Sensitive Equipment and Operations

Tim Street

Philip Hankin

"…he is amongst the best if not the best in his field and with his outstanding professionalism there was humour and an enormous warm heart."

"I was always impressed by his technical delivery of his subject matter and his clear passion for furthering the discipline."

"The Design Team meetings were always a better place when he was there."

"There was nothing he couldn't fix or build."

"Phil was a true gentleman of our industry."

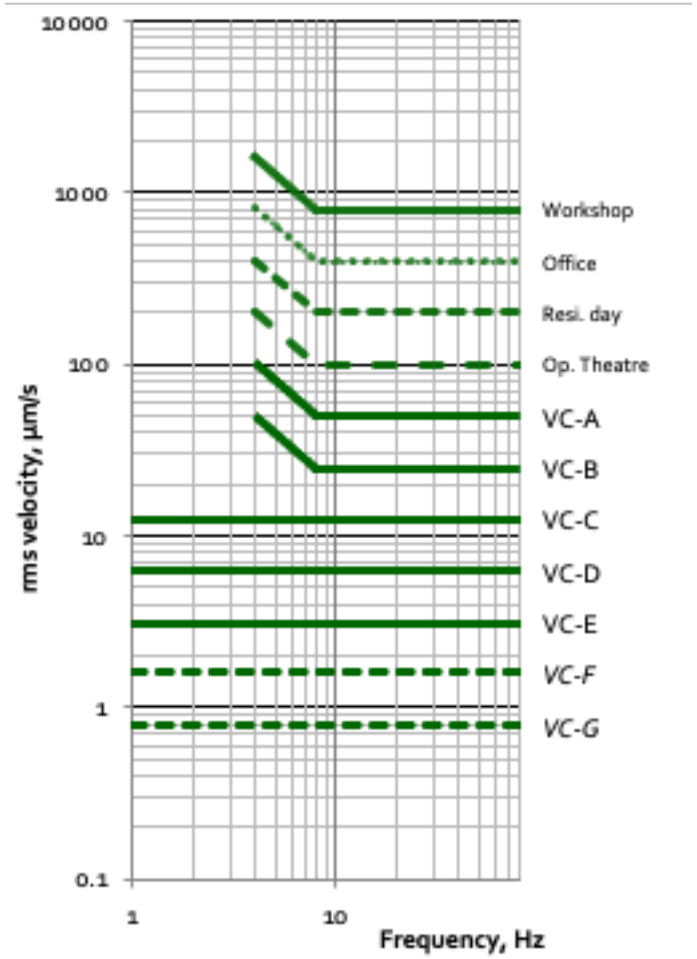
Changes to the Chapter

Example inclusions and amendments:

- Variations in measurement equipment or interpretation of measurements
- Location of measurements or where design targets apply
- Relevance of manufactures serviceability limits
- Client or end-user expectation management
- Vibration impact on existing facilities

ASHRAE VC Curves

Criterion Curve	Amplitude µm/sec (µin/sec)	Detail Size µm
Workshop (ISO)	800 (32,000)	n/a
Office (ISO)	400 (16,000)	n/a
Residential Day (ISO)	200 (8,000)	75
Operating Theatre (ISO)	100 (4,000)	25
VC-A	50 (2,000)	8
VC-B	25 (1,000)	3
VC-C	12.5 (500)	1-3
VC-D	6.25 (250)	0.1-0.3
VC-E	3.12 (125)	<0.1
VC-F	1.56 (62.5)	n/a
VC-G	0.781 (31.3)	n/a



Alternative Criteria Considerations

- Vibration is just one form of noise.
  Equipment may also be sensitive to electro-magnetic noise, thermal noise, airflow and acoustic induced vibration, etc.

- Varying sensitivity to different modes of vibration and time period.
  It is a good idea to get a technical understanding of the inner workings of the equipment.

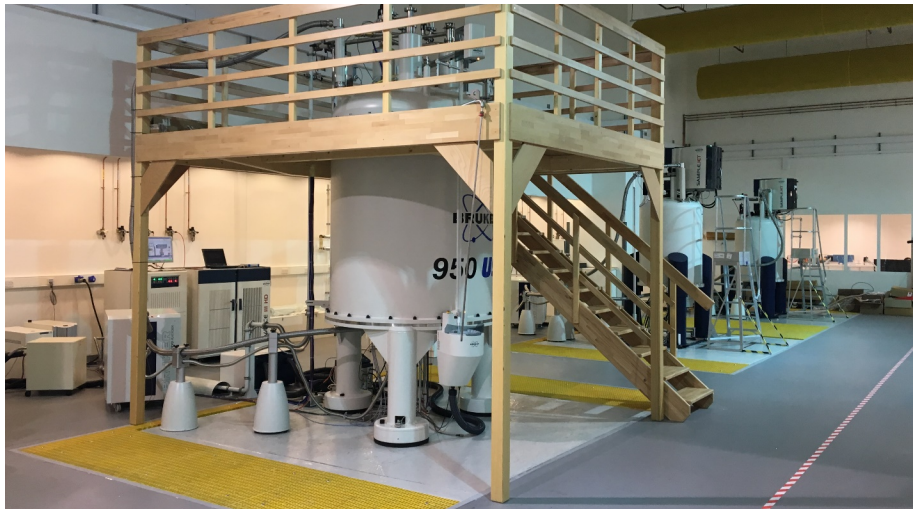
- Varying applications of equipment.
  e.g. Hospital / Medical Research, or Product Development / Production Facility

- Equipment warranty issues

Project vibration requirements should be precisely described at an early stage

Control of Vibration

- Site Selection
  Avoidance where possible of sites exposed to obvious vibration generating activity, or in soil types where vibration may propagate with minimal attenuation at distance.
- Building Depth
  For very vibration sensitive environments exposed to notable ground vibration consider deep basements to avoid surface ground waves.
- Structural Strategy
  Avoidance of low natural frequency elements of building structure. Allowance for introduction of inertia bases.
- Internal Vibration Control
  Avoidance, mitigation or management of vibration generating activity in the building.
- Workbench or Floor Isolation
  Don't forget to consider any internal vibration isolation mechanism that may render external isolation solutions counter-productive.
- Vibration Monitoring



ANC | ACOUSTICS & NOISE CONSULTANTS

Measurement & Assessment of Groundborne Noise & Vibration

10 & 12 November 2020