



October 6, 2014

I don't see crack monitoring plan as specified in Special Provisions.

TO: Jim Hollar
Cold Rivers Bridges, LLC
FROM: DC Blakeman
President, Becc Company Inc
SUBJECT: Vibration Control Program (Vibration Monitoring Program)
Rockingham BRF 0126(12)
Rockingham, Vermont

This plan does not adequately address sections 55(b), 55(i), 56(b) and 56(c).

This plan only presents the qualifications of the company president. What are the qualifications of the workers who will be doing the actual field work? Or is the president going to do all of the field activities?

Program is submitted, as required in Special Provisions: 55. M
(b) VIBRATION MONITORING

**Monitoring Program Based on the
Transportation- and Construction-Induced Vibration
Guidance Manual
California Department of Transportation Environmental Program
Environmental Engineering
Noise, Vibration, and Hazardous Waste Management Office**

I. Instrumentation Used

A. Instantel Seismographs Series III and Series IV instruments; specifically –

- 1) Blast Mate III
S/N BA7197
- 2) MiniMate Plus (Series III)
S/N BE6335
S/N BE6468
S/N BE6437
- 3) Minimate Pro 4 (Series IV)
S/N MP 12905
S/N MP 12522
- 4) Micromate (Series IV)
S/N UM6043

Are all of these being used on the project? Which instrument is being used where?

B. All of the instruments used will be calibrated within 6 months of the start of construction.

II. Procedures

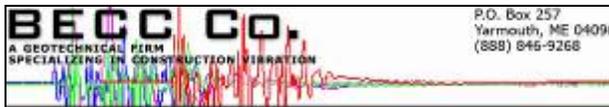
Upon notification by the State of Vermont AOT Contract Administrator the Vibration Consultant will dispatch a seismograph and Technician to monitor all vibration producing equipment and activities (i.e., blasting, vibration rollers, vibrating hammers etc).

How will the seismograph be coupled to the bridge/building?

III. Vibration Control Program

Please elaborate

- 1. During construction operations the instruments will be set in **Histogram Combo Record Mode.**
- 2. The level of detection for histogram collects all vibration data, the combo mode will be set at 0.050 in/sec (Maximum Geo Range – 10.0 in/sec)
- 3. The location of the monitor will be at the nearest structure on either side of the construction vibration source (i.e., building, bridge)
- 4. Trigger source will be transducer geophone only.



C. During continuous vibration activities such as vibrator rollers or pile driving activities the instrument will be set in Histogram (strip chart) Combo Record Mode. 1. The level of detection will be set at 10.00 in/sec (Geo Max Sensitivity)

(Note: in the Histogram mode the instrument has no trigger source or level, the instrument records all vibrations and/or overpressure)

2. The histogram interval will be set at 5 seconds (Note: the highest vibration level sensed every 5 seconds would be recorded).
3. The seismograph will be placed at the nearest structure to the vibration source.
4. The results of the vibration activities will be given to the Vermont AOT Engineer at the completion of the day's monitoring. If, however, the vibration pattern approaches an "unsafe level" the Engineer and the operator will be notified immediately (the safe level of vibration is based upon the latest publications – see list of publication at end of addendum-the safe level of operations as accepted by the industry is the USBM /USOSM STANDARD)

A. Maximum allowable vibrations for the Existing Structures should be no more than 2.00 inches per second with the vibration frequency at 30 Hz or higher, 1.00 in/sec at 4 Hz to 30 Hz and 0.79 in/sec below 4 Hz. The Maximum allowable "Air blast" should not exceed 150 dBl at any existing structure.

Maximum allowable vibration for a "Publicly owned"/ or "Privately owned" historical building should not exceed 1.5 in/sec for construction vibration @ over 40 hz, 1.0 in/sec for construction vibration @under 40 hz and or 1.25 in/sec above 20 hz and 1.00 in/sec below 20 hz for all other construction vibrations. The "Air Blast" should not exceed the allowable specifications.

IV. Reports

All recordings will be electronically sent and the Vibration Consultant will submit a hard copy after its analysis. An example of the hard copy description will appear later in this submission.

