

Case Study

Handling Vibration Complaints Using A Hybrid Solution



Construction Site Test Setup

BACKGROUND

The City of Edmonton has seen significant growth in recent years. In fact, the 2011-2016 records show that the census metropolitan area of Edmonton overtook the national growth rate 5 years in a row with a 13.9 per cent population growth.¹ As the booming construction industry created new residential and commercial facilities, Edmonton's total number of registered complaints filed with the city also grew.

CHALLENGE

From 2013-2015, a total of 131,907 complaints were filed covering a wide range of nuisances, everything from pets and garbage, potholes, construction and noise to name a few.²

Directly correlated to the city's growth, was the increase in the number of active construction sites and general traffic, both being sources of vibration and complaints.

The challenge for the city was to identify the equipment and machinery that were sources of complaints especially during neighborhood rehabilitation projects that required complete overhauls of the road, sidewalk, and lighting.

Another challenge was to communicate responsibly with homeowners concerning the measures the city had taken regarding vibration annoyances. This reassurance would help prevent complaints and further escalations.

1. New census data: Edmonton-area population surges past national growth rate. CBC News.
2. Which Edmonton ward files the most complaints with 311? Global News.

CASE STUDY OVERVIEW

Applications:

- Construction
- Civil Projects
- Research
- Remote Access

Location:

Edmonton, Alberta, Canada

The Challenge:

Authenticate and understand the vibration complaints submitted to the City of Edmonton by local residents.

The Solution:

Instantel's Minimate Pro6 monitoring unit combined with a digital camera and a fisheye lens.

Monitoring Timeline:

Continuous monitoring

Companies Involved:

- Instantel
- City of Edmonton

Key Benefits:

- Identified unwelcomed, specific seismic events.
- Improved understanding of the infrastructure components that contribute to vibration complaints (road surface improvements, speed zoning limits).
- Reduced on-site visits when seismic activities occurred.



Minimate Pro6 With Two Geophones

SOLUTION

The city's responsibility to investigate such complaints led them in search of a suitable solution with the ability to detect and record any unwelcome seismic activity.

Instantel's Minimate Pro6 seismic monitor was chosen in combination with Campbell Scientific Canada's CC5MPXFE digital camera equipped with a fisheye lens.

The Minimate Pro6, with its advanced monitoring technology and rugged design, was able to detect excessive vibrations that surpassed a pre-determined threshold level for hundreds of ground vibration occurrences. Once triggered the CC5MPXFE camera took a snapshot to pinpoint the vibration disturbance.

According to Clarence Stuart (BSc, QEP, Environmental Scientist at the City of Edmonton) who spent considerable research and field trial work on this design:

“

Based on my research, there is no vibration monitoring solution like the one we've created. Everyone loves this value-added integration that provides a visual snapshot linked to the vibrational disturbance. It's the perfect harmony between precision detection and real-time visuals.

Clarence Stuart (BSc, QEP, Environmental Scientist at the city of Edmonton)

”



CC5MPXFE Fisheye Camera With Images Of Typical Vibration Triggers

APPROACH

A typical ground vibration analysis consisted of two Minimate Pro6 geophone sensors placed in the test area; one near the road or house (depending on the complaint), and the other near the property line. The readings from each sensor were compared and if their readings were above the 'acceptable' threshold limit, the Minimate Pro6 triggered an alarm signal for the CC5MPXFE to take a visual snapshot of the area. The remotely monitored vibration data was sent to Instantel's THOR software (or optionally to Instantel's cloud-based Vision platform) using a cellular modem to analyze the disturbance and subsequently link the data with the images.

RESULTS

- The success of these installations has led the City of Edmonton to use this combined solution as part of their ongoing fleet of citywide construction and city infrastructure surveillance.
- Using Instantel's remote monitoring data collection tool, the City of Edmonton was able to free up staff resources as they no longer needed to remain on location and physically record vibration sources throughout the day.
- Now, the City of Edmonton can better address resident complaints with remedial measures that directly relate to the source of the vibration disturbances.
- This approach to vibration monitoring has built an increased level of confidence in the construction sector, allowing the city to communicate responsibly with homeowners without further escalation.

Special thanks to:
Clarence Stuart, BSc QEP, Environmental Scientist with the City of Edmonton