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SPECTRUM ANALYSIS FOR NOISE SOURCES FROM DIFFERENT SOUND LEVEL ZONES CREATING LOW FREQUENCY NOISE DISTRIBUTION

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ABSTRACT

Common people Individual ear will not be conscious of low frequency sound. The ear decreases sound at a low noise level compared to 25 dB at 100 Hz, 40 dB at 50 Hz and 70 dB at 20 Hz. The result at higher concentrations is not prominent with a decrease of about 5 dB. When the rate rises for 70 decibles, the frequency in the 20Hz range will not be so hearable. The noise level meters of the A scale will generate more noise signals that will be reflected on LFN. Present paper shows LFN for traffic-related sound sources and silent areas that produce noise. An estimate was developed using MATLAB to predict a sequence of spectrum analyzes. The end findings represent countless sound concentrations with a 10 Hz frequency interval difference. In the frequency range of 40 Hz to 80 Hz, sound concentrations show serious noise spectrum and show supreme to smallest. Spectrum analysis has been developed in all noise generation areas. The beat noise-like output of the detected signals shows that LFN has occurred and a careful reduction measures have to be taken to offset noise concentrations as quickly as possible.

KEY WORDS : Noise pollution, Noise barrier, Noise from different sources, Noise attenuation, Low frequency noise, Noise spectrum

Spectral scrutiny

Sound frequency spectrum forces sound worth predominantly low frequency noise (LFN) resulting in the same distress level as regional noise will have severe effects on the life features of those it pretends. LFN's causes may differ from vehicles, traffic, windmills, equipment, sectors, and several deep-seated devices. Frequency transmits a vibrant position in the class and circulation of sound sensing. The noise frequency spectrum is used to fussily evaluate noise attenuation and techniques of alteration (Andy Moorhouse *et al.*, 2005).

While comparing with distinct noise criteria, it may mainly seem too rigid to condense vital concentrations of LFN to round the start of hearing. However, there is a growing familiarity that such small boundaries are required to provide LFN with sufficient safety. This is due to the well-built rejoinders and the apparent difficulty with LFN orientation (report on LFN 2001).

Later the LFN is many frequency structure sound, frequency spectrum is gained over Fourier analysis

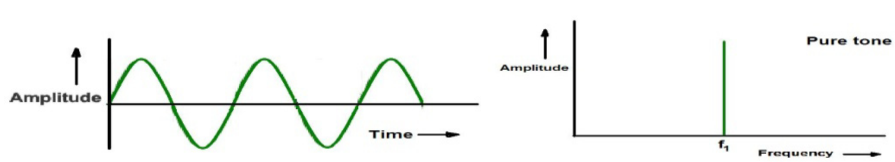

Fig. 1. Frequency distribution

from Sound and Vibration Measurement (Anon 2000 and 2010c).

Theory about LFN

The LFN difficulty can take place wherever if there is a noise range of 10 –150 Hz in general with noise in the 40 – 60 Hz range. The most common origin of noise is industry and also other causes such as domestic accessories, fridges, oil fired tanks, laundry engines and other sources like road automobiles. Sometimes LFN resembles tremor than noise and it can root structural vibration. To identify the source of LFN will be strenuous and could not forever be definite. LFN is every so often jumbled with vibration, largely owed to the point that some parts of the humanoid body can echo at different low frequencies. A heart can ring at frequencies of about 50 to 100 Hz and the head at 20 to 30 Hz (report on LFN 2001).

Large quantities of LFN originated from the A-weighting network. The quantities through the noise should be set to linear with the machinery. For an introductory review, amounts should be controlled by noise study and the use of slimmer frequency bands or flat FFT (Fast Fourier Transform) analyzes would be required (Cam *et al.,* 2010).

Recycled spectral assessment to solve the sound frequency opus. Spectrum is manufactured by a sine wave chain and Fast Fourier has been granted spectral exploration for this research. The spectrum analysis is a journey through the MATLAB instrument for each case. (Yang Fan *et al.,* 2010).

Sources of Noise

The vital part with veneration to noise pollution is assembling evidence about noise levels, source from someplace noise is shaped and its time of contact. The resulting are the changed sources of noise recorded as observations.

Study Area

Traffic noise is recorded at National Highway 4 near ORR(outer ring road). 8 hours

Traffic noise again recorded at ODR near Avadi. 8 hours

Recreation centre at Ambattur – A business mall. 4 hours

Factory place where heavy machinery like cutting and planning work was carried. 8 hours

Near river bed chosen as a silent zone. 2 hours

Mat lab

MATLAB is a scientific totaling surroundings established by The Math works, Inc. for calculation and data revelation. It is together as shared system and a programming linguistic; whose simple data hint is an array. Further basic array tasks, it offers programming types related to those of other computing linguistics, e.g., functions, control flow, etc. (Wendy *et al.,* 2005). Scripting user distinct functions and m-files which can be accomplished by giving inputs and getting preferred outputs (Christophe Rauscher, 2001).

