On March 10 – 14, 2008 Technology Support will be hosting the Basic Machinery Vibration (BMV Category II) seminar and Certification. This remains in keeping with our strategy to maintain Technology Support’s philosophy to work with our customers to help increase their potential for improved Asset Management and Optimal Mechanical Reliability.

The seminar will be conducted by US based, David Szrom, of the Vibration Institute. The Vibration Institute has conducted several programs and certification exercises with us since 2000, including MVA I, II and III and Balancing of Rotating Equipment programs. This four-day BMV course will include several practical sessions as well as the review of case studies. The Certification examination will be staged on Day Five.

We take this opportunity to invite you to enroll representatives to participate in the program. Following is the course outline and contacts if you want further information.

It is important to note that this seminar is generic in nature, geared towards problem solving, and ultimate operational reliability. This course is not meant as a marketing effort for any manufacturer or vibration analysis product.

Please note that early, timely registration is important for preparation of the Certification Examinations. We look forward to you taking advantage of this opportunity.

Respectfully,

Josie-Ann Carrington
Director – Operations
Technology Support Limited
Basic Machinery Vibrations Course Description (Category II)

Basic Machinery Vibrations is designed for those who have had less than three years of experience in measuring and analyzing machine vibrations. Also, Basic Machinery Vibrations is often taken by more experienced individuals to prepare for the Vibration Institute’s Category II Vibration Analyst Certification Examination.

TOPICS
- basic vibration concepts and terminology
- use of electronic data collectors for monitoring and analysis
- machine monitoring principles
- selection and location of transducers
- data acquisition for monitoring and analysis
- fault and condition analysis
- calculating machine frequencies
- operating speed fault analysis
- machine acceptance testing
- preparation for Category II Vibration Analyst Examination
Introduction/Review

- Physical nature of Vibration
- Forces, Period, Amplitude
- Frequency, Phase
- Measures, Conversions
- Time wave forms, RMS, Damping
- Critical Speeds, Instabilities

Data Acquisition Procedures

- Transducer selection/location, Measure selection/sensitivity
- Frequency response, Data storage with tape
- Data collector, Data displays,
- Data acquisition time

Uses and Limitations of Instruments

- Oscilloscopes, Tracking filters, FFT Analysers
- Data Collectors, Data sampling
- Triggering, Aliasing, Resolution
- Dynamic Range, Windows, Averaging

Time and Frequency Analysis Techniques

- Time domain, Frequency analysis, Sidebands
- Beats, Orders, Spectrum Shapes
- Synchronous and Nonsynchronous signals
- Modulation
- Fault Analysis

Workshop I: Vibration Theory, Data Acquisition, and Data Processing

Phase and Orbital Techniques

- Phase measurement and analysis at operating speed
- Loop rules
- Orbit evaluation

Resonance and Critical Speed Testing

- Bump test, Coast-down/Start-up tests
- Test procedures
- Interference diagrams

Condition Evaluation

- Criteria, Overall levels (peak, rms, peak to peak)
- Standards, Spectral, Orbital, Time wave form evaluation
- Band analysis, Setting alarms

Basic Vibration Control

- Isolation, Damping, Tuning
- Correction, Selection techniques/procedures
- Foundations
Workshop II: Fault and Condition Analysis

Field Balancing
?
Criteria
?
Techniques
?
Trial weight/phase angle selection

Workshop III: Balancing

Rolling Element Bearings
?
Analytic techniques
?
Identification of defects on balls/cages/races
?
Corrosion, Fatigue, Excessive clearance
?
Leak of lubrication, Demodulation methods, Condition Evaluation

Machinery Diagnostics: Operating Speed
?
Unbalance, Subsynchronous instability, Coupling problems
?
Misalignment, Mechanical looseness, Rubs, Rotor bow
?
Resonance, Fluid-film bearings, Condition Evaluation

Pumps, Fans and Compressors
?
Pump impeller/casing/piping vibrations
?
Natural frequencies, Clearances
?
Recirculation, Cavitation performance curves
?
Impeller, Casing, Shafts, Foundations
?
Isolated bases, Piping, Ducting, Structural/Acoustic Resonance’s

Workshop IV: Exercises on Analysis

Motor and Generator Diagnostics
?
Mechanisms, Vibration/Current Measurements
?
Stator/Rotor faults
?
Shorted end rings, Broken rotor bars
?
Air-gap variation, Variable-speed motors

Gears and Gearboxes
?
Measurement and Analysis, Gear mesh
?
Cracked/broken/chipped teeth
?
Gearbox evaluation

Roll, Spindle, and Press Vibrations
?
Barring, Eccentricity, Flat Spots
?
Sag, Frame Vibration, Calenders
?
Winders and Coaters, Critical Speeds
Basic Machinery Vibrations
Presented by Vibration Institute
Hosted by Technology Support Limited

Location: Cara Suites  
Southern Main Road  
Claxton Bay  
Trinidad & Tobago

Date: March 10 - 14, 2008

Time: 8:00 a.m. to 4:00 p.m.

Intended for: Maintenance and Operation Engineers, Technicians and Analysts,  
Data Collectors, Vibration Analysts

Course & Examination: $11,500.00TT plus VAT  
(Certification is valid for Five (5) Years)

Fee includes:  
Text Book, “Basic Machinery Vibrations”  
All other course material  
Lunch and Refreshments daily

Deadlines: Registration – February 18, 2008  
Payment – March 3, 2008

Cheques must be made payable to Technology Support Limited.  
Fax the completed Registration Form to us at 868-657-0000.
REGISTRATION FORM
#39 Farah Street
Les Efforts West
San Fernando
Ph: 868-657-1037    Fax: 868-657-0000

Course Name: Basic Machinery Vibration Analysis
Presented By: David Szrom, The Vibration Institute
Course Date: March 10 – 14, 2008
Course Fee: $11,500.00TT plus VAT

Deadline for Registration: February 18, 2008
Deadline for Payment: March 3, 2008

(Please fill out in BLOCK letters)
Company’s Name: ______________________
Attendee’s Name: ______________________  Job Title: ______________________
1. ______________________  ______________________
2. ______________________  ______________________
3. ______________________  ______________________
4. ______________________  ______________________

Authorized by: ______________________  Job Title: ______________________
Date: ______________________

Total Payment: ______________________
Please make cheques payable to Technology Support Limited