



WHAT YOU SHOULD KNOW ABOUT CONTROLLED BLASTING

**LAS VIRGENES MUNICIPAL WATER DISTRICT
WATER STORAGE TANK PROJECT**

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MEETING OUTLINE AND SCOPE

- Description of Project
- Blasting Locations
- Excavation Methods
- Review Modern Blasting Technology
- Explosives Security, Regulations and Oversight
- Blast Effects - Vibration and Noise
- Controlling Blast Effects
- Questions and Answers



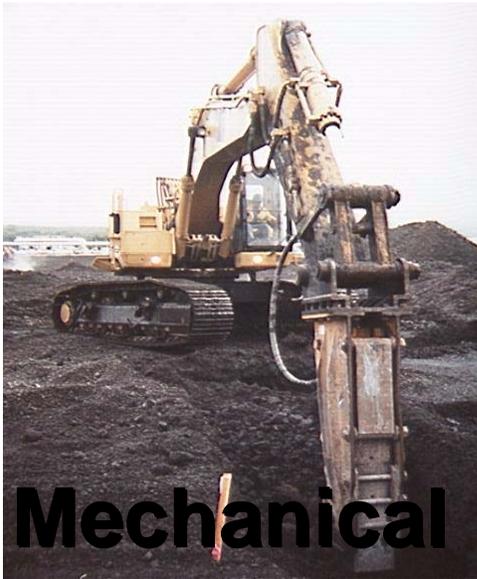
PROJECT DESCRIPTION

Brief project description (If not already done by others)

WATER TANK WORK SITE MAP



Excavation Methods



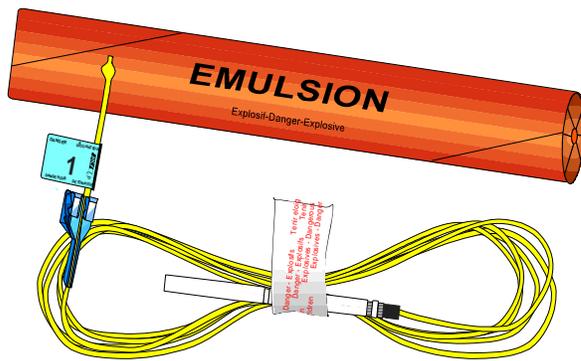
Mechanical methods were considered but rock at site is too hard.

Project Management Practices

- Evaluate Area Property
 - * Pre-construction Inspections
- Apply Blasting Controls
 - * Charge Weight Limits
 - * Noise Control Measures
- Public Communication
 - * Project Phone Number
(XXX) XXX-XXX
 - * Open Meetings
- Government Approvals
- Perform Work Safely
- Monitor Actual Blast Effects



Modern Explosives Technology



Modern explosives are much safer than the old "Dynamite and fuses" seen in Hollywood Movies



Blast effects are also much different than the fireball special effects seen in movies like Diehard

Blasting Program Requirements

- Only Proven and Safe Methods will be Used
- Prevent Damage to all Property and Facilities
- Minimize Impacts on Neighbors and Environment
- Ensure Explosives Security
- Licensed Blasters and Trained Inspectors will Oversee all Blasting Work



Explosives Delivery, Transport & Storage Systems

- No Overnight Storage Allowed
- ATF Rules
- DOT Rules
- OSHA Rules
- Inspector and Consultant Oversight



