

UNITED STATES DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH TECHNOLOGY CENTER

NOISE CONTROL ASSISTANCE

Pueblo County Road and Bridge (ID 05-04158)  
Pueblo, Pueblo County, Colorado

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by

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## INTRODUCTION

The Denver Safety and Health Technology Center was requested by Jim Ploughman, Federal Mine Inspector, to provide noise control assistance on a Caterpillar<sup>1/</sup> D8-H dozer owned and operated by the Pueblo County Road Department. A citation had been issued for the operator receiving a noise exposure of 182 percent.

## BACKGROUND

Two trips were made in March 1988 to discuss specific controls and materials. The installation of a windshield and acoustical materials was decided upon with the final design left to the Company's discretion. Pictures of previous designs and information on installation of a windshield were left with company personnel.

## MEASUREMENTS

Noise measurements were recorded at the operator's shoulder using a NAGRA SN tape recorder. The tapes were analyzed in our laboratory for 1/3-octave-band frequencies and overall noise levels. A GenRad sound level meter was used to verify measurements.

## DESCRIPTION OF CONTROLS

Figure 1 is a view of the dozer with the windshield frame. The frame was welded to the floor and stabilizers were then bolted to the frame, directed to the rear of the platform and bolted to the floor. This particular design afforded stability with little flexing. Angle iron was welded to the inside of the main frame as a framework for the window panels. The panel corners were then rounded off to facilitate installation of the glass (figure 2). Used conveyor belting was used as a flexible filler between the cowl and windshield (figure 3). The completed shield consisted of five window panels with safety glass mounted on rubber gaskets (figure 4).

An acoustical floormat was cut and laid on the compartment floor. A piece of belting was then placed over the floormat to help reduce wear and tear (figure 5). Belting was also placed under the operator's seat to block transmission noise (figure 6). Finally, a piece of loaded vinyl was draped in the rear of the engine compartment to prevent noise from coming through the dash panel controls (figure 7). An elbow extension was installed on the exhaust stock to direct noise away from the operator (figure 8).

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<sup>1/</sup> References to specific brand names is made only for purpose of identification and does not imply endorsement by MSHA.

## RESULTS AND DISCUSSION

Noise levels were measured before and after controls were installed and the results are summarized in table 1 and figures 9 and 10.

Table 1. - Sound Level Measurements

	Noise levels, dBA	
	No controls	All controls
Reverse tramping	102	96
Forward tramping	102	96
Pushing load		84

The noise controls reduced the noise levels 6 decibels in both operating modes.

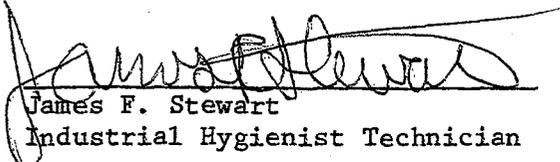
Figures 9 and 10 show reduction only in the lower frequencies. The lack of reduction in the upper frequencies was due to the mode of dozer operation during the tests. The dozer was run in high gear without pushing a load, which tended to increase the contribution of the track noise. A regular work-cycle test of pushing a load was then conducted and the results are given in figure 1. These results show low levels in all the frequencies and an overall dBA level of 84.

## CONCLUSIONS

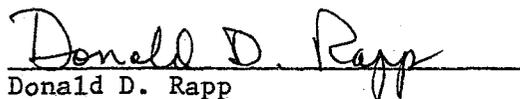
The installation of the windshield and acoustical materials reduced the noise levels from 102 dBA to 96 dBA while tramping. The level dropped to 84 dBA while pushing a load. The amount of reduction achieved is indicative of the quality and workmanship of this particular shield. Hearing protection should still be worn. In our opinion, there are no other controls recommended at this time.

ACKNOWLEDGEMENTS

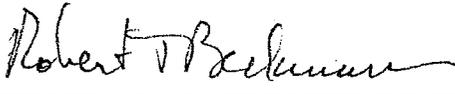
We wish to express our thanks and appreciation to Russell DeSalvo, Joe Russ,  
and Mike Lisac of Pueblo County for their hard work and dedication.