The linguistic coding method to be used to execute noise meter and FFT signal information in the MATLAB. At the beginning of the mfile, this linguistic coding is printed in command. It is to be saved as the mfile with a file name and similar as the name of the function has to be retrieved for Inquiry.

The noise frequency is casual and the model spectrum assessment Fig. 2 demonstrates that the frequency ranges from 20 Hz to 40 Hz with a 53 dBA to 71dBA decibel rate. At 79 dBA, the maximum frequency of 95 Hz happened. This shows that there is generally also a frequency distribution of low frequency noise.

Here, frequency distribution is an oscillatory depiction showing that sound concentrations penetrate the environment evenly. Noise spectrum indicates that noise concentrations range from 59 dBA to 81 dBA across all frequency ranges, which means it's like a bandwidth.

The band width means that during the entire day of traffic operation noise dissipates. During all parts of the sound signal event, the frequency variation is

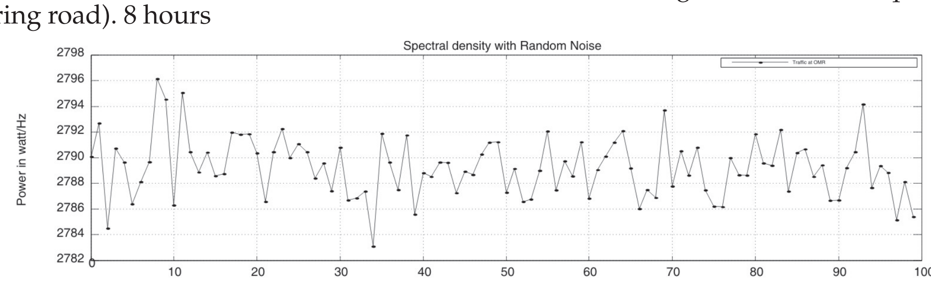

Fig. 2. Spectrum of open traffic stream at NH_4 ORR location

from greater to lower.The avadi places were registered noise levels and Figure 3 showed the amount of annoyance. The spectral Figure 3 demonstrates that both peak hour and non-peak hour frequency of noise decibels is uniform.

There are moments when the frequency caliber is staggering. The frequency peak-hour level is always greater than the non-peak-hour level. The frequency range from 50 dBA to 60 dBA with a frequency range from 10 Hz to 62 Hz is usually within the noise level of traffic. Whereas the frequency ranges between 80 Hz an 90Hz happen at peak time with a 65dBA decibel. The maximum decibel level of 78 dBA reaches a frequency

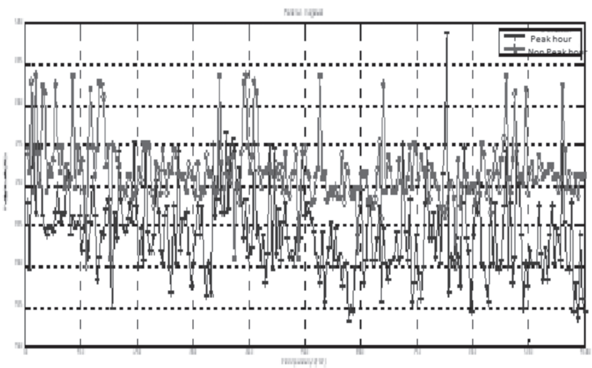

Fig. 3. Spectrum at Avadi ODR

The maximum decibel level of 84 dBA reaches the peak hour noise level at various frequencies. This shows that noise frequency at peak hour predominates with a greater decibel rate.

Factory machine noise is traditionally a human interface barrier. Noise generation is now becoming exasperation owing to equipment. The spectral Figure 4 displays some light on the noise level frequency representation. Noise levels for frequency representation are viewed here.

With the exception of the marble cutting operation, in the case of Lathe machine and jack larcenist operation, all other operations fall like a band width in a frequency range of 0 to 200 Hz with a decibel range of 75 dBA to 83 dBA.

While the decibel range for milling work is 85 dBA to 104 dBA, the jack machine displays a decibel variety of 110 dBA to 122 dBA. The frequency representation form of the band width indicates that a standardized noise level is generated as a source. Withal, the frequency of noise is a periodic function and Figure 5 shows the events in sight. Marble cutting indicates a uniform and linear frequency of noise, and all other concentrations of noise constitute aperiodicity.

The 103dBA maximum decibel concentration happened at 172 Hz frequency. The shape of the frequency indicates that the amount of noise is uniform at all moments. As the frequency variation in the noise concentrations indicates a staggered level of noise exasperation and it is high time to mitigate noise pollution. This staggered shape represents a noise generation oscillating nature. This will result in damage in the form of health risks in the form of vibrations and physical damage. It is high time to assess an instant measure so that noise generation is significantly lowered during factory machine operation such as jack hammer and milling work.