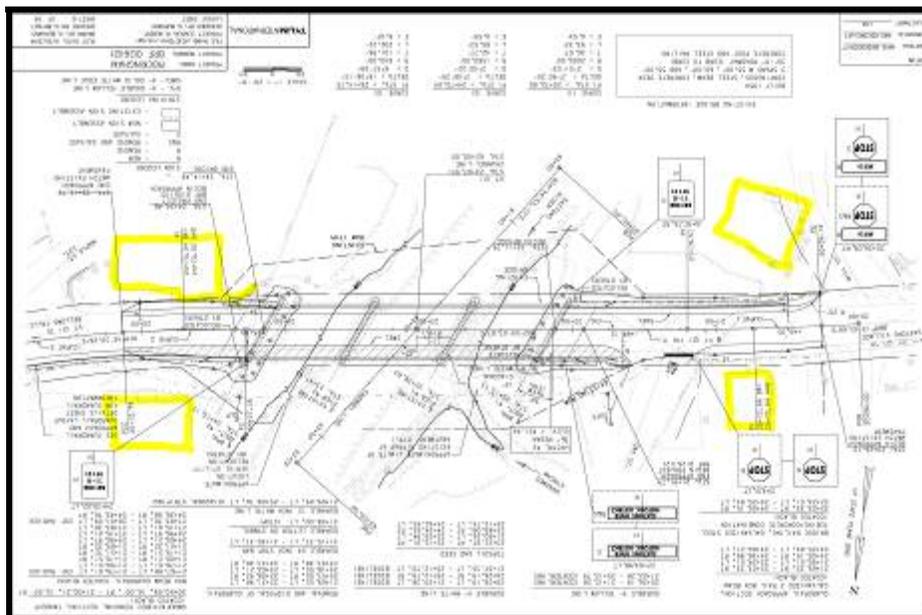
Within what time frame?

V. Monitoring Activities

The majority of the monitoring activities will be concentrated on particular designated areas of concern that will be coordinated amongst the Vermont AOT personnel, the Vibration Consultant and the General Contractor.

VI. Maximum Levels of Allowable Vibrations

Using four seismographs in the areas of highest sensitivities as designated by specifications and monitoring the vibration levels for a period of at least 60 hours will establish a basic line vibration. (see locations below)



Sample Log

VIBRATION MONITORING REPORT

Sample Log

Contractor
Cold River Bridges
Job Location
Rockingham BRF 0126(12)

BECC COMPANY
 28 Ledgewood Drive/Box 257
 Yarmouth, ME 04096

Time	Activity
8:06	Set-Up
12:41	Take Down



SEISMOGRAPH UNIT: MiniMate
 SERIAL# BE6468 CALIBRATED:10/21/14
 MODE/SETTINGS: Histogram-Combo

VIBRATION CONSULTANT

M. Sakuma

Time	PPV (in/sec)	Frequency (Hz)	dBl	Location	Distance
8:15	.072	23	112.8	Sample	115'
9:15	.007	8.8	115.9	"	"
10:16	.013	32	Out of range	"	"
11:10	.052	39	116.3	"	"
12:11	.012	5.2	Out of range	"	"

TECHNICIAN: Mike Sarrazin

JOB TIME AND TOTAL HOURS: 5

DATE:10/22/10 WEATHER/COMMENTS:Cold,Clouds(**Please Note: American Excavating was hammering at the time!**)

Example of Previous Highest Vibration Monitoring in Rockingham, VT



Event Report

Histogram Start Time 9:42:48 AM January 4, 2012
Histogram Finish Time 11:21:13 AM January 4, 2012
Number of Intervals 393.00 at 15 seconds
Range Geo: 1.25 in/s
Sample Rate 1024sps

Serial Number BE6437 V 10.20-8.17 MiniMate Plus
Battery Level 6.1 Volts
Unit Calibration June 1, 2011 by InstanTEL
File Name H437E3FE.ZC0

