5.5.2 Limit Values for Accelerations According to International Standards

Limit values for accelerations in the international codes are directly linked to pedestrian comfort. Due to the plethora of studies on such a subjective matter as pedestrian comfort, there are many different acceleration limits in the international codes. An overview of the acceleration limits in the codes and relevant literature is provided in table 5.7. Some of these limit accelerations are dependent on the natural frequency while others are constant for the whole range of pedestrian induced loading frequencies.

Vertical acceleration $a_{V,\max}$ [m/s²]		
ISO 2631	$1.9 \cdot \sqrt{f_1}$	f_1 = fundamental natural frequency of the bridge
AISC Guide 11	0.5	
Eurocode 1	$Min \begin{cases} 0.50\sqrt{f_h} \\ 0.70 \end{cases}$	for f = 1 to 3 Hz for f = 3-5 Hz: check dependant on case from f = 5 Hz: no check necessary
DIN-Fachbericht 102	$0.5 \cdot \sqrt{f_1}$, vert.	for $f_1 \leq 5$ Hz; f_1 = fundamental natural frequency of the unloaded bridge
VDI 2057	$0.6 \cdot \sqrt{f_1}$, vert. 0.214 , hor.	f_1 = fundamental natural frequency of the bridge
SBA	0.39	
BS 5400	$0.5 \cdot \sqrt{f_1}$	f_1 = fundamental natural frequency of the bridge
Ontario Bridge Code ONT83	$0.25 \cdot f1^{0.78}$	f_1 = fundamental natural frequency of the bridge
Eurocode 5 (ENV 1995-2)	0.7	
Bachmann [40]	0.5 - 1.0	
Japanese Footbridge Design Code (1979)	1.0	
Lateral acceleration $a_{L,\max}$ [m/s²]		
Eurocode 1	$Min \begin{cases} 0.14\sqrt{f_h} \\ 0.15 \end{cases}$	for f = 0.5 to 1.5 Hz for f = 1.5-2.5 Hz: check dependant on case from f = 2.5 Hz: no check necessary
Eurocode 5 (ENV 1995-2)	0.2	for f < 2.5 Hz (for standing individuals)

Table 5.7 Acceleration limits as comfort criteria