Vibration measurements – what can go wrong?

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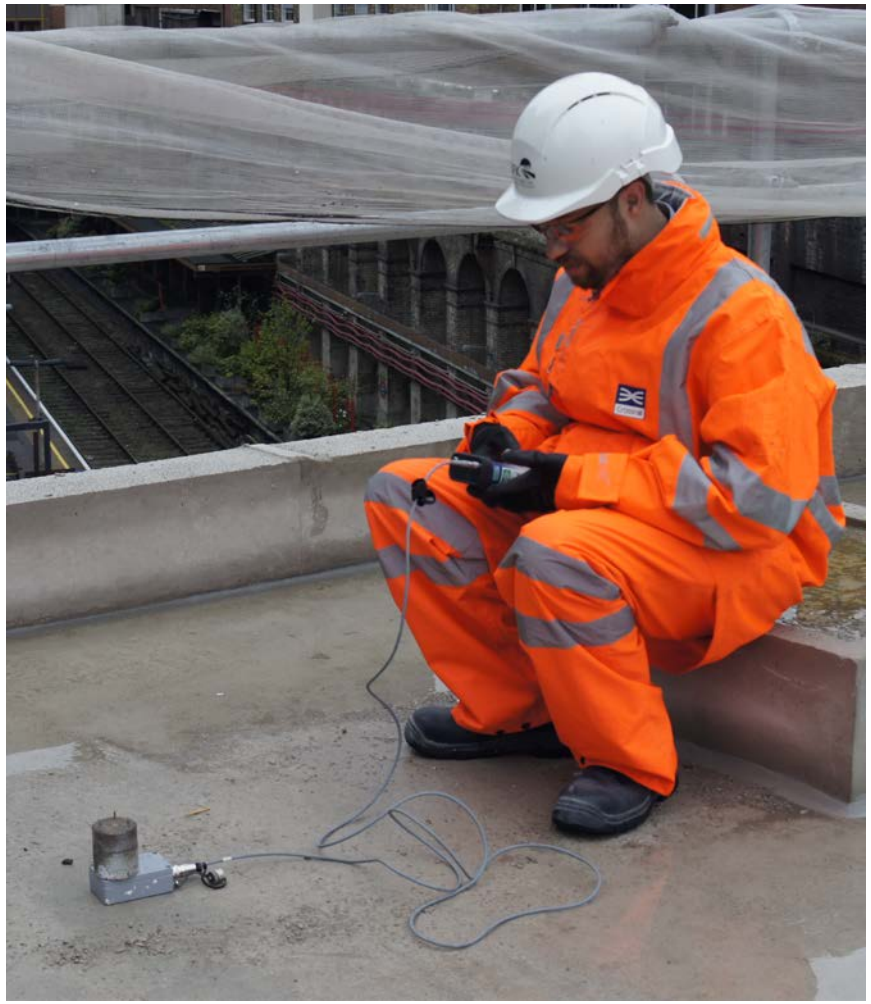
The Basics

Health and Safety
- Covid-19

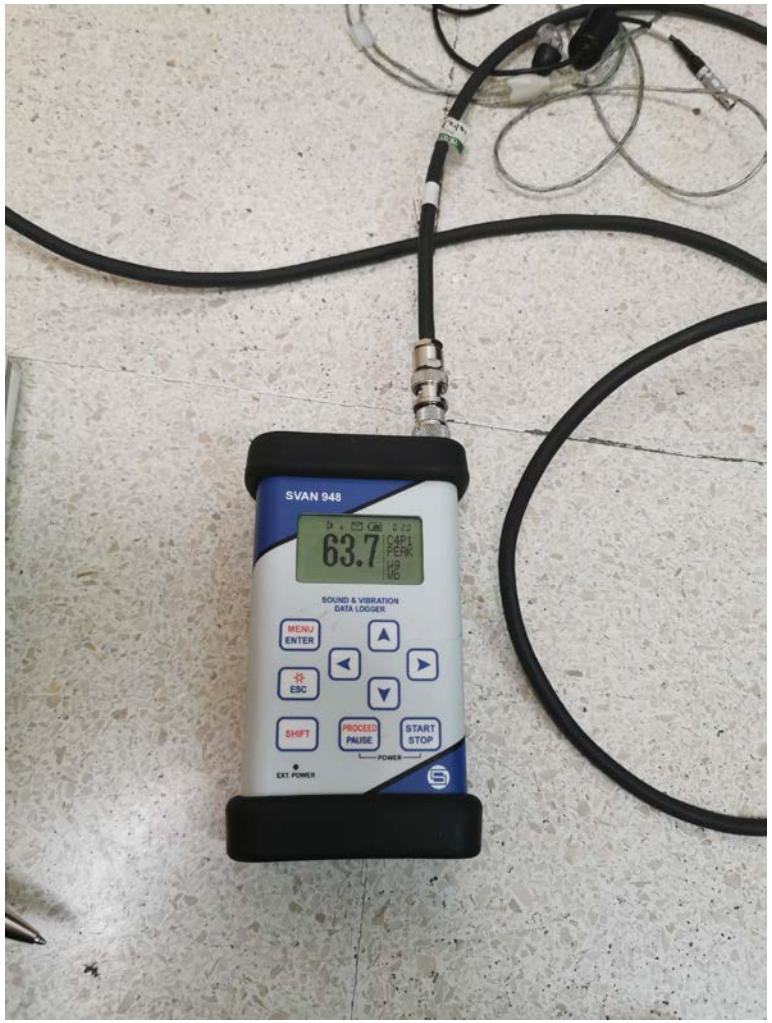
Equipment Preparation
- Equipment list (don’t forget anything)
- Functionality tests
- Calibration (more on that later)