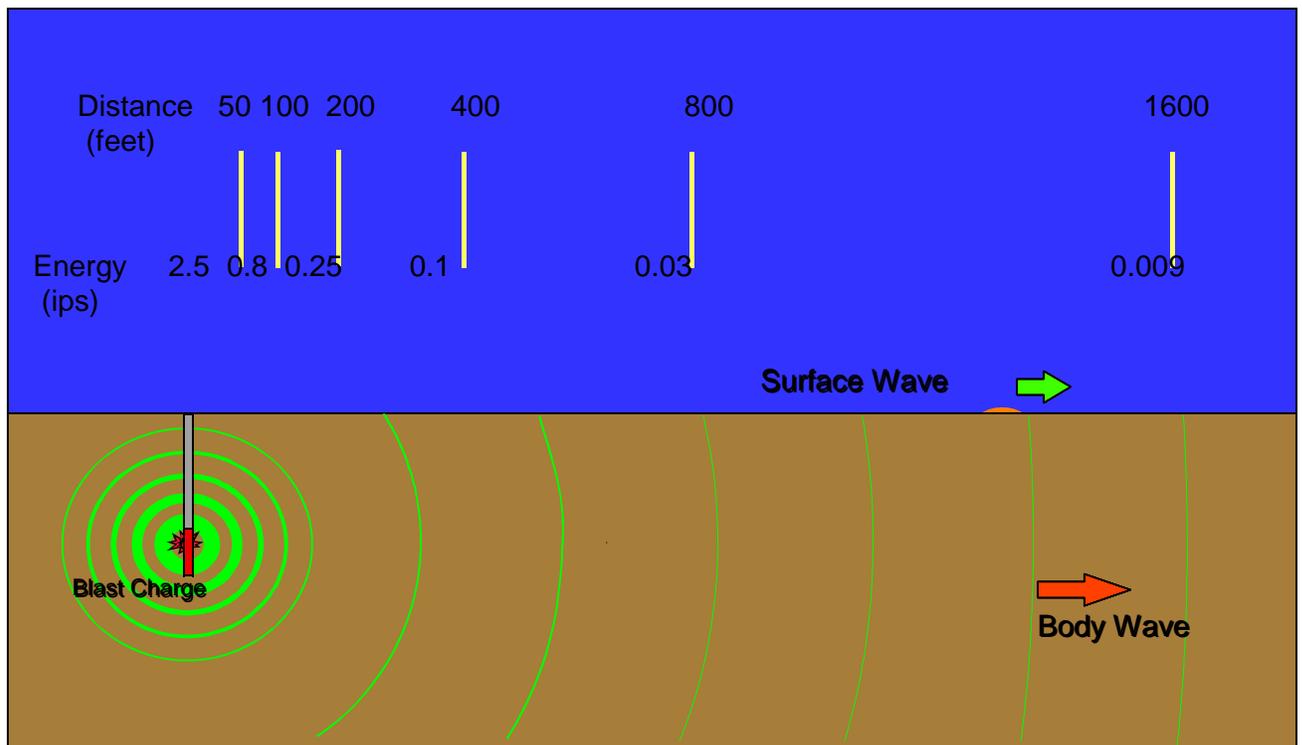
Careful Oversight



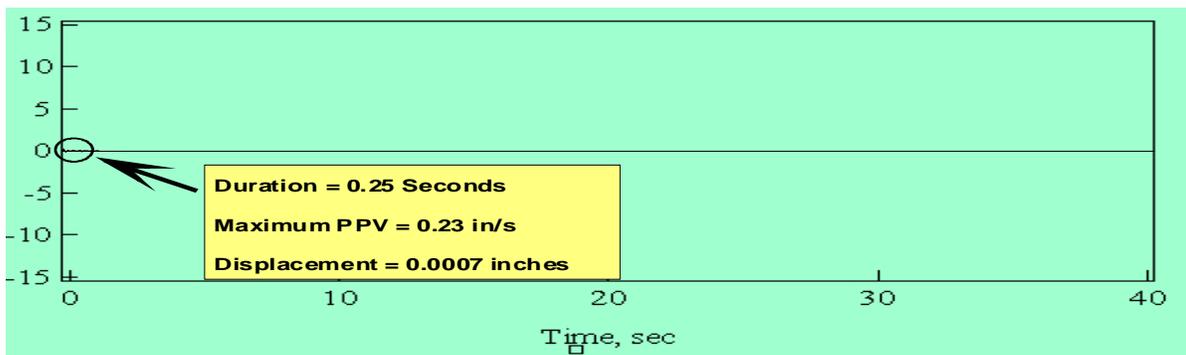
