

**Brief Report to the 8th Meeting
of the
Consultative Committee for Acoustics, Ultrasound and Vibration**

**NPLI
Acoustics, Ultrasonics and Vibration Standards**

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1. ACCREDITATION

The Acoustics, Ultrasonics and Vibration Section (AUV) of the National Physical Laboratory, India (NPLI) was re-assessed by the Asia Pacific Metrology Programme (APMP) in November 2011. This was a surveillance visit (full re-assessment) of the laboratory and therefore included a technical assessor, Mr. C. S. Veldman from the National Metrology Institute of South Africa (NMISA). During the assessment, the scope of accreditation was extended in the Acoustics and Vibration as well as the Ultrasonics fields.

In the field of Acoustics, the laboratory added calibration of microphone using the actuator method as well as the realization (using secondary methods).

In the area of Vibration, the laboratory extended the frequency range for primary and secondary sensitivity calibration of accelerometers to include frequencies from 0.1 Hz to 10 Hz.

In the area of Ultrasonics, the laboratory extended the frequency range for primary standard of Ultrasonic Power to include frequencies from 1 MHz to 15 MHz.

1.1 CMC Reviews

CMC submission from AUV in Acoustics and Vibration was approved and published in the KCDB (Appendix C) on October 2009 and January 2012, respectively.

2. ACOUSTICS AND VIBRATION

The laboratory is in the process of replacing and upgrading aging equipment relating to all areas of standard realization and dissemination. Through this planned upgrade of the laboratory infrastructure, it will further extend calibration services to its clients to include calibration of acoustical equipment in conformance of current IEC standards. The upgrade of the system will provide the laboratory the capability to realize the standard for sound pressure in air for LS1P as well as LS2P microphones using primary methods with reduced uncertainties of measurement and extended frequency ranges. Currently the laboratory is realizing the standards using LS1P as well as LS2P microphones.

The national standard for vibration is to be re-located from the laboratory on the first floor to a Metrology Building, dedicated for the realization of the standard, on the ground

floor. The frequency range over which the national standard for vibration is being realized (using primary method) has been extend down to 0.7 Hz.

Updated CMCs have been submitted and the Intra-regional review questions and concerns are being addressed.

Based on this system, new CMCs will be submitted for inclusion in Appendix C of the BIPM database in the near future.

3. ULTRASONICS

Updated CMCs for Ultrasonic Power have been submitted and the Intra-regional review questions and concerns are being addressed.

4. COMPARISONS

4.1 Acoustics and Vibration

No International or Regional comparisons were conducted or participated in by the laboratory during the past 2 years. The laboratory has expressed interest to participate in the APMP regional low frequency vibration comparison as well as the APMP regional comparison of middle frequency vibration.

4.2 Ultrasonics

The Ultrasonics lab took part for Ultrasonic Power parameter in the CCAUV-K3 key comparison piloted by PTB in 2011. Till now, NPLI has finished the comparison and reported the data to the pilot laboratory.

5. OTHER TOPIC

Feasibility and willingness of new key comparison in Low Frequency Vibration and acceleration

6. REGIONAL ACTIVITIES

Conducted National Symposium on Acoustics (NSA-2011) with theme of Noise Pollution at Bundelkhand University, Jhansi on 17-19 November 2011 and also organized one day workshop on Noise and Vibration Control (WNVC2012) held at NPL, New Delhi on 27th January 2012.

In addition, it is proposed to organize jointly Indo-French Conference on Acoustics (IFCA2013NEW DELHI) during 20-22 November, 2013 at NPL, New Delhi.

7. PUBLICATIONS

7.1 Acoustics and Vibration

1. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Room Acoustics - Design for Internal Acoustic Quality," *Journal of the Acoustical Society of India*, 38(1), pp. 3-10, Jan. 2011.

