

# Florida State Fire Marshal's Office

## Understanding Construction Materials Mining

Miami Lakes Community Meeting  
June 15, 2017



# How it Works: Vibrations 101

## Velocity

The rate of speed at which particles move back and forth.

Maximum rate is used in determining the possibility of damage.

The maximum or peak particle velocity (PPV) is typically recorded in inches per second (IPS).

## Frequency

The number of times a particle moves back and forth in one second. This movement is called a cycle or oscillation. The number of cycles a particle undergoes when hit by a vibration wave is recorded in cycles per second or Hertz (Hz).



# How Are Vibration Limits Set?

Florida law mandates that statewide ground vibration limitations for construction materials mining must follow federal limitations set by the United States Bureau of Mines.

The Bureau of Mines' Report of Investigations 8507 established limitations, known as maximum peak particle velocity (PPV), **at 0.5 inches per second.**



# How Are Vibrations Measured?

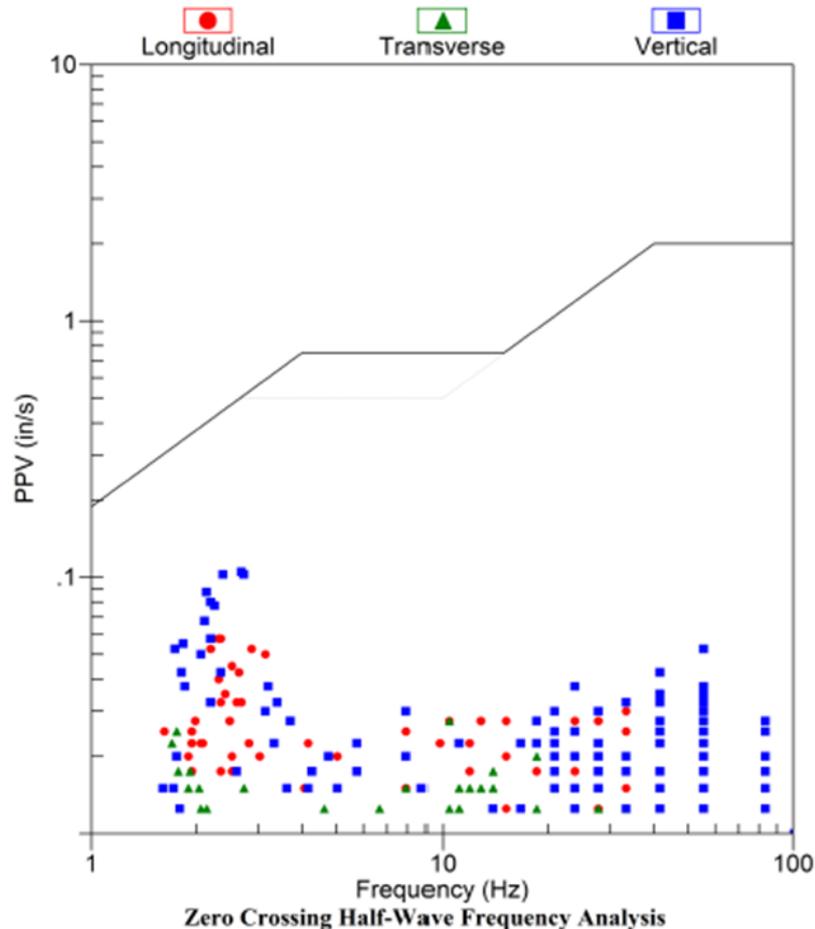
Seismographs are used to detect and record the intensity of seismic waves that propagate vibrations emanating from a blast event.



