

Noise Study in a Synthetic Fibre Plant

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Noise study was conducted in the Filament Take-up Hall, Texturizing Hall and Compressor House of a Synthetic Fibre Plant to assess the level and quality of noise, occupational noise exposure and speech interference levels in these units. The Filament Take-up Hall is fitted with 40 high speed winding machines on a vertical stand and the Texturizing Hall is fitted with 9 texturizing machines. The Compressor House is fitted with appropriate machines, with door and windows open.

The measuring instruments consisted of a Bruel and Kjaer Impulse Precision Sound Level Meter, type 2209, a Condenser Microphone, type 4166 and a 1/3 Octave Filter Set, type 1616. All the measurements were carried out during working hours by keeping the microphone at 1.2 meter above the floor level and meter at 'slow' response. The noise level data was recorded in dB(A) and 1/3 Octave sound pressure levels in dB.

Noise level measurements were made at 5 different points each in the Filament Take-up Hall and Texturizing Hall and at one point in the Compressor House and ten readings were taken at each point. Their average values were determined by averaging 50 readings in the Filament Take-up Hall and Texturizing Hall and ten readings in the Compressor House. For the investigation of quality of noise, 1/3 octave analysis of the noise was made at two points in the Filament Take-up and Texturizing sections and at one point in the Compressor House. At each measuring point, one set of 1/3 sound pressure level from 31.5 to 8000 Hz was completed in a period of about 30 minutes by taking ten readings for each 1/3 Octave centre frequency over a period of about one minute. The average values for each band were determined from the combining sets of reading, i.e. 20 readings of the respective bands in the Compressor House. Approximate values of Preferred Speech Interference Levels (PSIL) were determined by using relationship, $PSIL = dB(A) - 7$ [1].

The range and average values of noise level in these units are given in Table 1 and 1/3 octave spectra of the noise is shown in the Figures 1-3. Lower, middle and upper curves in these figures indicate the recorded minimum, average and maximum respectively of 1/3 octave sound pressure levels in these units. The results show that the average values of occupational noise in Filament Take-up Hall, Texturizing Hall and

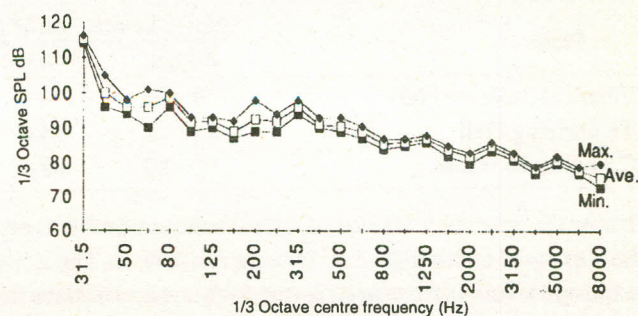


Fig. 1. 1/3 Octave spectrum of noise in the Filament Take-up Hall. Lower, middle and upper curves show the min., average and max. values of 1/3 octave sound pressure levels in the respective bands.

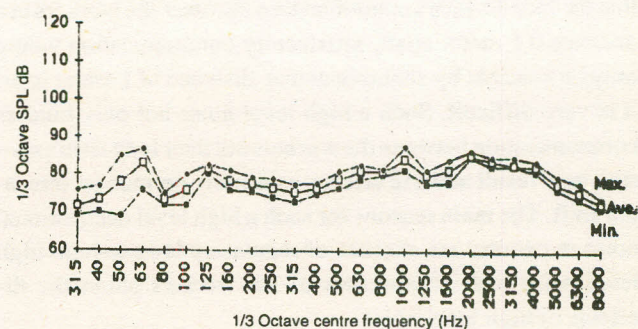


Fig. 2. 1/3 Octave spectrum of noise in the texturizing Section. Lower, middle and upper curves show the min., average and max. values of 1/3 octave sound pressure level in the respective bands.

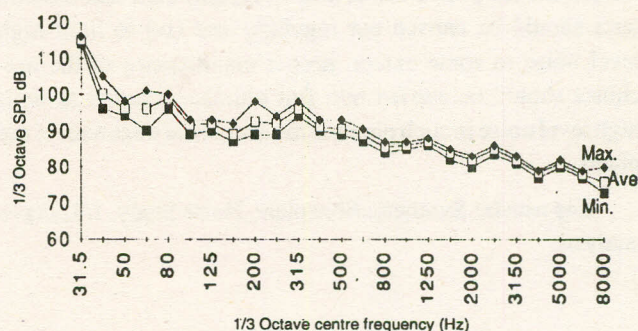


Fig. 3. 1/3 Octave spectrum of noise in the Compressor House. Lower, middle and upper curves show the min., average and max. values of 1/3 octave sound pressure levels in the respective bands.

Compressor House are 93, 94 and 98.5 dB(A) and PSIL values 86, 87 and 91.5 dB respectively. 1/3 octave spectra indicate that in Filament Take-up Hall, Texturizing Hall and Compressor House, the workers are exposed to 1/3 octave sound pressure levels in the range of 64-84, 74- 84 and 76-116 dB respectively.

The worker in these units generally works for at least 8 hrs./day and 6 days/week. i.e., 48 hrs./week and are exposed to such a high level occupational noise (in the Compressor

NOISE LEVELS IN THREE SECTIONS OF THE SYNTHETIC
FIBRE PLANT SURVEYED.

Plant	Noise Levels dB(A)	
	Range	Average
Filament Take-up Hall	89 - 95	93.0
Texturizing Hall	90 - 95	94.0
Compressor House	97 - 99	98.5

House the operator works when there occurs any problem and he is exposed to this high level for a shorter period). The noise exposure levels in these units is very high and much above the maximum permissible limits of 90 dB(A) for 40 hrs./week as allowed by ISO [2] and other national standards [3-10] on occupational noise exposure. Webster's relationship [11] shows that for face-to-face communication between the workers at a distance 0.5 meter apart, satisfactory communication would only be possible by shouting and at distance of 1 meter apart it is very difficult. Such a high level noise not only hinders communication between the workers but their long term exposure may result adverse effects, especially permanent threshold shift. The main reasons for such a high level occupational noise in country are absence of regulatory laws to limit high level noise and unawareness of the workers about the ill-effects of high level noise.

Therefore, in order to provide safety measures to the workers in such plants, it is suggested that (i) their working time may be adjusted appropriately, (ii) the workers should use ear protectors during work, (iii) their audiometric tests should be carried out regularly and (iv) to limit high level noise to some extent, proper maintenance of the machines should be carried out. But ultimate solution to limit high level noise in such plants is the acoustical treatment of the plants.

Key words: Synthetic fibre plant, Noise Study, 1/3 octave analysis.

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