HGC ENGINEERING

Advances in Acoustic Monitoring

Air and Acoustic Monitoring Conference

Air & Waste Management Association – Ontario Section

Corey D. Kinart, MBA, PEng
HGC Engineering

October 25, 2016

ACOUSTICS NOISE VIBRATION

Overview

- Why we conduct acoustic monitoring
- How we used to do it
- Evolving uses
- Measurement devices
- Power
- Memory
- Data transfer
- Limitations

HGC ENGINEERING

Why Conduct Acoustic Monitoring?

- Can be outdoor, indoor, under water…
- Measure sound levels:
  - Over extended periods (average, maximum, minimum, etc.)
  - During times when attended measurements are not practical
  - In places where attended measurements are not possible
  - To capture specific events of interest

HGC ENGINEERING

Other Applications

- Bio-acoustical monitoring (terrestrial and marine)
- Transportation hub/corridor management (airports, seaways)
- Defence/security applications
- Mechanical system health & failure detection
- Medical applications
- Many more

HGC ENGINEERING

Advances in Acoustic Monitoring

- A more powerful tool
- Thanks to technological advances in:
  - Measurement devices
  - Digital memory
  - Power systems
  - Compact cellular communications

HGC ENGINEERING

The Days of Old & New

- Environmental noise/vibration monitoring is certainly not new
- BUT, earlier systems have typically been permanent installations
  - Bulky
  - Grid power
  - “Hard-wired”

HGC ENGINEERING

The Days of Old & New (cont'd)

- "Old" systems had plenty of drawbacks
  - Size
  - Power needs
  - Monitor/data integrity