Notes

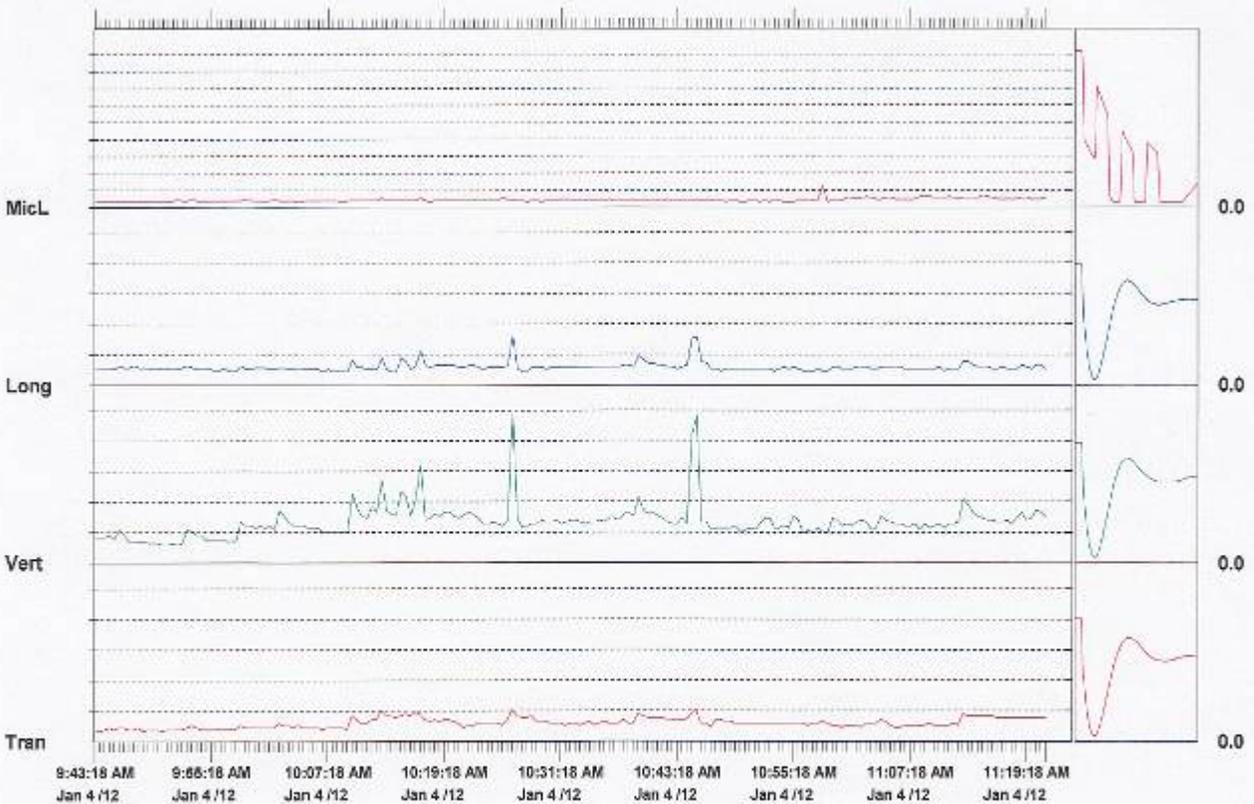
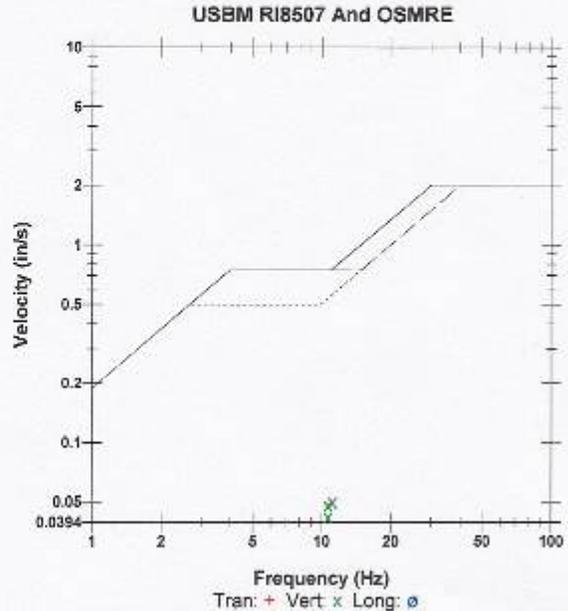
Monitor Location: 100ft NW Bridge Abutment
Client: Cold River Bridges
Location: Rockingham, VT
User Name: BECC Company/Alex Gilbert