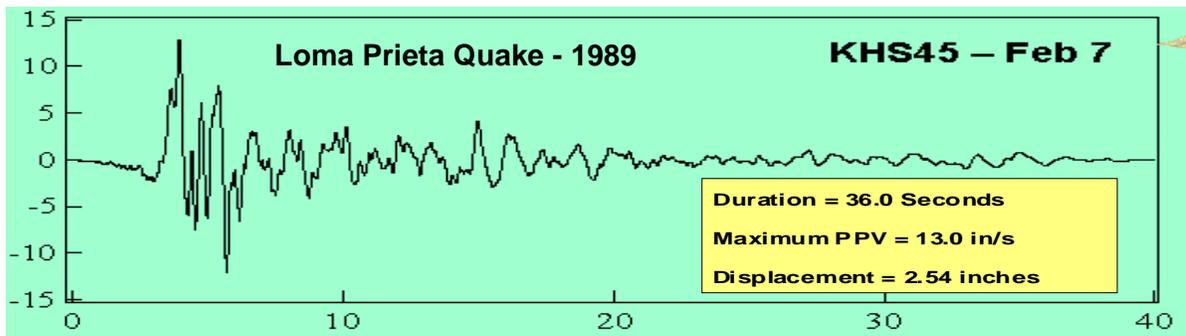
Trained Inspectors will Oversee Blasting Work and Explosive Handling Practices

