

## **ABSTACT**

*CV. XYZ is a forage producer UMKM. CV. XYZ do the production to order or MTO (make to order), with an average production time of 8 hours per day. In the production process, CV. XYZ uses a hammer mill machine as a raw material grinder for foage and a diesel engine Fuso D-16 as an activator. The diesel engine Fuso D-16 often emit noise that has made two out of a total of twelve workers has decreased hearing function. The two workers had difficulty hearing within a distance of more than 1 meter. Based on direct measurements using a Sound Level Meter, the noise level emitted by the Fuso D-16 diesel engine using an existing muffler has a high decibel value of 94.68 dB. The decibel value has exceeded the limit of the decibel value stipulated in the Minister of Manpower and Transmigration Regulation (PER.13 / MEN / X / 2011), which is 85 dB per 8 hours. Therefore, this study will design a muffler with a rational product design method to meet customer needs. After doing the observations and interviews, it was found that the requirement of CV. XYZ is a muffler that can reduce noise, is easy to maintain, and is heat resistant. Then in this research, we design a muffler that has a perforated hole, absorptive component, and a pipe that can be assembled. The proposed muffler design can reduce the sound level to 83.05 dB, have pipe that can be assembled with a bolt as an adhesive between the pipe and the muffler body, and can withstand the flow of heat from diesel engine.*

*Keyword : noise, hearing loss, muffler, rational product design method*