  
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 Date 5-25-88  
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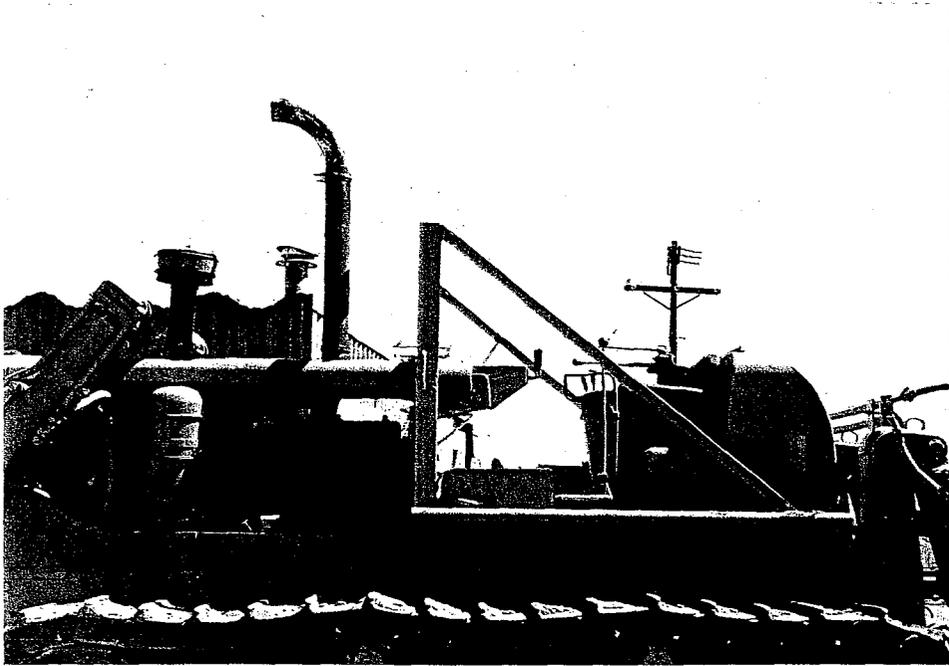


FIGURE 1. - D8-46 dozer.

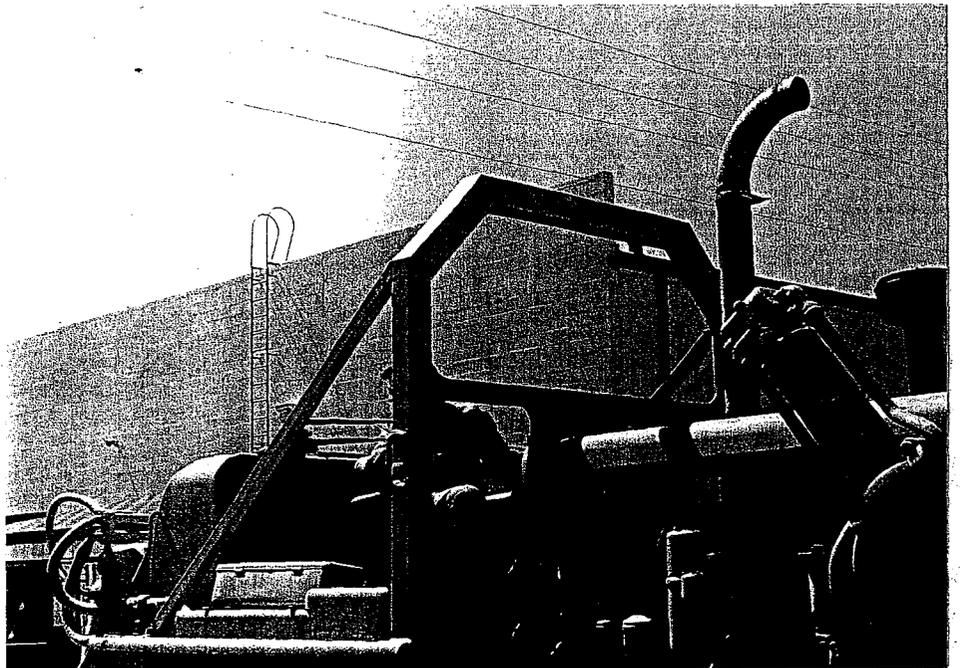


FIGURE 2. - Window panel framework.

