Title: **OCTAVE BANDS: NOISE RATING**
Ref Number: **15**
Location: **NATIONAL COLLEGE ACOUSTIC LAB**
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Academic: **SALIH HASSAN**
Team Size: **~4**
Environment: **INDOORS**

OBJECTIVE

To make a frequency analysis of a source sound in octave bands

APPARATUS

- Sound Level Meter CEL 328 or CEL 593
- Calibrator
- Tripod
- Fan, acting as a noise source

THEORY

The more modern sound level meters have internal filters, so that an octave band analysis of sound can be undertaken.

Octave bands are a convenient way of dividing the aural spectrum (20 Hz to 20 kHz) into "chunks". The musical relationship of octaves has been known for centuries and scientifically the octave is defined as the interval between two frequencies, the upper being twice the lower i.e. $f_{upper} = 2* f_{lower}$

The name given to the octave band is the geometric mean frequency, f_{centre}

$$f_{centre} = \sqrt{f_{upper} * f_{lower}}$$

so, for example 22 Hz to 44 Hz octave band, centre frequency is 31.5 Hz.

PROCEDURE

Measure the octave band and overall "A" weighted and Linear weighted sound pressure levels of a noise source in the reverberation chamber, then move the setup into the anechoic and repeat.

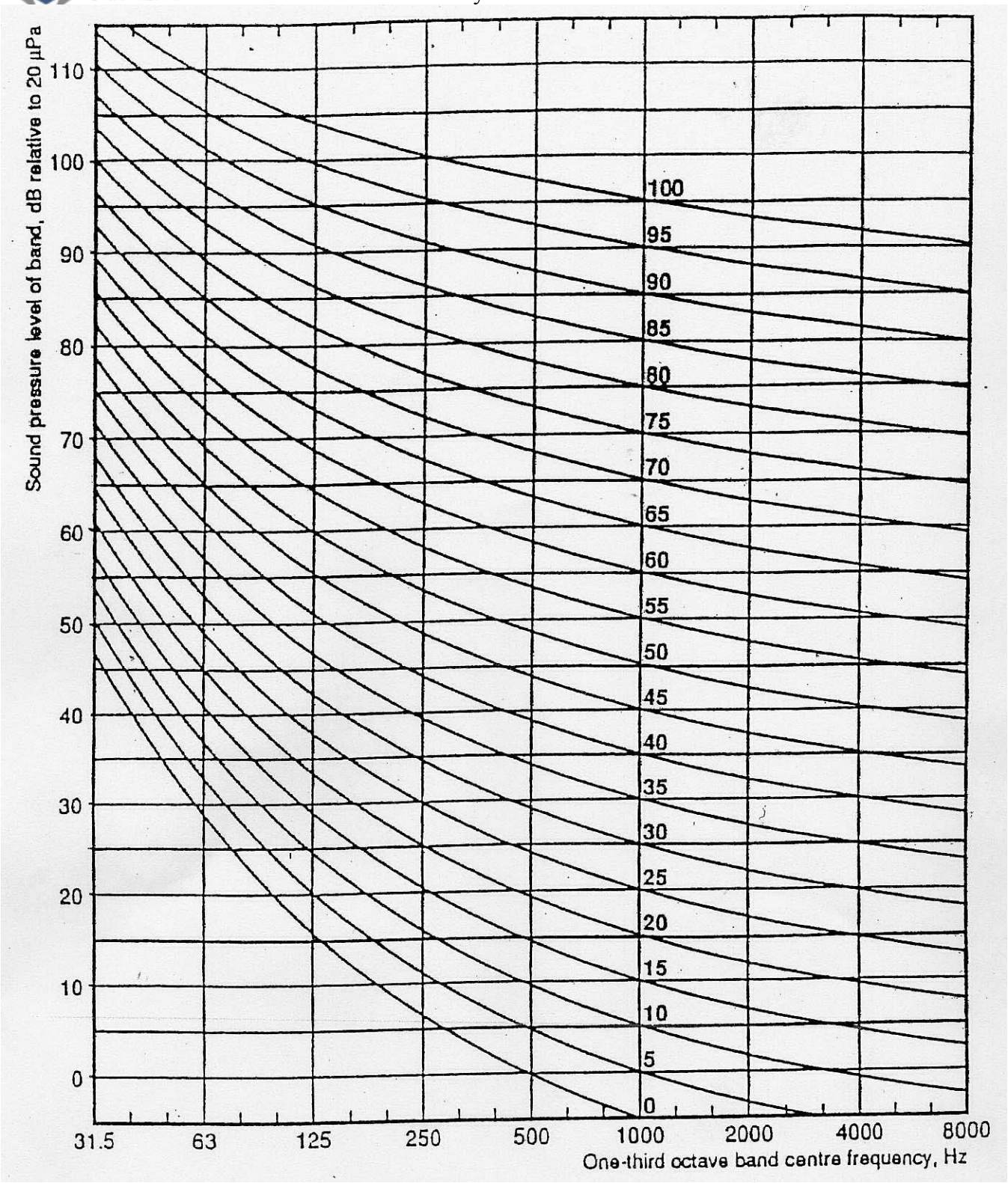
1. Calibrated Sound Level Meter
2. Carry out measurements in all octave bands between 31.5 Hz and 8 kHz.
    a) Place noise source 1m from the SLM at a height of 1m
    b) Measure the background noise level without fan running
    c) Repeat for each octave band
3. Repeat for each room, try not the change ant setting.

Note: if you are using the CEL 328 the set up should be as follows : F (fast); FL (frequency linear) for octave band measurements and A for A weighted overall measurements. DO NOT USE FA (frequency and A weighting)

RESULTS

1. In what frequency does the maximum sound pressure level occur?
2. Why should a smooth curve not be used to join the points?
3. Explain the differences between SPL overall "A weighted", SPL overall linearly weighted and in octave bands) in anechoic and reverberation chambers.
4. Would you expect the same reading if the meter was moving whilst the measurements were being undertaken?
5. Did you notice that the instantaneous octave band levels at low frequency (125 Hz) change whilst the higher frequencies (4 kHz) did not? Why?
6. Plot the octave bands on the Noise Rate sheet for the anechoic and the reverberant measurement and determine the NR for the rooms with and without the fan running.

Freq	Source	Background	Source	Background
Hz	dB	dB	dB	dB
31.5				
63				
125				
250				
500				
1k				
2k				
4k				
8k				
Linear				
A				
C				



NOISE RATING CURVES