The frequency is in a cluster and between 50 Hz and 80 Hz because the decibel value is almost like an

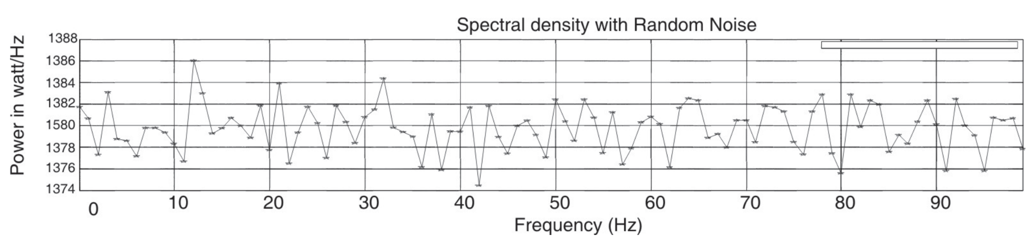

Fig. 4. Spectrumat Factory in Avadi

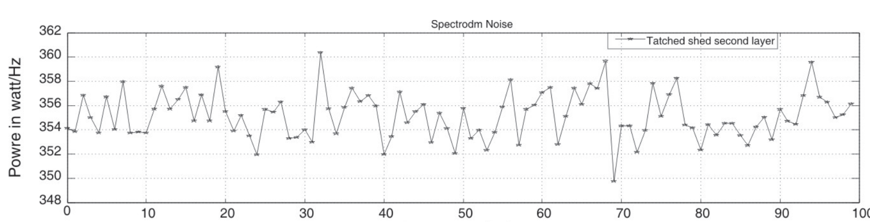

Fig. 5. Spectrumat Factory in Avadi

amplitude band between 47 dBA and 57 dBA at river bed place, 89dBA to 97 dBA at mall place and open traffic flow place.The random signal variation representing spectrum analysis indicates that the frequency is between 20 Hz and 40 Hz with a 53 dBA to 744 Hz decibel rate. The maximum frequency of 85 Hz happened at sonic intensity of 80 dBA.This shows that LFN also usually has frequency allocation for open traffic and level crossing locations.

Observations from noise spectrum

In Figure 2 to 7, the noise frequency curves showed a straightforward multi-level curve representing distinct noise source operation alone. There are multiple frequency spectra and a number of peak noise decibel levels are observed. The distinct peaks are not uniform in terms of noise concentrations , In factory and mall places. The maximum decibel level 94dBA has a frequency of 92 Hz and 22 Hz respectively. While the noise level is 114 dBA with the same frequency. Then the noise signal is compared with the noise generation traffic stream. NH4's factory and traffic are severely affected by the populations residing close housing locations in the nearby areas factories.

Traffic that is serious along the highway also affects individuals using the highway with serious noise. Figure 2 shows this example as a spectral frequency curve. The decibel value moves from greater range to reduced range for every 10 Hz frequency. The frequency curve is not uniform for the ODR, where the noise signal level is represented by the segmental curve as the ORR traffic curve.

The various peaks depiction of decibel levels corresponding to the frequency indicates that cars are more in ORR where they are less in ODR. The maximum decibel level in ODR is 69 dBA and has a frequency of 42 Hz, where the maximum level of 84 dBA occurs in distinct frequencies. For a frequency of 10 Hz to 75 Hz, the bandwidth formation of about 10 dBA from 60 dBA to 70 dBA occurs in ORR traffic stream.

This demonstrates that throughout the moment, the noise level is uniform. The frequency spectrum shows a uniform decibel level when compared to the noise signal from the traffic stream in the silent zone. Although the procedure and the maximum variation of noise concentrations are at all frequency intervals, the noise concentrations are uniform.

On the uniform rate of noise signal emission, the human interface is subject to severity. The frequency is a non-periodic type that is explicit in the activity of the plant than the stream of traffic. This is also another noise level indicator present throughout the operating time. This demonstrates that there is generally also frequency distribution of low frequency noise.

It is observed that each noise source has its own range of frequency representation.

- The amount of the open traffic stream is approximately 51 dBA to 77 dBA, approximately 10 Hz to 100 Hz. This demonstrates considerably that noise concentrations predominate during the study at all times.
- The factory operation displays a different frequency distribution range. Multiple peak concentrations indicate that in all frequency ranges, all operations considered show the maximum to minimum decibel levels.
- This demonstrates that noise concentrations are not incidental or udden, and the presence of the signal is always transmitted through each job procedure.
- Due to its geographical place, factory mills produce serious noise impact. These mills are operated close individuals and residential areas.
- In decibel levels, there are minor variations in the maximum value at the minimum value. The distribution of frequencies indicates that noise concentrations are at a steady rate and noise dissipation is complete.