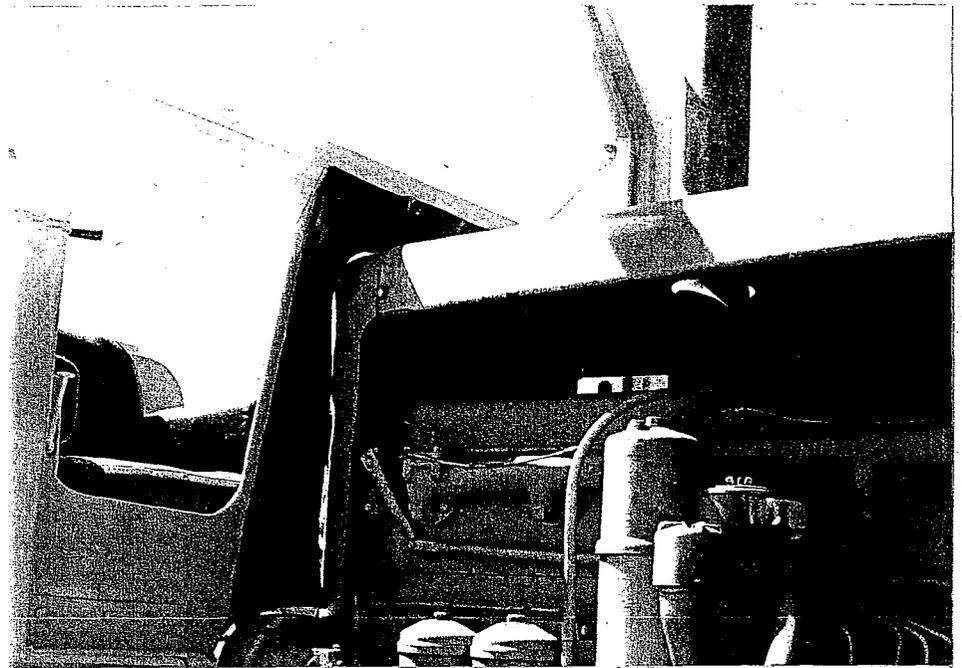


FIGURE 3.—Belting around cowl.

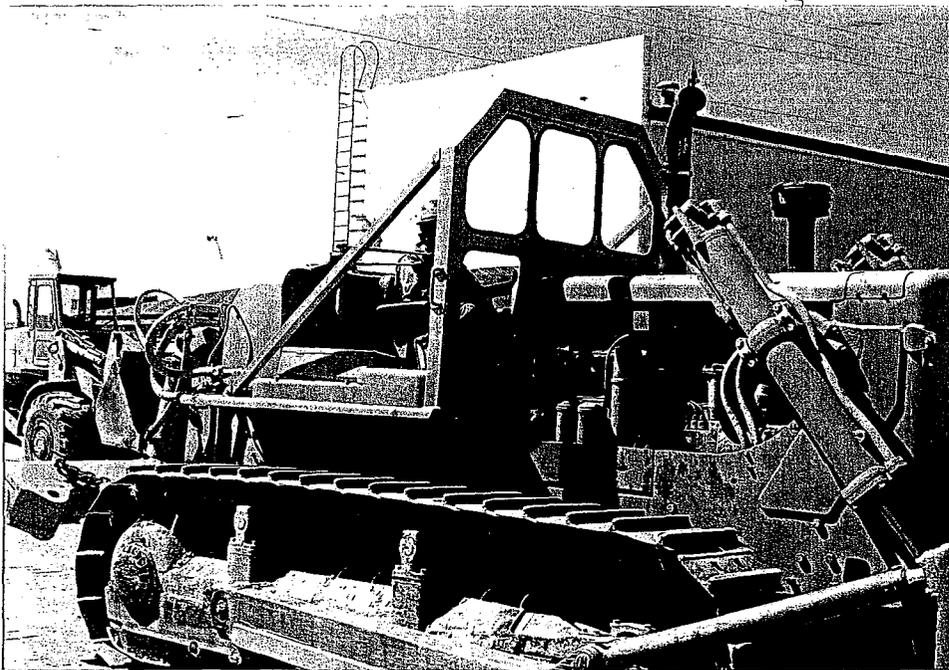


FIGURE 4.—Completed shield.

