus University
Sweden



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UNIVERSITY OF BATH