

Influence of Cab on Noise Level of Farm Tractors*

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Tractor is an important source of power on the farm and most suited prime mover in substitution to animal power. During the tractor operation, tractor operator together with the tractor forms a man-machine system. Tractor driver's comfort and safety needs serious thought as far as his overall performance is concerned.

Noise is an important aspect of working environment, which has received much attention for many decades. Noise is conveniently and most frequently defined as 'unwanted sound'. Noise affects the sensitivity and reaction rates of the operator. Therefore, it is desirable to reduce the operator's exposure from the noise on the field.

Tractors were considered to be likely to provide the most damaging environment, bearing in mind the noise levels and duration of exposure. It affects the performance of the operator by lowering its concentration and interfere with worker-to-worker communication in the team. Noise also causes discomfort to the operator with respect to the nervous tension, irritation and

fatigue. Tractor operator's noise exposure is obviously very unsatisfactory showing that hearing is at risk.

Noise level of 35 hp tractor were above the safe limit for 8 hr working period and ranged between 90 to 100 dBA (Bansal *et al.*, 1982). Sealed cab is some 15 dBA superior to the cabless conditions and opening the back of the sealed cab allows the noise to rise by 1 to 2 dBA (Graham and Marples, 1971).

By introduction of the cab the sound level reaching the operator's work-place inside the cab was restricted. Digital sound level meter having electronic condenser microphone of 1/2 inch standard size was employed for noise measurement in accordance with IS : 5994-1970. Test was conducted under different field operations and sound level was recorded on cabless as well as the cab fitted tractor.

Noise level measurement on the cabless tractor for all the operations C_1 , C_2 and C_3 alongwith different timing levels T_1 , T_2 and T_3 ranged from 90.90 to 98 dBA. This noise level was beyond the limit of recommended noise level for the operator in man-machine system. It crossed the audible noise limit because of high engine noise, noise which was already present in the environment and unusual odd noise due to malfunctioning and wear and tear of machine/engine components.

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TABLE 1

Noise level (dBA) measurement during different field operations.

Time/Operation	R_1	R_2	R_3	Mean
T_1C_1	82.0 (91.0)	88.0 (96.0)	86.0 (99.0)	85.33 (95.33)
T_1C_2	84.0 (90.0)	86.0 (93.0)	85.0 (92.5)	85.0 (91.83)
T_1C_3	83.5 (95.0)	88.0 (97.0)	87.5 (100.0)	86.38 (97.33)
T_2C_1	82.5 (90.0)	88.0 (97.0)	84.0 (97.0)	84.83 (94.66)
T_2C_2	83.0 (89.0)	85.0 (93.0)	83.0 (90.7)	83.66 (90.90)
T_2C_3	84.0 (95.0)	85.0 (98.0)	87.0 (101.0)	85.33 (98.0)
T_3C_1	81.5 (90.0)	84.0 (95.0)	85.5 (96.0)	86.66 (93.66)
T_3C_2	85.0 (90.0)	87.0 (94.0)	85.0 (93.0)	85.66 (92.33)
T_3C_3	85.0 (94.0)	86.0 (99.0)	86.5 (99.5)	85.83 (97.50)

Note : Figures in parentheses indicate the values of noise level on the cabless tractors.

T_1 : 8.00 to 10.00 a.m.

C_1 : Transportation

T_2 : 12.00 to 2.00 p.m.

C_2 : Harrowing

T_3 : 4.00 to 6.00 p.m.

C_3 : Ploughing

After mounting the cab on the tractor, it was found that the sound level inside the cab was 83.66 to 86.66 dBA which was quite below the safe limit of the sound level for the human ear. Table 1 revealed that the noise level in both the

cases was not significantly affected by the timing level. It was observed from Figure 1 that the noise level inside the cab was quite below the safe noise level for 8 hr work period as compared on the cabless tractor for all the operations under

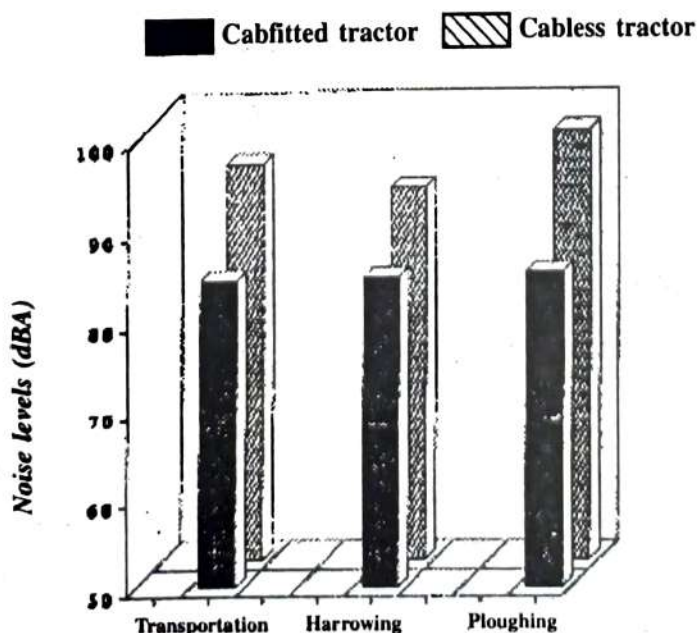


Fig. 4.15 : Comparison of noise level on cabless and cab fitted tractor during different operations.

consideration.

Safe noise level inside the cab was achieved by using the soft wood and coconut fibre in the construction of the cab for closing the opening,

as these materials have the sound absorbing properties and don't allow the sound to reflect with higher intensity than that of its original.

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