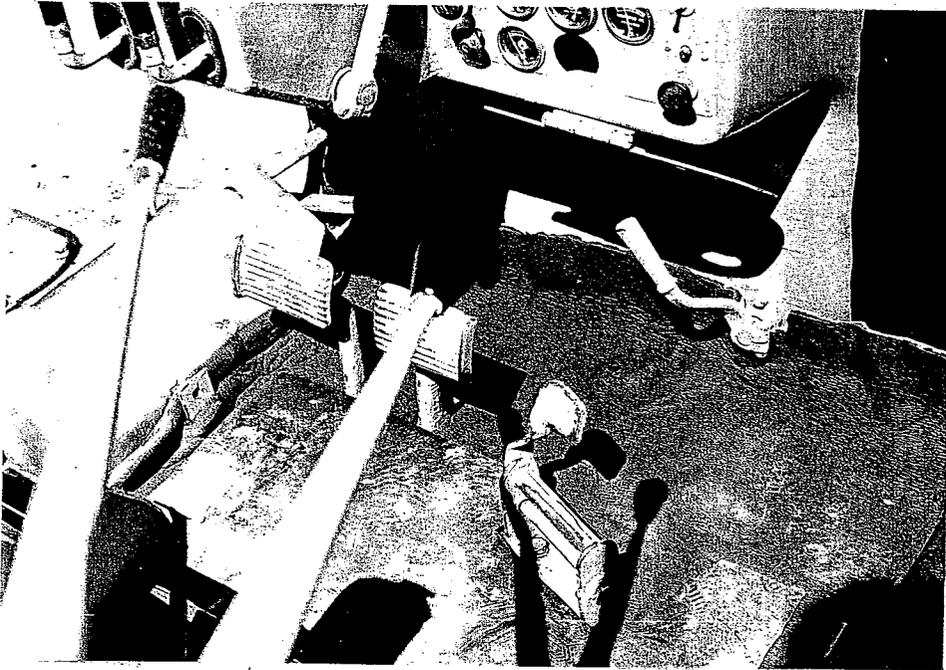


FIGURE 5.— Acoustical floor mat w/ belting.