Extended Notes

Microphone Linear Weighting
PSPL 108.5 dB(L) on January 4, 2012 at 10:58:03 AM
ZC Freq >100 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 689 mv)

	Tran	Vert	Long	
PPV	0.01000	0.0500	0.0162	in/s
ZC Freq	12	11	12	Hz
Date	Jan 4 /12	Jan 4 /12	Jan 4 /12	
Time	10:12:33 AM	10:26:18 AM	10:26:18 AM	
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.2	4.0	4.1	

Peak Vector Sum 0.0501 in/s on January 4, 2012 at 10:26:18 AM



Time Scale: 30 seconds /div **Amplitude Scale:** Geo: 0.01000 in/s/div Mic: 0.00050 psi(L)/div

Sensor Check



Levels of Comparison

In the following table a very basic comparison of vibration response as compared with everyday activities. (Note: this is a blasting vibration comparison)

Loading Phenomena	Site (a)	Micro strain Induced by Phenomena (uin/in)	Corresponding Blast Level (b)	
			(in/sec)	(mm/sec)
Daily Environmental changes	K1	149	1.2	30.0
	K2	385	3.0	76.0
Household Activity				
Walking	S2	9.1	0.03	0.8
Heel drops	S2	16.0	0.03	0.8
Jumping	S2	37.3	0.28	7.1
Door Slams	S1	48.8	0.50	12.7
Pounding Nails	S12	88.7	0.88	22.4

- (a) K1 & K2 were placed across a taped joint between two sheets of gypsum wallboard
- (b) Blast equivalent based on envelope line of strain versus ground vibration.

Publications:

Construction Vibrations; Charles H Dowding

Shock and Vibration Handbook, Fourth Edition; Cyril M Harris

Blasters' Handbook, Seventeenth Edition; ISEE

Effects of Repeated Blasting on a Wood-Frame House; Mark S Stagg, David E Siskind, Michael G Stevens and Charles H Dowding

California Department of Transportation

Noise, Vibration, and Hazardous Waste Management Office 1120 N Street, Room 4301 (MS27)

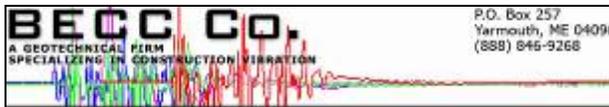
Sacramento, CA 94274 Contact: Jim Andrews

Prepared by:

Jones & Stokes 2600 V Street

Sacramento, CA 95818 Contact: David Buehler, P.E.

The qualifications for BECC COMPANY will be attached with this submittal.



Visit: WWW.becccompany.com

FEDERAL ID NUMBER 01-0380695

BECC Company, Inc. was organized and incorporated in 1981. The primary objective of the corporation is to complement the construction industry with general safety and Geotechnical expertise.

Since its inception BECC has performed Geotechnical and Construction Safety tasks for General Contractors, Subcontractors, Blasting Contractors, The Insurance Industry, Engineering Firms, Governmental Community and The Legal Community with expertise.

In 1985 BECC organized a Geotechnical, Seismographic, and Construction Vibration department. Our staff is associated with the U.S. Bureau of Mines, The World Construction Vibration Group, and the Civil Engineering Department at Northwestern University. BECC Company is an authorized INSTANTEL™ dealer for the Northeast and Mountain States since 1991. We maintain clients in Maine, New Hampshire, Vermont, Massachusetts, South Dakota, Montana, Wyoming and Colorado.

Additional information is available for specific corporation references.