Method Statement/Risk Assessment
- Contacting site
- Plan works in advance
- Know what you’re doing and where
- If using site assistance, make sure they understand how delicate/expensive equipment is



Equipment Choice and Preparation (1)

- Vibration and/or sound
- Manned/unmanned (source and access dependent?)
- Equipment selection – proprietary/bespoke
- Battery/mains power
- Competency



Equipment Choice and Preparation (2)

- One/multi direction(s)
- One/multi position(s) – where?
- What metric(s) to store or raw data? Time periods?
- Continuous measurement or triggered or manual start/stop
- Instrumentation set up
- Kit check in office/lab

Site Considerations

Location of equipment/transducers
- Building damage – measure at foundation
- Drill and fix, glue, gravity

Whole body – measure at entry point to person
- Hide transducers underneath furniture

Other vibration sources not anticipated?

Access not as planned?

System check and/or calibration on site

Which channel is vertical/lateral/transverse?
- Orient to building if possible

Equipment Failure – what can go wrong?

Transducers

- Many accelerometers have casing as part of circuit
- Electrical pickup very easy – isolate and keep dry
- Care when mounting on vertical surfaces – tape cable to ‘catch’ transducer

Cables and connections

- Be careful with microdot cables – they’re very fragile

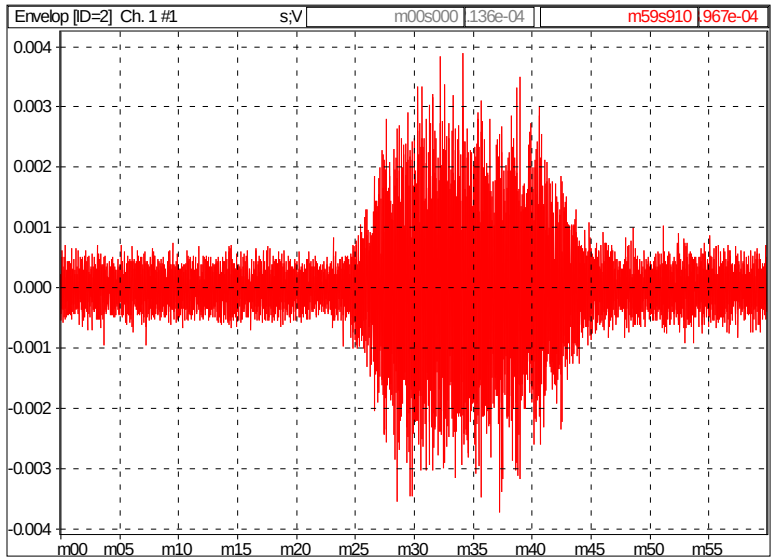
Data Analysis

Gain settings and transducer sensitivity

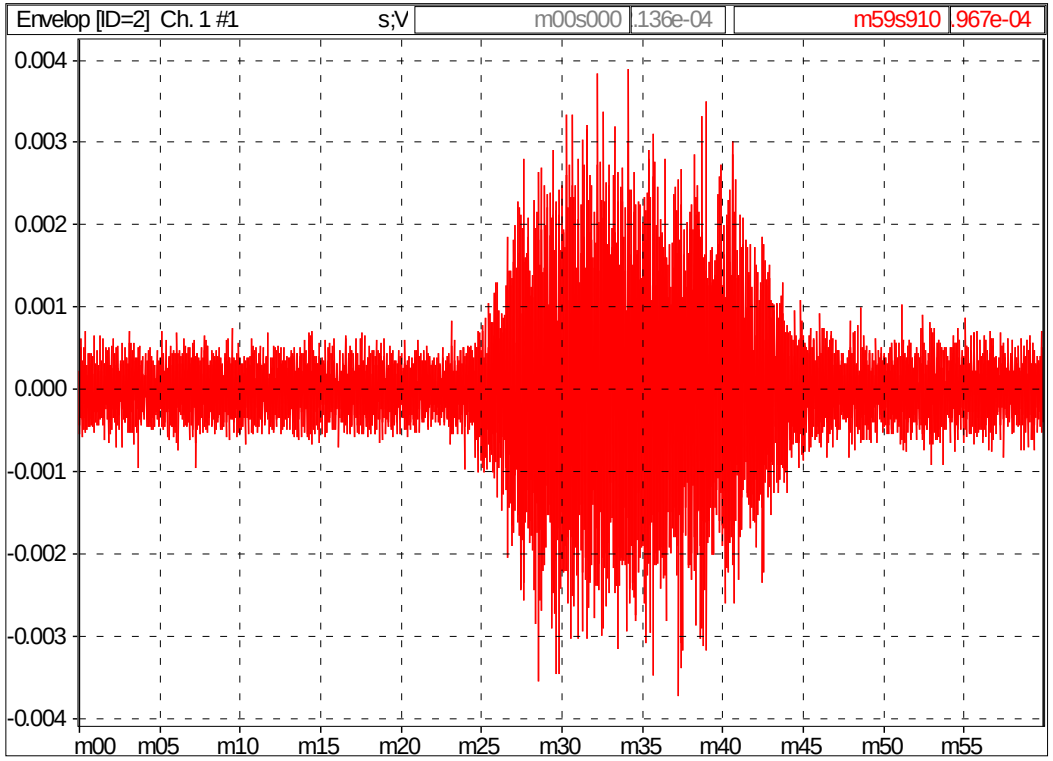
- Scaling and unit issues
- Avoiding overloading/signal getting lost in quantised noise
- Bandwidth – if using SLMs, vibration will be measured to 20kHz
- Low pass filters

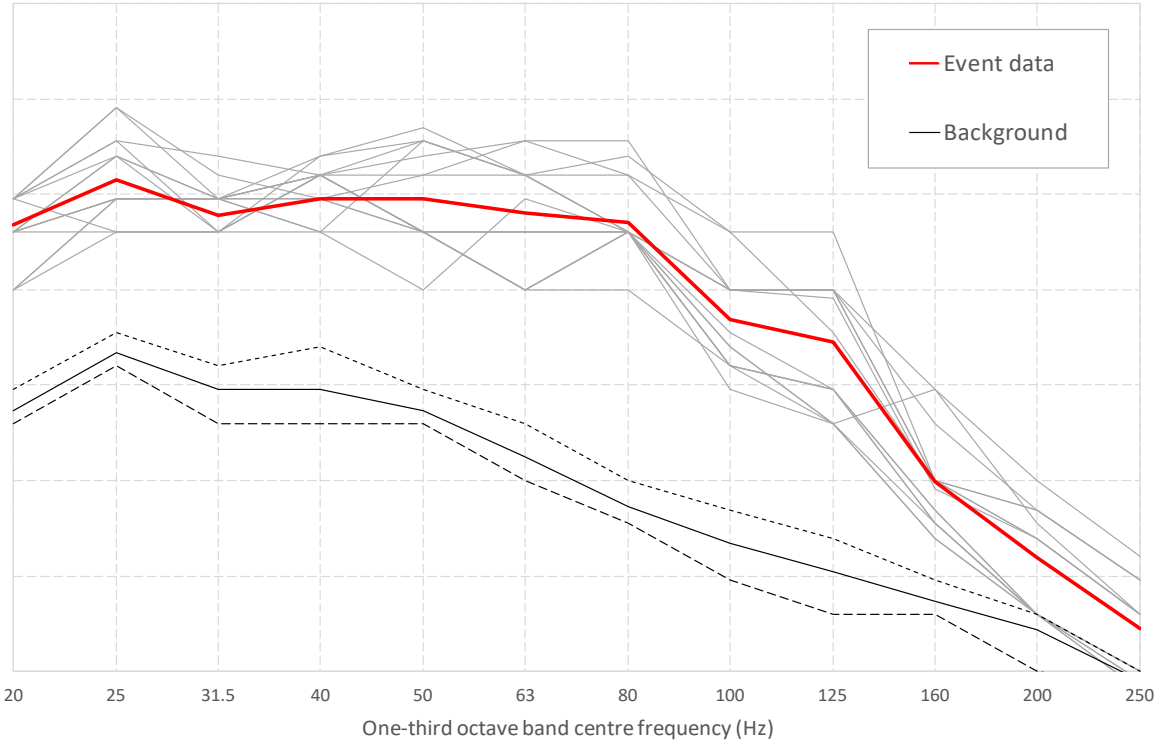
VDV

- Correct weighting according to direction
- VDV day/night calcs from VDV of events



Signal versus noise





Unmanned and Remote Access

What vibration source is being measured?

- Construction site visits avoided
- Railway tunnels

Other vibration sources which have not been anticipated?

- Residents/occupants inside buildings
- Mechanical equipment within building: HVAC, lifts

Mobile phone connection?

- Check phone signal strength using online checker
- Verify on site

General recommendations

- Don’t skimp on preparation
- Be competent with the equipment
- Have some spares
- Take lots of notes and photos
- Don’t be afraid to ask questions!

Thanks for listening

- Questions?