AD 405:
Vibration assessment of transient response factors

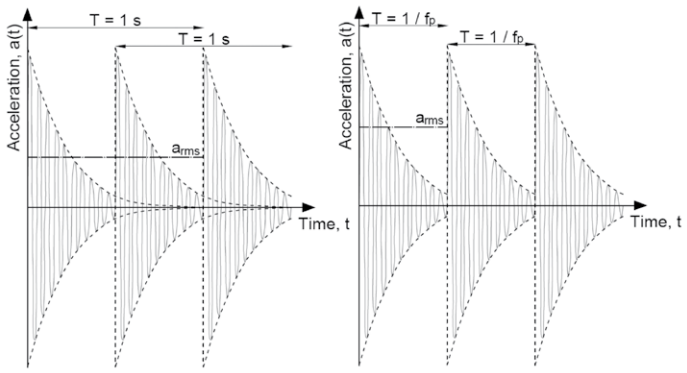
This advisory desk note clarifies advice given in SCI P354: Design of floors for vibration: a new approach, regarding the calculation of the transient response factor of a floor system. The transient response factor *R* is given by equation (38) in the publication as the weighted root mean square (rms) acceleration, $a_{w,rms}$, divided by 0.005 ms^{-2}. A generic formula to calculate the weighted rms acceleration is given as equation (12) in section 2.4.1.

$$a_{w,rms} = \sqrt{\frac{1}{T}\int_0^T a_w(t)^2 dt}$$

For the calculation of $a_{w,rms}$, values are needed for the time period under consideration, *T*, and the acceleration function, $a_w(t)$. For transient vibration analysis, the weighted acceleration function, $a_w(t)$, can be found in section 6.3.3, as equation (34). A superposition formula is provided to calculate the acceleration of each impulse by summing the acceleration responses of each mode of vibration of the floor.

In section 2.4.1 and 6.3.3 different values for the time period *T* to be considered are given. In section 2.4.1, it is suggested that a time period of *T* = 1 s should be used, while in section 6.3.3 it is recommended to take $T = 1/f_p$ when calculating the rms acceleration using equation (12). For an average walking pace of f_p = 2 Hz that would lead to a time period of *T* = 0.5 s.

Both of these recommendations refer to a single step. The time period *T* = 1 s does not represent two steps, but instead allows for the time that it takes for the acceleration caused by a single step to fade out, which may overlap with other steps. The time period $T = 1/f_p$ represents the time between two steps.



The difference between the two assumptions can be better understood with the figure above.

SCI recommends $T = 1/f_p$ to be used for the calculation of the transient response factors. This ignores the response at the tail end of the step, but this is generally small compared to the initial acceleration caused by the step. As seen in the figure above, using $T = 1/f_p$ leads to a marginally higher rms acceleration, and is therefore on the safe side.

Contact: **Antonia Pilpilidou**
Tel: **01344636525**
Email: **advisory@steel-sci.com**

New and revised codes & standards

From BSI Updates February 2017

BS EN PUBLICATIONS

BS EN ISO 148-1:2016
Metallic materials. Charpy pendulum impact test. Test method
Supersedes BS EN ISO 148-1:2010

BS EN ISO 148-3:2016
Metallic materials. Charpy pendulum impact test. Preparation and characterization of Charpy V-notch test pieces for indirect verification of pendulum impact machines
Supersedes BS EN ISO 148-3:2008

BS EN ISO 9934-1:2016
Non-destructive testing. Magnetic particle testing. General principles
Supersedes BS EN ISO 9934-1:2015

BS EN ISO 10675-1:2016
Non-destructive testing of welds. Acceptance levels for radiographic testing. Steel, nickel, titanium and their alloys
Supersedes BS EN ISO 10675-1:2013

BS EN ISO 17635:2016
Non-destructive testing of welds. General rules for metallic materials.
Supersedes BS EN ISO 17635:2010

BS EN ISO 17637:2016
Non-destructive testing of welds. Visual testing of fusion-welded joints
Supersedes BS EN ISO 17637:2011

BS EN ISO 19598:2016
Metallic coatings. Electroplated coatings of zinc and zinc alloys on iron or steel with supplementary Cr(VI)-free treatment
No current standard is superseded

NEW WORK STARTED

BS 5427:2016/A1
Code of practice for the use of profiled sheet for roof and wall cladding on buildings

ISO 4986
Steel castings. Magnetic particle inspection
Will supersede BS ISO 4986:2010

ISO 4987
Steel castings. Liquid penetrant inspection
Will supersede BS ISO 4987:2010

ISO 4992-1
Steel castings. Ultrasonic examination. Steel castings for general purposes
Will supersede BS ISO 4992-1:2006

ISO 4992-2
Steel castings. Ultrasonic examination. Steel castings for highly stressed components
Will supersede BS ISO 4992-2:2006

ISO 16573
Steel. Measurement method for the evaluation of hydrogen embrittlement resistance of high strength steels
Will supersede BS ISO 16573:2015

ISO PUBLICATIONS

ISO 8502-2:2017
(Edition 3)
Preparation of steel substrates before application of paints and related products. Tests for the assessment of surface cleanliness. Laboratory determination of chloride on cleaned surfaces
Will be implemented as an identical British Standard

ISO 8502-3:2017
(Edition 2)
Preparation of steel substrates before application of paints and related products. Tests for the assessment of surface cleanliness. Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)
Will be implemented as an identical British Standard