Becc Company Inc.
28 LedgeWood Drive
PO Box 257
Yarmouth ME 04096
Phone: 207-846-9268
888-846-9268
Fax: 207-846-1405

References:

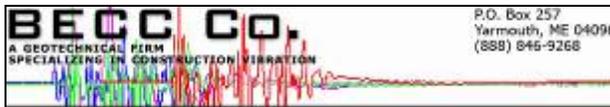
- Bechtel Company, Otis Eastern Service Inc, Welded Construction, Portland Natural Gas Transmission System (Portland Natural Gas Pipeline Construction Project)
- BIW Expansion Project (Atkinson Construction, Inner Space Services Inc)
- 3 sewer contracts City of Berlin (SCI, Paragon)
- 4 sewer contracts City of Manchester NH (S.E. MacMillan Company, Park Construction Company)
- 5 sewer contracts City of South Portland ME (each contract had a different Prime, Breascia Construction, S. E. MacMillian, R.D. Grondin and Sons, Cianbro Company, & Methuen Construction)
- Henniker Bridge-NH (Moores Marine Construction)
- Enfield Bridge Reconstruction (Miller Construction)
- Haley & Aldrich, GZA GeoEnvironmental
- Reed & Reed, Inc.
- Sanford Maine Sewer Department

(Contractors)

Blasting & General

Drilling & Blasting Rock Specialists
RD Edmunds
Allen Drilling & Blasting
Hill Drilling & Blasting
SCI Construction
American Explosives
Dyno New England
Sigler Drilling & Blasting
Dynamite Drilling & Blasting
Cianbro Corp
Frank Whitcomb Corp
Moores Marine
Abbot Brothers

Manter Company
Daniels Drilling & Blasting
Jamco
Procon Construction
Paragon Construction
J Parker & Daughters
Northeast Blasting
PDK Drilling & Blasting
McGoldrick Bros. Blasting
Sargent Corp
SUR
Miller Construction
Ibby Drilling & Blasting



Dwight C. Blakeman
 President Becc Co.
 Supervising Administrator

EDUCATION

University of Maine	Orono, Maine	1973
BS: Forestry - Wood Science and Technology		
Minor: Civil, Structural Engineering, Business Law		
Casper College	Casper, Wyoming	1970
AS: Engineering/Geology		
St. John's Academy	Winfield, Kansas	1963
College Prep		

BUSINESS EXPERIENCE

BECC Co., Inc. Yarmouth, Maine 1981-present

President & Owner Organized and Incorporated BECC as a Geotechnical and safety organization.

- * Handle all CEO responsibilities.
- * Chief Consultant.
- * More than 35 years in related construction industry.
- * Over 40 years dealing with construction law and insurance.
- * Organize and implement Pre-Construction safety consulting and expert Witness. (Court testified in MA, RI, NH, and ME.)

The Dunlap Agency Auburn, Maine 1980-1981

General Manager of Loss Control and Claims Administration Dunlap is an insurance agency that services Northern New England.

- * Established and organized both the Loss Control and Claims Departments.
- * Designed and implemented uniform reporting system.
- * Wrote and coordinated comprehensive loss control and safety programs for Four firms. (Largest program implemented was L.L. Bean's.)
- * Established liaison between large agency accounts and insurance company Claims manager.

Blue Rock Industries Westbrook, Maine 1977-1980

Director of Safety and EEO

- * Personnel, safety, loss prevention, and EEO were the major responsibilities.
- * Established and implemented complete safety - EEO - loss control program For company. Program produced a marked reduction of one truck Accidents. 30% reduction of each of 3 years as director of program.
- * Wrote and implemented a program to satisfy all government regulation Changes, which included a complete EEO - Affirmation Action Program. Program enabled Blue Rock Industries to accept \$26 million in contracts.
- * Worked with controller to reduce overall insurance cost by 15%.

BUSINESS EXPERIENCE (continued)

U.S.F. & G. Portland, Maine 1973-1977

Safety Engineer and Premium Auditor

- * Responsible for general safety, loss control, and fire safety for all clients in NH and Southern Maine. Audited clients in Western and Northern NH.
- * Had largest reduction percentage in New England (U.S.F. & G. insured) during last two years.