2. Mahavir Singh, "Sound Transmission through Building Elements," *Proc. of Indo-US Workshop on Nanosonic & Ultrasound (IUWONU2011) and International Conference on Nanotechnology & Ultrasound (ICNU2011)*, Trichy, pp. 52 -70, Jan. 2011.
3. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Experimental Investigations of the Sound Transmission Loss of Window Panels," *Proc. of 1st National Conference on Advances in Metrology (AdMet-2011)*, Banglore, pp. 1-6, Feb. 2011.
4. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Acoustic Comfort – Noise Control for Buildings," *New Dimensions of Physics of Proc. of National Conference on Ultrasonics (NCU-2011)*, Jhansi, pp. 1-14, Mar. 2011.
5. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Sound Transmission through Cavity Walls Constructed from Gypsum Board," *GESTS Int'l Trans. Acoustics Science and Engr.*, 15 (3), pp. 107-112, Mar. 2011.
6. Naveen Garg and Omkar Sharma, Noise Impact Assessment of Mass Rapid Transit Systems in Delhi City," *Indian Journal of Pure and Applied Physics*, 49, pp. 257-262, Apr. 2011.
7. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Experimental Analysis of the Sound Transmission Loss of Single, Double and Triple Glazing Window for Traffic Noise Reduction," *Journal of the Acoustical Society of India*, 38(3), pp. 106-113, Jul. 2011.
8. Mahavir Singh, Dharam Pal Singh and Omkar Sharma, "Sound Insulation Performance of Double-leaf Structures," *Acoustic Waves of Proc. of National Symposium on Acoustics (NSA2011)*, Bundelkhand, pp. 15-24, Nov. 2011 (Received a Best Paper Award).
9. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Sound Transmission Loss of a New Designed Lightweight Partition," *Acoustic Waves of Proc. of National Symposium on Acoustics (NSA2011)*, Bundelkhand, pp. 62-77, Nov. 2011.
10. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Vibration in Residential Environments due to Road Transportation," *Journal of the Sound, Vibration and Harshness*, (in press).
11. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Experimental and Theoretical Evaluation of Sound Transmission through Double Window Panels," *GESTS Int'l Trans. Acoustics Science and Engr.* (in press).
12. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Some Practical Aspects of Absorption Measurements in Reverberation Room," *GESTS Int'l Trans. Acoustics Science and Engr.* (in press).
13. Mahavir Singh, Omkar Sharma and Dharam Pal Singh, "Theoretical and Experimental Investigation for Sound Transmission through Multi-layered Window Structures," *2nd National Conference on Advances in Metrology (AdMet-2012)*, Pune, pp. 1-7, Feb. 2012.
14. Mahavir Singh, "Development of Lightweight Sandwich Material as Acoustic Partitions for Building Applications," *National Seminar on Material Characterization by Ultrasonics (NSMCU-2012)*, New Delhi, pp. 1-7, Apr. 2012.

15. Dharam Pal Singh and Mahavir Singh, "Acoustic Properties of Coconut Coir Fiber Sound Absorption Panel," *National Seminar on Material Characterization by Ultrasonics (NSMCU-2012)*, New Delhi, pp. 1-8, Apr. 2012 (Received a Best Paper Award).

Invited Talk

1. Invited talk by Mahavir Singh on "Sound Transmission through Building Components" in IUWONU2011 & ICNU2011TRICHY, Tamil Naidu, Jan. 2011.
2. Invited talk by Mahavir Singh on "Acoustic Comfort – Noise Control for Buildings" in NCU-2011, Bundelkhand University, Jhansi, Mar. 2011.
3. Invited talk by Mahavir Singh on "Sound Transmission of a New Designed Lightweight Partition" in NSA2011JHANSI, Nov. 2011.
4. Invited talk by Mahavir Singh on "Development of Lightweight Sandwich Material as Acoustic Partitions for Building Applications" in NSMCU2012NEW DELHI, Apr. 2012.
5. Invited talk by Mahavir Singh on "Developments in Noise Control" in Department of Physics, HNBG (Garhwal) University, Utrakhand, Jun. 2012.

7.2 Ultrasonics

1. Yudhisther Kumar, R Sandeep Kumar, Reeta Gupta and Deepa Joshi, "Characterisation of Ultrasonic Power Transducer Developed at NPL," *Proc. of National Symposium on Acoustics (NSA-2011)*, Jhansi, Nov. 2011.
2. R Sandeep Kumar, Yudhisther Kumar, Reeta Gupta, Deepa Joshi and Ashok Kumar, "Ultrasonic Method of Measurement of Wall Thickness Variation in a Metallic Pipe – A Case Study," *Proc. of National Symposium on Acoustics (NSA-2011)*, Jhansi, Nov. 2011 (Awarded Best Paper Published From ASI).
3. R. Gupta, R Sandeepkumar, P Jain, P. Sethi, Doshi, Yudhisther Kumar and Ashok Kumar, "Ultrasonic Search Device for Underwater Applications," *Proc. of National Symposium on Acoustics (NSA-2011)*, Jhansi, Nov. 2011.
4. Deepa Joshi, R Sandeep, R Gupta, Yudhisther Kumar and Ashok Kumar, "Different Mode Wave Generation using EMAT," *Proc. of National Symposium on Acoustics (NSA-2011)*, Jhansi, Nov. 2011.
5. R Sandeep Kumar, Deepa Joshi, Yudhisther Kumar, R. Gupta and Ashok Kumar, "EMAT Based Ultrasonic System for Determination of Thickness Variation in Metallic Samples," *Proc. of International Conference on Non Destructive Evaluation for Steel and Allied Industries (NDESAI 2011)*, Jamshedpur, pp.146-153, Dec. 2011.

Invited Talks

1. Invited talk by Ashok Kumar on "Applications of Ultrasonics in Measurement", in NCU2011JHANSI, Mar. 2011.

2. Invited talk by Yudhisther Kumar on “Ultrasonic Power Measurement and its Biomedical Necessities, in NCU2011JHANSI, Mar. 2011. (Published in *New Dimensions of Physics*, (2010), 22-26)
3. Invited talk by Yudhisther Kumar on “Ultrasonic Power Measurement and its Importance in Industry” in NSA2011JHANSI, Nov. 2011.
4. Invited talk by Yudhisther Kumar on “Ultrasonic Non-destructive Testing and Evaluation of Materials”, in WCPAMS2012ROHTAK, Feb. 2012.