

Impact of Effective Layout in Reducing Noise Pollution in Birnin Kebbi Central Market in North-West Nigeria

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Abstract

The central market Birnin Kebbi has been identified as one of the noisiest locations in the Capital city of Kebbi State, located in North-West Nigeria. The milling section of the market is a major contributor to noise pollution. The area is also one of the busiest because its access gate is close to a parking lot, thereby exposing the operator and their customers to noise and other visitors who want fast access into the market. A major source of noise is the diesel-powered internal combustion engines, which are the convenient choice because of the country's economy and standard of living. This study investigates the effect of a recent relocation of the milling section on the noise level and the different impacts such relocation has on machine operators' health and economy. The noise level at both locations was measured using a noise level meter for five consecutive days from 9 am to 3 pm each day. The traffic intensity at both locations were also compared, while a survey among the operators was conducted to determine the health and economic impact of the relocation on them. The Activity Relationship (AR) and To-Fro charts were used to assess the impact of the relocation on customers' patronage. The result showed that while the noise level remained high above the harmful level of 85dBA, the effect on population decreased significantly as people exposed to noise reduced from 100/m²/minute to 20/m²/minute during peak hours. However, The AR and to-Fro analysis revealed a significant increase in the distance covered between the milling section and other sections that are auxiliary to milling. This finding also correlates with the reported decrease in the patronage level of customers and job satisfaction of the milling operators. Therefore, there is the need to adopt an optimized layout that will relocate the axillary sections closer to the milling section with minimal exposure to noise. Also, there is a need for increased awareness among operators on the short-term and long-term effects of excessive noise pollution. The market administrators also need to adhere to sound level standards in the country.

Keywords

Environmental Ergonomics, Sound level meter, Occupational Safety, Facility Layout and Nigeria.

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