Literature Review

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People work in loud environments without any kind of hearing protection in a lot of different countries around the world. This extended exposure to high noise has the potential to cause a range of health problems, including hearing loss and tinnitus (also known as ringing in the ears). The "World Health Organization (WHO)" estimates that around 1.1 billion young people are running the risk of acquiring hearing loss as a result of their exposure to loud noise at their places of employment and during the activities that they participate in during their free time (WHO, 2015). According to an article that was published in Safety+Health (2014), there are around 30 million people in the United States who are exposed to noise levels that may pose a threat to their health while they are at work. The hearing loss brought on by exposure to loud noise can be prevented. Having said that, the harm that has already been done cannot be undone after it has been done. [1]

As a result of working in noisy conditions, a significant number of people in Qatar are experiencing hearing loss. For instance, many workers in the construction industry are often exposed to dangerously high levels of noise because of the nature of the job. This can lead to long-term ear damage and eventual hearing loss. "Tinnitus", sometimes known as "ringing in the ears", is another symptom that may be experienced by employees in some instances. Hearing loss has been related to Qatar's major issue with noise pollution, which is a problem in the country. [3] According to the findings of a study that was carried out in 2015 by Qatar University, 76 per cent of people living in Qatar were subjected to noise levels that were detrimental to their health. According to the findings of the study, noise pollution is a significant issue in Qatar, with 62 per cent of the population being subjected to noise levels that are detrimental to their health. [5]

The "Noise Reduction Coefficient", sometimes known as the "NRC", is a rating system that uses a single number to express how efficiently a material can absorb sound. The data presented on Soundproof Panda (2018) evinces that if a material has an NRC of 1.0, it indicates that it is capable of absorbing one hundred per cent of the noise that is directed toward it. [7] The NRC rating indicates how well a material absorbs noise; a higher rating indicates better performance. A wide variety of materials can be utilised to accomplish the goal of lowering the level of noise. Acoustic tiles, sound-absorbing foam, fibreglass insulation etc. are all examples of common sound-absorbing materials that are generally used (MMT Acoustix, 2022). [10]

As an illustration, an NRC rating of. 75 denotes an absorption rate of 75% of the sound energy that comes into touch with that particular material. Simply explained, noise is not produced by the sound being reflected back into the space. A substance with an NRC of 0.75 is also regarded as 25% reflective. [12]

High-quality acoustic foam panels for the walls and ceiling that absorb sound. 10 types and 7 hues of 3D designs are developed to accommodate every aesthetic. ARAI tested NRC (noise reduction coefficient) at a value greater than 0.90. All acoustic foam is produced at 50 density for maximum sound absorption and is available in thicknesses of 1, 2, 3, and 4. The best substitute for rockwool, glasswool, and polywool. [13] Sound absorber made of 100-density polyurethane foam with NRC characteristics for soundproofing and acoustics. Easily hidden behind metal panelling, fabric panelling, gypsum walls and ceilings, and brick walls. NRC greater than 1.0 tested by ARAI and accessible as needed in QATAR. [14]

Acoustic tiles are often manufactured from mineral wool or fibreglass, and they are utilised for the lining of walls and ceilings. [15] They do an excellent job of dampening sounds of both low and middle frequencies. The lining of walls and ceilings with sound-absorbing foam, which is often comprised of open-cell foam, is common practice. It does a good job of absorbing sounds of both mid and high-frequency ranges. Walls and ceilings can be insulated with fibreglass insulation, which consists of glass fibres. It does an excellent job of soaking up sounds of low frequency. [17]

Carpet is another typical material that serves the purpose of absorbing sound. It can be installed on floors and walls to assist in the regulation of sound. Last but not least, drapes are an excellent method of sound absorption. One may either hang them on the wall or use them to create a partition between two rooms. [18] These are just a handful of the many different types of materials that can be used to insulate against sound and absorb unwanted noise. Each of the mentioned types of material possesses a unique set of benefits and drawbacks, hence it is essential to select the appropriate material for the task that has to be completed.

Mass Loaded Vinyl is a sound-dampening membrane that may be readily installed on walls, ceilings, and floors using nails and adhesive. It comes in 3mm, 5mm, 8mm, 10mm, and 12mm sizes. MLV is a soundproofing underlay that can be hidden below carpet and timber flooring, as well as behind walls and ceilings. STC passed the ARAI test with more than 36 Db. High performance and longevity thanks to the use of silicone, aluminium, and EPDM of

the highest grade. The product has choices for self-adhesive and manual fixtures and are available in brown to match the majority of doors. [20]

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