Blast Energy Reduces Rapidly with Distance

Vibration reduces rapidly with distance

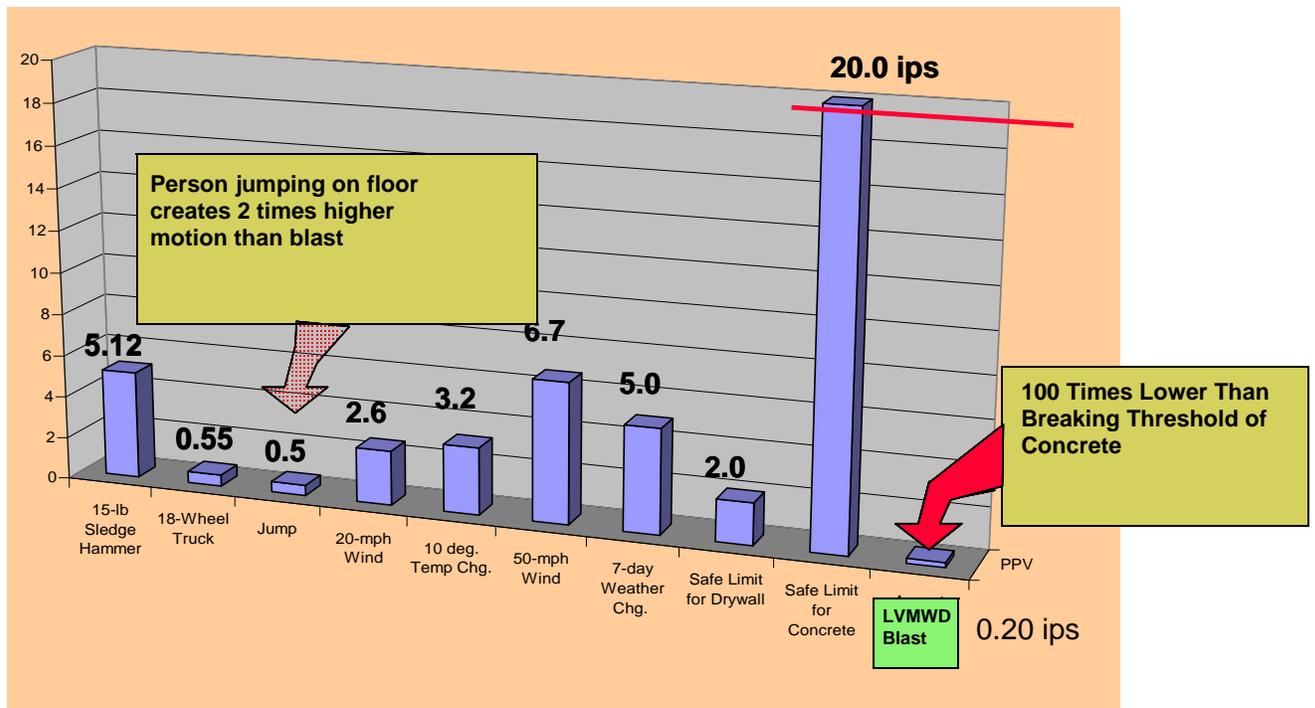


Comparison Between Earthquake and Controlled Blast Vibrations



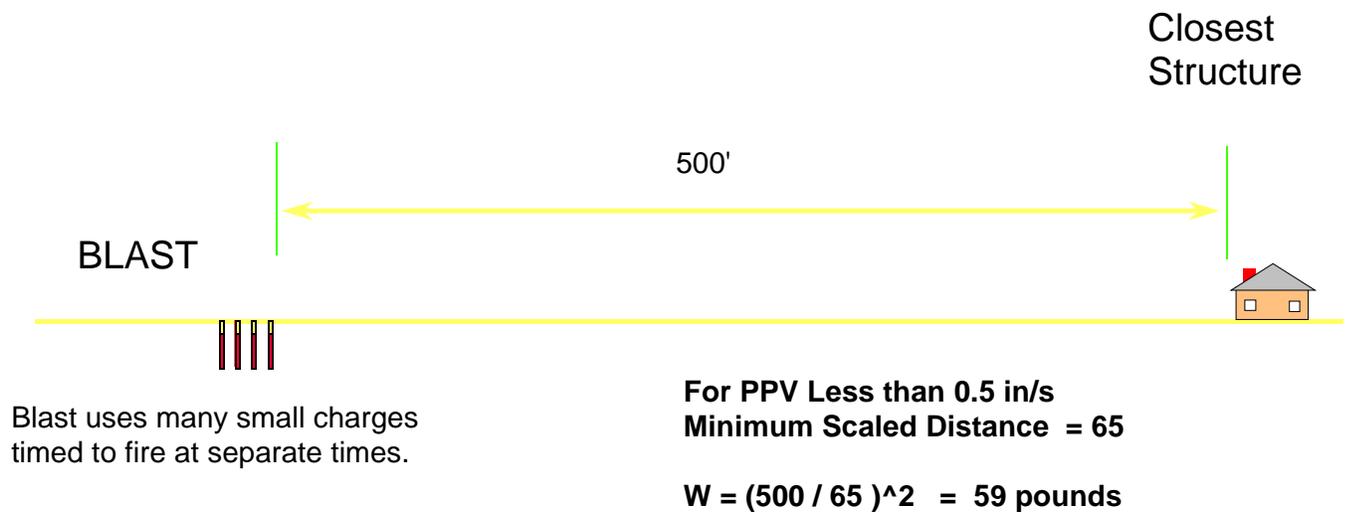
Earthquake Movement is over 3,000 times greater!

Motion of Blasts Compared to that Caused by Normal Human and Environmental Forces