# Reading Seismographic Data

## USBM Safe Blasting Levels

SN: 8623 Event: 36

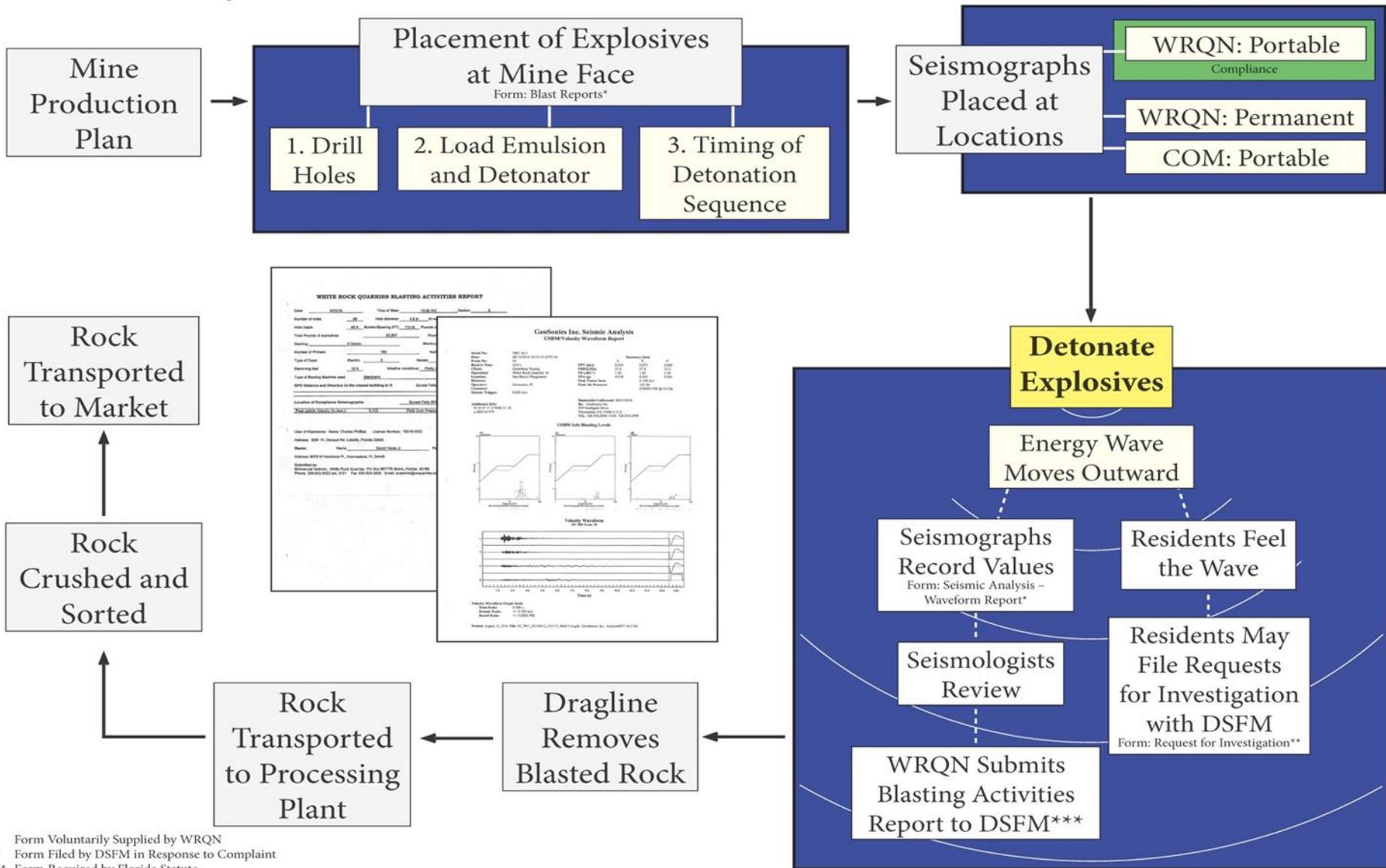


	Summary Data		
	L	T	V
PPV (in/s)	0.058	0.028	0.105
FREQ (Hz)	2.3	10.4	2.7
PD (.001")	3.88	1.92	6.86
PPA (g)	0.020	0.013	0.033
Peak Vector Sum :	0.108 in/s		
Peak Air Pressure:	104 db		
	0.00053 PSI @ 2.5 Hz		

# What Limits Mean For Your Home

<b>Legal Limits in Florida</b>	<b>Peak Particle Velocity</b>	<b>Possible Results</b>
0.50 in/sec	0.50 in/sec	Lower limit for threshold damage to plaster walls (3-15 Hz)
	0.75 in/sec	Limit for threshold damage to drywall structures (3-15 Hz)
	2.00 in/sec	Threshold damage likely
	2.80 in/sec	Less than 50% chance of minor damage to structures
	5.40 in/sec	Greater than 50% chance of minor damage to structures
	7.60 in/sec	50% chance of major damage

# Life Cycle of a Blast Event



\* Form Voluntarily Supplied by WRQN  
 \*\* Form Filed by DSFM in Response to Complaint  
 \*\*\* Form Required by Florida Statute

# Analyzing the Available Data

A third-party consulting company, Lampl Herbert Consultants, Inc., reviewed blast records between January 2016 - December 2016.