HGC ENGINEERING

Evolving Uses

- Noise Complaint Investigations

- Construction Vibration Monitoring

- Baseline Noise Studies
- Wind Energy Noise Assessments…

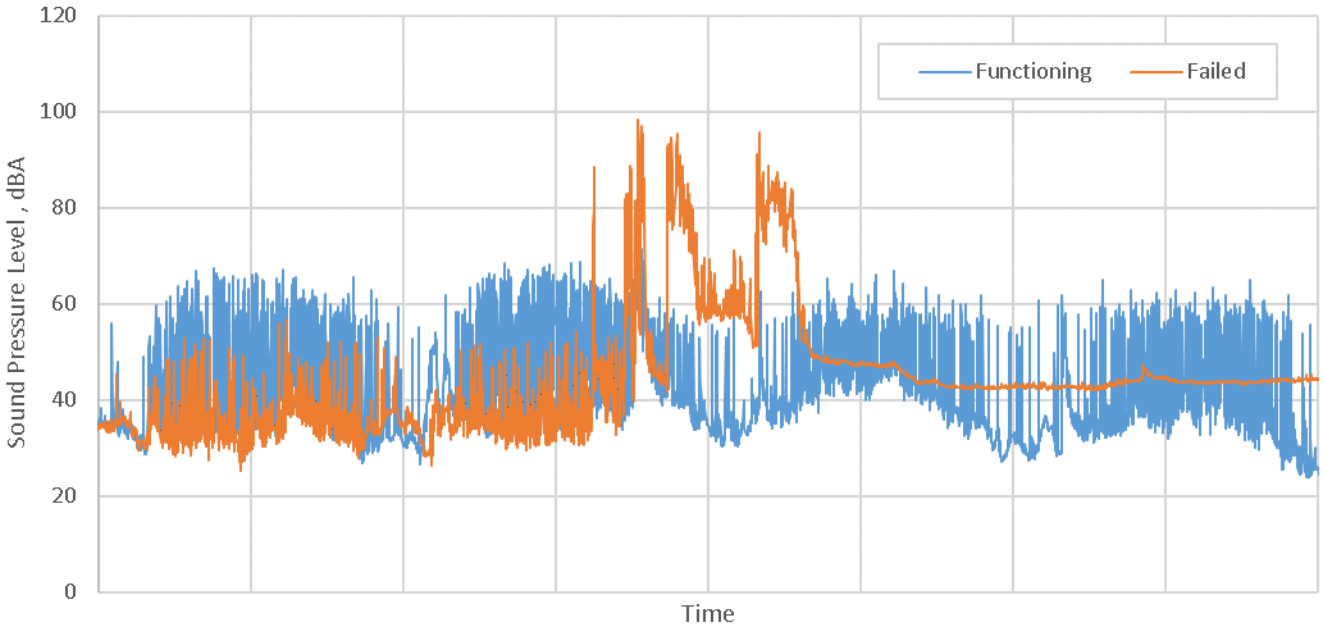
HGC ENGINEERING

Measurement Device

- Central component of any acoustical monitoring system
  - Greater dynamic range
  - Remote configuration
  - Triggering threshold
  - Self-test microphone integrity

HGC ENGINEERING

Equipment Integrity



HGC ENGINEERING

Power

- Advances in portable solar systems
  - Decreasing hardware costs
  - Extended deployment in remote areas
  - No need for regular power maintenance
  - Improved resource efficiency
- Monitor restarts after power interruption

HGC ENGINEERING

Memory

- Decreasing hardware costs
- Built-in or swappable
- Significant increase in capacity
- Allows tremendous amounts of data
  - Triggered or continuous audio recordings

HGC ENGINEERING

Data Transfer

- Hard-wired, Wi-Fi or cellular modem
  - Timely (if not real time) analysis
  - Ensure equipment operating correctly
  - Can avoid a redeployment

HGC ENGINEERING

Limitations

- Solar Power
  - Must have sufficient solar exposure
  - Size/weight can be challenging to deploy in very remote areas
  - Non-stealth
- Cellular Modems
  - Power hungry
  - Secondary failure point
  - Usually not fast enough for real-time downloading

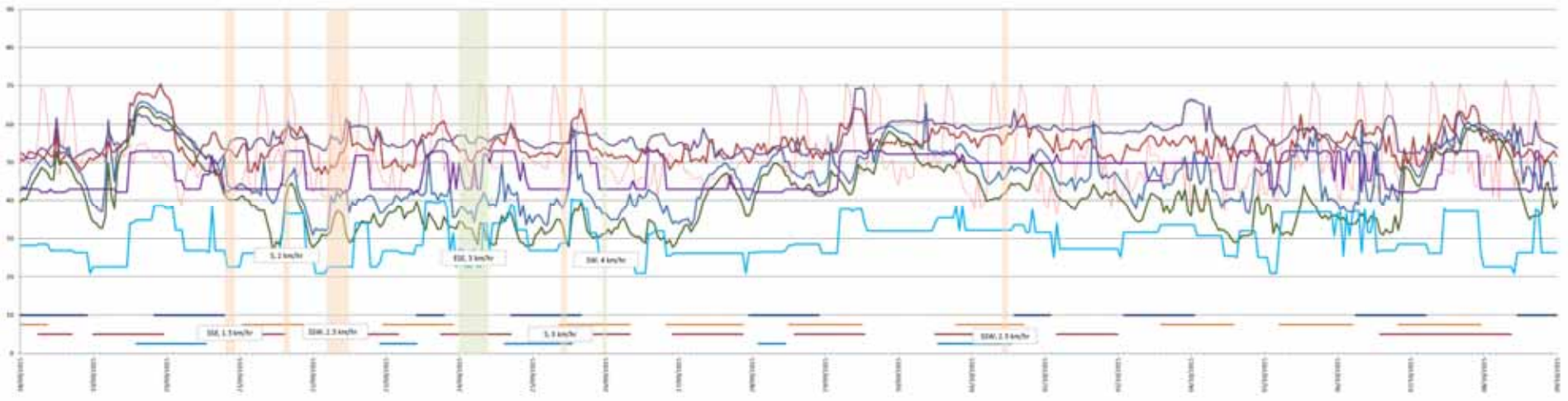
HGC ENGINEERING

Lessons from Field Experience

- Too much data can be a bad thing
  - Carefully plan data collection
  - Ensure efficient use of more advanced systems

HGC ENGINEERING

Don’t Let This Happen To You



HGC ENGINEERING

HGC ENGINEERING

Any Questions?

ACOUSTICS NOISE VIBRATION