Data Sources: Oriard, 1999; Stagg et al, 198; and BSI Surveys, 2001

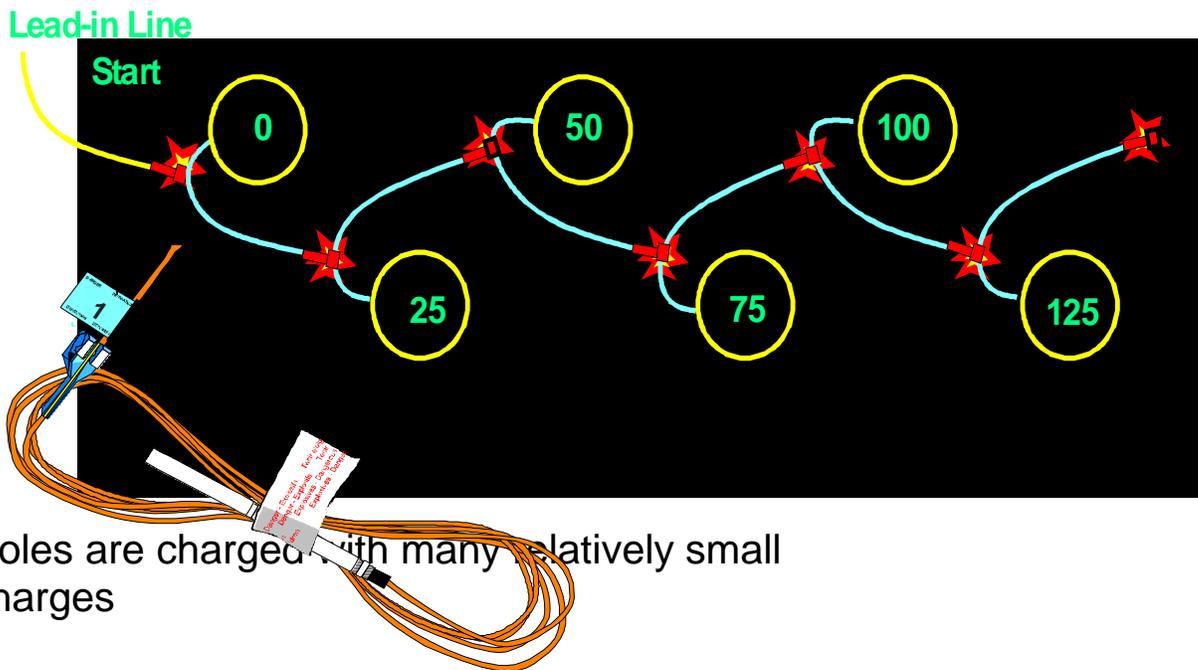
How Blasters Determine Charge Size to Control Vibration



Charges are fired separately to reduce vibration

Detonators are hooked up to create a series of many time-delayed charges for all charges

Many Holes are Drilled



Holes are charged with many relatively small charges

PUTTING BLAST VIBRATION INTO PERSPECTIVE



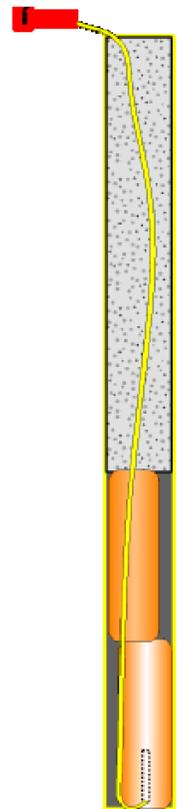
In a Controlled Test, Buried Raw Eggs and Light bulbs Survive Vibration 10 times greater than that allowed for this work (5.0 versus 0.5 in/s)

Egg and light bulb buried next to a buried 11-lb charge survived motion 20 times higher than intensity of motion predicted at Properties closest to LVMWD Blasts