DISCUSSION

The noise rates registered to show the noise attenuation were compared with all the noise rates collected outside the shed. The recorded noise levels have been analyzed for spectrum to achieve spectrum noise reduction. For all instances, Figure 7 shows spectral analysis and spectrum of

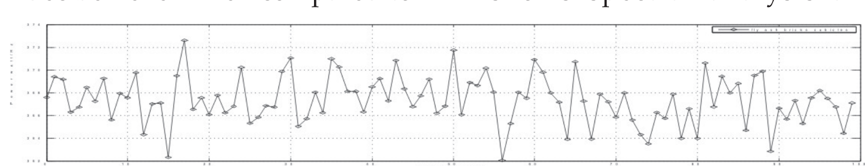

Fig. 6. Spectrum at Mall in Ambattur

frequencies. While observing the noise signal frequency spectrum, it is discovered that over the frequency range from 0 to 100 Hz there are numerous peaks around every 10 Hz.

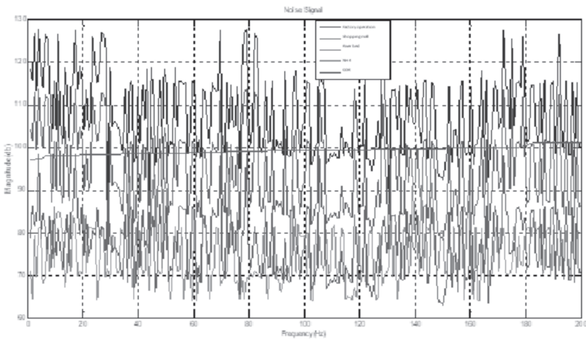

Fig. 7. Spectrum of all the noise sources

The following observations are shown in the five distinct frequency spectrums taken for sound concentrations. The ODR indicates that at all the traffic stream regarded the smallest noise level of 48 dBA at a frequency of 75 Hz and 85 Hz. Whereas for a smallest noise level of 55 dBA, the frequency of noise collected in the silent zone river bed is 15 Hz. Similarly, the peak noise level for ODR of 76 dBA indicates a frequency of 21 Hz, open traffic frequency of 75 Hz for a maximum noise level of 88 dBA.

For each frequency value, the depiction of various frequency distributions thus occurred. This staggered shape represents that a level of noise is not homogeneous and sometimes peaks at its range. In the ORR, for a decibel value range of 83 dBA to 91 dBA, most decibel values fall between 18 Hz and 82 Hz. The open stream between 70dBA to 80dBA decibel concentrations, 0 to 70 Hz frequency. Multiple peak cluster shows the highest noise concentrations that existed in open traffic at all times of the traffic stream as well as the raising of the attenuating obstacle. The noise attenuation relates to noise that indicates sound waves distributed through time variables at distinct frequencies.

Similar representation for both the factory mills and recreation centers was noted throughout the entire spectrum, indicating that noise attenuation is needed by offering obstacles to prevent noise pollution. The barriers ' noise reduction capacity is connected with the type as well as the characteristics of the material. The noise reduction connected with the frequency distribution of noise concentrations is therefore assumed to have existed.

The above event represents the creation of a sonic boom even in the traffic stream where the excessive sound wave propagates in relation to the intensity of noise. The LFN also prevails owing to vehicle speed rather than operation and stoppage. This situation is now prevalent in the present research where we can say that at flourmills and traffic locations on ORR the noise rates are about more than 100 dBA to 125 dBA. It shows that here the LFN produces the same quantity of energy formation from about 40 Hz to 60 Hz.

CONCLUSION

A appropriate experimental analysis was provided, using a traditional sound observation spectrum analysis, to investigate issues in measuring noise pollution produced by sources producing noise. Because of the pulsed and noise-like conduct of the observed signals, LFN has been shown to exist and severe attenuating measures must be performed to attenuate noise concentrations as soon as possible. Most outdoor tyre / road noise frequency spectrums show a prominent peak in the range of 40 to 70 Hz.

Noise spectrum consisting of a combination of distinct noise sources with a clear 40 to 70 Hz dominance range. One might be tempted to speculate from this reality that the peak is due to the oscillating pattern of noise geometry and subsequent frequencies of effect. But this could only be a partial reason at most, as the maximum frequency relationship between distinct sources of noise generation is the same also for less noise generator type patterns.

After analyzing a lot of information from wave files collected at chosen places under distinct traffic circumstances, it was noted that in most instances the noise power is greater at reduced frequencies and as one passes to greater frequencies, the noise power drops quickly. A phase will then attain where the noise power with random fluctuations is discovered to be more or less the same.

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