## **Consultants reviewed:**

- Data directly from all WRQ North seismographs
- Blast Activities Reports for blasts
- Blaster's Reports
- Reports from Broward County's hired seismologist
- Recorded resident complaints



# What Did the Analysis Show?

## **LHC Team cross correlated blast events documented in records available between January 2016 – December 2016**

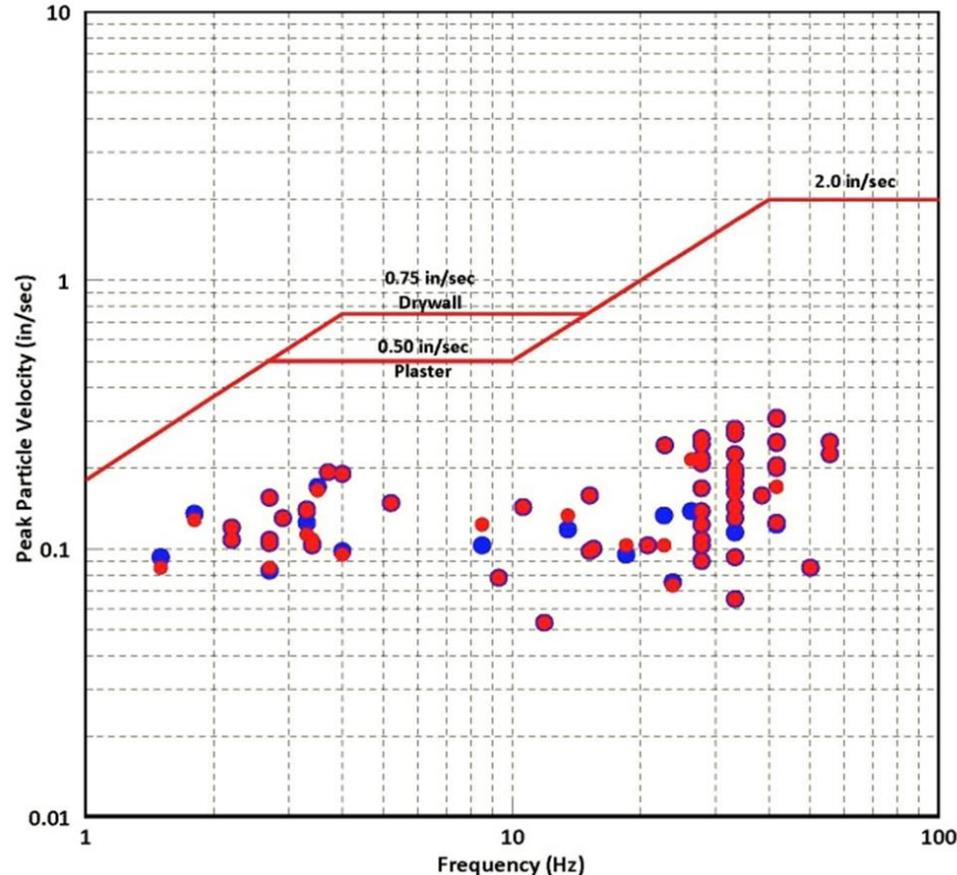
- Some human and instrument errors were identified in reports
- Questions Outstanding:
  - PPV as only variable of interest does not explain the physical dynamics of wave propagation and vibration levels in these water filled limestone quarries
  - On occasion, the seismograph closest to structures did not record the peak values for a blast event
  - The geology of the limestone formations influences wave propagation -- the expanses of lake water, blast patterns, and charge detonation
  - Explosives type, detonation devices, and detonation interval timing may have a significant impact on PPV and frequency values



# What Did the Analysis Show?

## Reported Peak Particle Velocities

Comparison of 76 Blast Events at White Rock Quarry North  
July 1, 2016 through December 22, 2016



# Understanding Your Rights as a Homeowner

## Florida Construction Materials Mining Activities Administrative Recovery Act:

- ✓ Grants exclusive legal authority for damage claims to the Division of Administrative Hearings (DOAH).
  - ❑ **NOTE: DOAH cannot hear claims for personal injury, emotional distress, or punitive damage claims.**
- ✓ Access forms online at [www.DOAH.STATE.FL.US](http://www.DOAH.STATE.FL.US) – under “Forms” tab or call **(850) 488-9675**



# What's Next?

The Division of State Fire Marshal was just appropriated \$325,000 by the Florida Legislature to conduct or contract for a study to review:

- Whether the established statewide ground vibration limits are still appropriate
- Review any legitimate claims paid for damages caused by mining activities

The Division will begin the contracting and procurement process as soon as possible.



# Contact Us

Florida Division of State Fire Marshal

(850) 413-3644

[http://www.myfloridacfo.com/Division/SFM/bfp/Mine\\_blasting.htm](http://www.myfloridacfo.com/Division/SFM/bfp/Mine_blasting.htm)