CONFINED BLASTS

1) CRUSHED STONE STEMMING IS PLACED OVER EXPLOSIVE CHARGES TO CONTROL NOISE

2) BLAST MATS ARE PLACED ON TOP OF BLAST AREAS

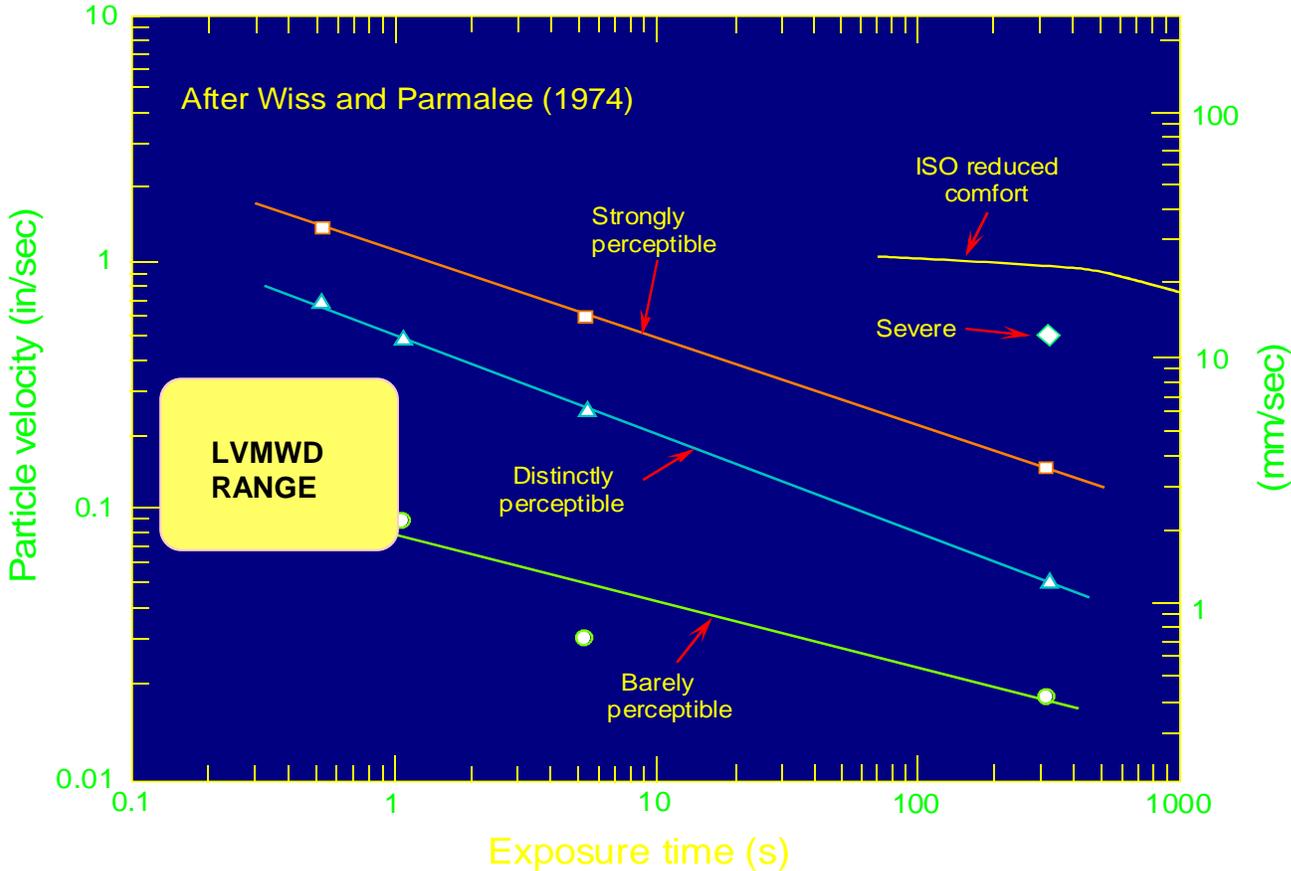




SUMMARY: WHY CONTROLLED BLASTS DO NOT CAUSE DAMAGE

- Energy from many small time-delayed charges reduces rapidly with distance.
- Motion caused by controlled blasting is 1000's of times less than that caused by earthquakes.
- Everyday environmental and human activities create more stress in structure than that caused by controlled blasts.

Human Response to Vibration



After USBM RI 8507 (1980)

WATER TANK PROJECT BLASTING SCHEDULE AND WARNING SIGNALS

- One blasts per day, each lasting less than one second. Temporary road closures of XXX Rd will occur while blasting; time will be kept as short as possible
- No blasting on Saturdays, Sundays or Holidays
- Blasting will occur begin XXXX and end in late fall, 2011.
- Nearby residents may hear warning sirens shown below

HORN SIGNALS FOR BLASTING

FIVE MINUTE WARNING:

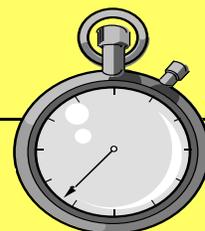
Long series of siren wails

ONE MINUTE WARNING:

A series of short siren yelps

ALL CLEAR SIGNAL:

A single one-minute siren signal



Noise & Vibration Monitoring



PROPERTY CONDITION SURVEYS



Owners of properties located within 1000 feet of potential blast areas have the option to have the condition of their property surveyed and documented by a Third-Party Specialist.



Summary of Blasting Procedures and Limitations

- Careful Geological Investigations
- Blast Planning and Review Procedures
- Blast Effect Controls are Applied
- Blasting Hours Limited :Daytime Hours no Weekends or Holidays
- Vibration and Noise Limitations
- Regular Inspections
- Results are Monitored



RENDERING OF FINISHED TANK

**Tank Drawing
Here**



QUESTIONS?