Construction Worker 1968-1970

Various companies

U.S. NAVY 1964-1968

Naval Air Crewman and Air Intelligence Operations



EDUCATIONAL CERTIFICATES

OSHA 500 course (qualified OSHA Regs Instructor)	1991
Revised Trenching - OSHA Seminar	1991
R&S - White - Blasting & Seismographic Institute	1987-1991
U.S. Department of Labor Professional Safety Seminar	1981-1989
DDC Instruction Massachusetts Safety Council	1981
Defensive Driver's Instructor Class	1981
Continuous OSHA Approved First Aid	1979-1981
Professional Safety Seminar - OSHA U.S. Department of Labor	1979
U.S.A. Mine Safety & Health Administration Instructor of Education	1978
American National Red Cross	1977-1980, 1983-1986
AGC Multimedia to Injured	
Graduated of Industrial Hygiene Course	1976
Graduate of Insurance Institute of America General Insurance Courses	1974

PROFESSIONAL AFFILIATIONS

Professional Member International Society of Explosive Engineers	1991 - Present
Member Maine Safety Council	1974 - Present
American Society of Safety Engineers (Professional Member)	1975 - Present
Member National Safety Council	1975 - Present
Member AGC's Safety Committee (Note: Chairman 1979 - 1981)	1977 - Present
Member Holmes Safety Council (Note: President)	1978 - Present
Member ASSE Construction Division	1984 - Present
Member Associated General Contractors	1977 - Present
Maine Insurance Adjuster Association	1980 - 1984

PROFESSIONAL SEMINAR MODERATOR/LECTURER

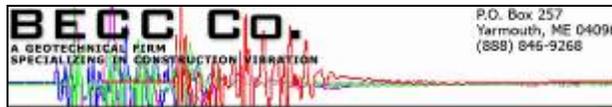
Associated General Contractors of Maine
 Maine State Department of Labor - Safety Division
 New Hampshire Department of Public Works
 Maine Safety Congress
 ASSE "Construction Safety"

PROFESSIONAL RECOGNITION

DuPonts Safe Blasting Award
 U.S.F. & G. Safe Professional Award
 AGS Safety Contribution Award

BLASTING RELATED ACTIVITIES

20 years of field related pre- post blast structural condition serves
 18 years of blast monitoring and consultation
 10 years as distributor of INSTANTEL™ blasting seismographs.
 15 years of Geotechnical consultation for public and private blasting projects.



In addition to the enclosed CV I would like to add the following qualifications specifically concerning blasting safety as well as seismology.

During my tenure at U.S.F. & G. Companies the Loss Control Supervisor was an expert at Blasting and Blasting Safety. I enjoyed four year's of personal training and received invaluable field and technical claims experience regarding blasting and seismology. We were one of the first insurance companies in the Northeast to use seismographs regularly in the field. I took two formal courses on Blasting and Blasting Safety and Field Seismograph/Instrumentation Usage while employed at USF&G.

I carried that experience to Blue Rock Industries, where I worked with the Bureau of Mines, their insurance company, Dupont, MSHA and our Blaster to reduce blasting vibration damage. We did a great deal of blasting in quarries and in our trenching operations.

I attended two programs on Blasting and Blasting Safety at The Bureau of Mines training facility in Pittsburgh, PA during my employment at Blue Rock. My formal seismology training began shortly thereafter, first with the Department of Interior then later with Bureau of Mines.

I have since given training programs on Blasting and Blasting Safety for the State of Maine Safety Inspectors, AGC of ME and the State of Maine Safety Conference. Through Tufts University and Northwestern University I have associated with Professors in Seismology and Ph.D. that are presently practicing in the private arena.

In 1981 I organized Becc Co., Inc. and we have worked directly with construction companies blasting companies, engineering companies and insurance companies completing pre-blast surveys, setting up blasting programs, investigating blasting claims reviewing seismograph data and advising them on blasting claims. I have continued my education the blasting and seismographic fields and have gone to Chicago to meet with Prof. Dowding and to San Francisco to inspect the effects of various sizes of earth tremors.

A partial list of the companies that we have dealt with in the past is included in the enclosed materials. Specifically, in New Hampshire, we have worked with the Testing Department at NHDOT (the department that handles seismographs), City of Manchester, City of Berlin, City of Portsmouth, City of Laconia and several smaller towns through out the State. We have been qualified as seismologists in each of these towns.

The State of Maine as well as NOAA has qualified BECC Company to monitor for Fish Sound Disruption by Construction Vibration Companies.