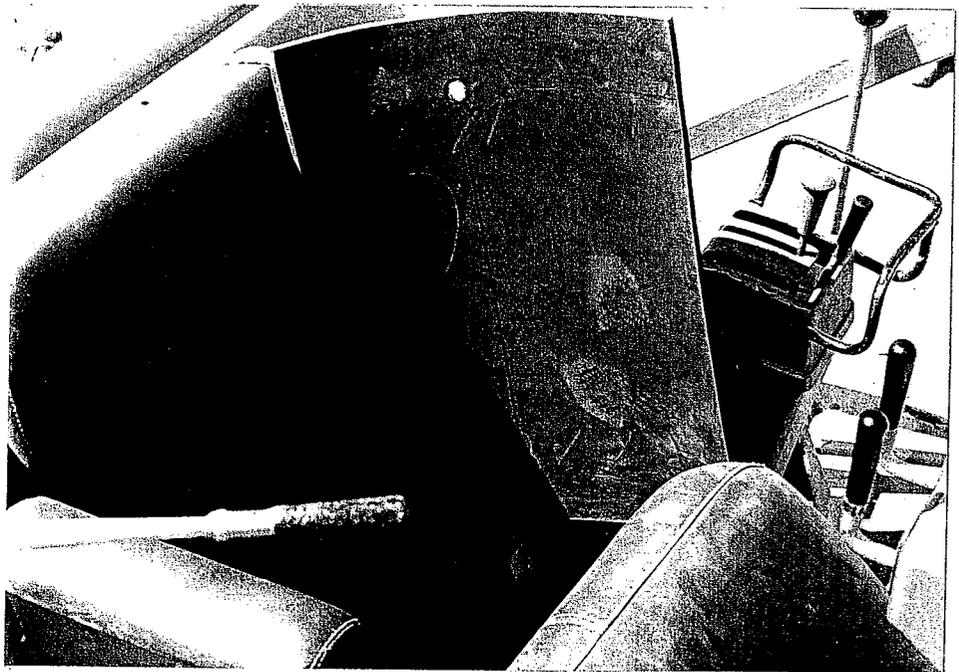


FIGURE 6.— Belting under operator's seat.

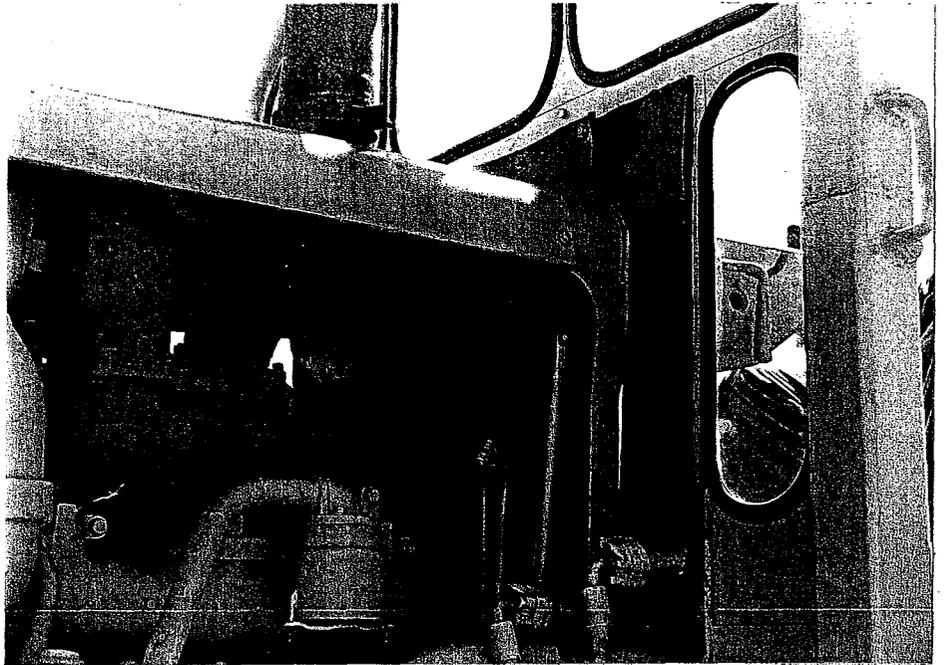


FIGURE 7.—Vinyl draped in engine compartment.

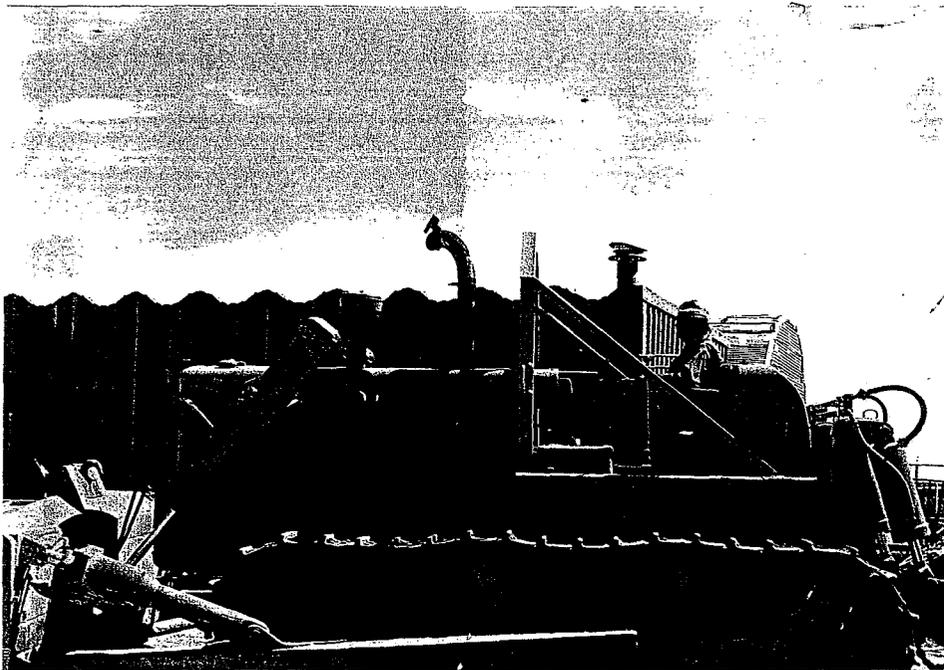
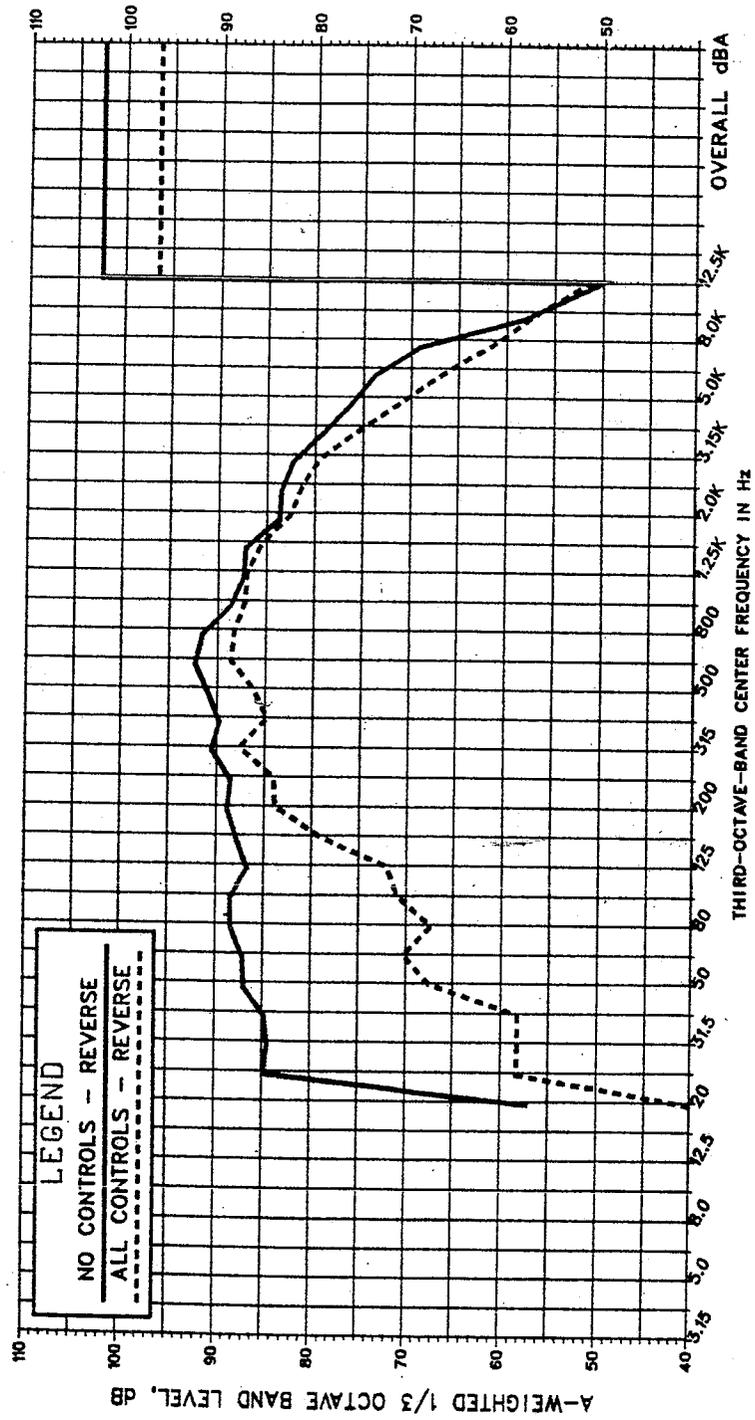
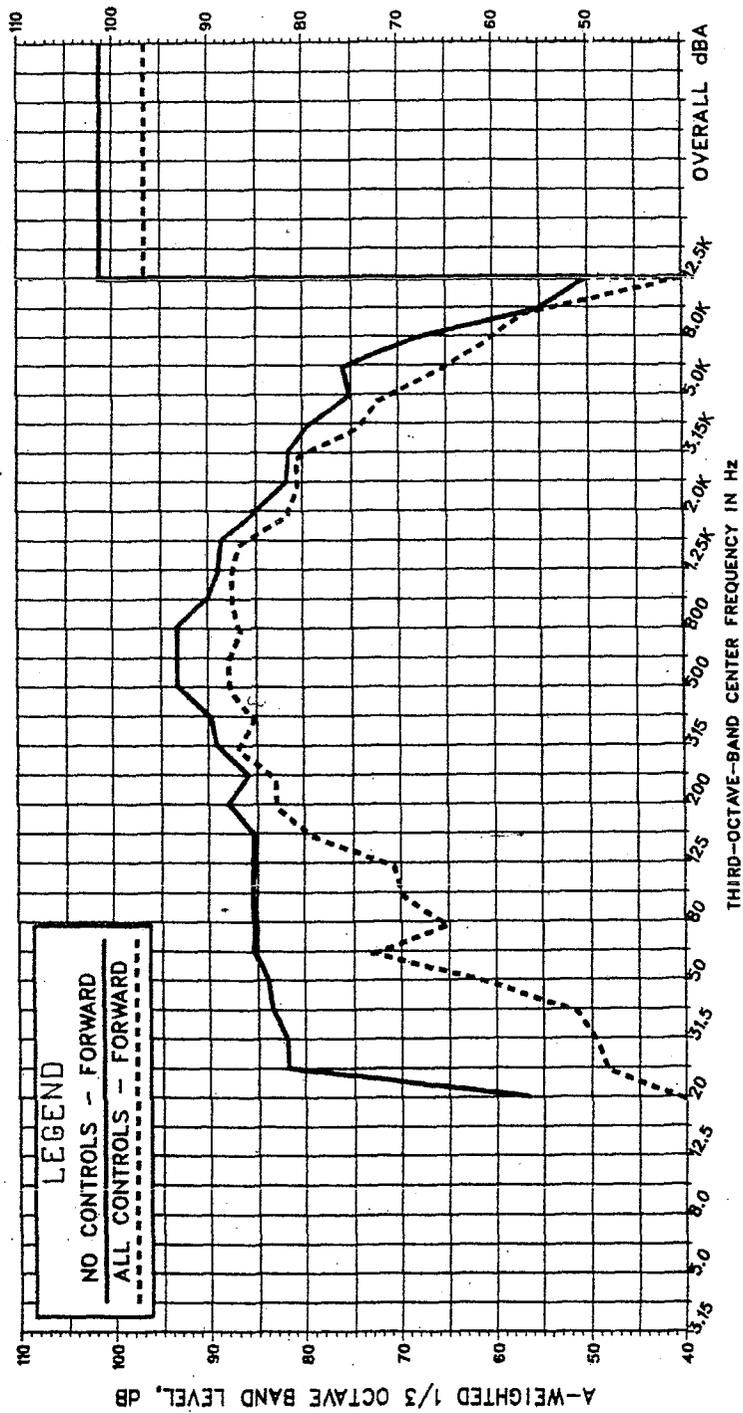


FIGURE 8.—Exhaust extension.

**FIGURE 9 - NOISE MEASUREMENTS**



**FIGURE 10 - NOISE MEASUREMENTS**



**FIGURE 11 - NOISE MEASUREMENTS**

