



DEPARTMENT OF THE NAVY
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IN REPLY REFER TO:

6260
SER/499
30 Jul 13

From: Commanding Officer, Naval Hospital, Lemoore
To: Chief of Staff, Naval Postgraduate School,
1 University Circle, Monterey CA 93943

Subj: NOISE MEASUREMENTS, NAVAL POSTGRADUATE SCHOOL,
MECHANICAL AND AERONAUTICAL ENGINEERING DEPARTMENT,
WATKINS HALL, ROOM 204, ULTRASONIC HORN OPERATION

Encl: (1) Industrial Hygiene Noise Survey Report

1. As requested by Mechanical and Aeronautical Engineering Department Professor Claudia Luhrs, noise measurements of the new ultrasonic horn located in the Watkins Hall, Room 204, Student Teaching Lab were conducted on 3 July 2013 by the Naval Hospital, Lemoore, Monterey area Industrial Hygienist.

2. Results and recommendations of the noise survey are discussed in enclosure (1).

3. Further clarification on this matter is available from S. Eric Thurston, Industrial Hygienist, at Commercial (831) 656-1074, e-mail sethurst@nps.edu.

A handwritten signature in black ink, appearing to read "K. R. Dagher", is positioned above the typed name.

K. R. DAGHER
By direction

Copy to:
NPS Safe Offcr
NPS GSEAS Assoc Mil Dean
NPS GSEAS Safe Adv

INDUSTRIAL HYGIENE SURVEY DATA

Command: Naval Postgraduate School Dept: Mech Aero Eng

Location: Student Teaching Lab POC: Professor Luhrs

Bldg/Room: 245, 204 Date: 3 July 2013

DESCRIPTION: Noise levels of the new Industrial Sonomechanics 1200 Watt ultrasonic horn were recently measured. The horn is operated with both liquid (water) and powder media placed inside glass beakers and the horn positioned on a stand directly above. The entire horn apparatus is present inside a small bench top test chamber with a hinged door. The horn is positioned lower and closer to the beaker when powder test media is used, with the media being placed in a smaller beaker that is in turn placed inside the larger beaker, with Parafilm used to seal the outer beaker. This setup is intended to avoid the lighter and smaller amount of powder media from being ejected out of the smaller test beaker when the media is exposed to the ultrasound waves during the testing procedure.

The chamber door is normally closed, but is rarely opened for a few seconds during the testing procedure. The operator is also required to take camera shots of some of the processes, approximately 6 times in the 3-hour test period, each lasting about 20 seconds. A remote power switch approximately 6 feet in length is used to turn on the horn during all test processes.

RESULTS:

TEST MEDIA: LIQUID (WATER), CHAMBER DOOR CLOSED

<u>AMPLITUDE</u>	<u>NOISE LEVEL, dBA</u>	<u>NOISE HAZARD RADIUS, ft</u>
20%	82.5	N/A
30%	87.2	1
40%	90.1	4
60%	87.7	2
80%	89.1	3
100%	90.3	7

INDUSTRIAL HYGIENE SURVEY DATA

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RESULTS (continued):

TEST MEDIA: POWDER, CHAMBER DOOR CLOSED

<u>AMPLITUDE</u>	<u>NOISE LEVEL, dBA</u>	<u>NOISE HAZARD RADIUS, ft</u>
20%	47.4	N/A
40%	61.1	N/A
60%	55.7	N/A
80%	51.1	N/A
100%	52.6	N/A

TEST MEDIA: POWDER, CHAMBER DOOR OPEN

<u>AMPLITUDE</u>	<u>NOISE LEVEL, dBA</u>	<u>NOISE HAZARD RADIUS, ft</u>
20%	67.4	N/A
40%	69.9	N/A
60%	76.7	N/A
80%	77.1	N/A
100%	79.6	N/A

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DISCUSSION: Noise levels generated during operation of the horn with powder test media are all below the Navy noise criterion level of 85 dBA outlined in reference (a), enclosure (1), paragraph 2. In contrast, except when the horn is operated at 20% amplitude, noise levels generated during its operation with the liquid (water) media exceed this criterion. However, with their arm extended and using the remote power switch, the operator can remain outside the noise hazard radii (NHR) during horn operation at all amplitudes.

With this in mind, the only time personnel can be exposed to hazardous noise levels is when they must take camera shots (and step inside the NHRs), which occur approximately 6 times per day for 20 seconds each time. The 8-hour average noise exposures of personnel present are expected to be below the NOEL of 85 dBA as outlined in reference (a), enclosure (1), paragraph 2 if the horn is operated remotely and entry inside the NHRs is limited to camera shots as discussed above.

The room door is properly posted with a NAVMED 6260/2 noise hazard sign denoting when hearing protection is needed as required by reference (b), Chapter 18, Section 1805.

RECOMMENDATIONS: While taking camera shots, the operator needs to wear either ear plugs or muffs as required by reference (b), Chapter 18, paragraph 1807a. Taking into account the very conservative reduced Navy hearing protection Noise Reduction Rating (NRR) as outlined in reference (a), enclosure (1), paragraph 6, ear plugs or muffs with a minimum NRR value of 18 are needed.

Personnel wearing hearing protection are required to complete personal protective equipment (PPE) training as outlined in reference (b), Chapter 20, Section 2013. This can be accomplished by completing ESAMS training module 1339 on Personal Protective Equipment (PPE).

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RECOMMENDATIONS (continued):

Since operator 8-hour average noise exposures are expected to be insignificant, audiograms (medical hearing tests) and completion of formal hearing conservation training for performance of this process alone are unnecessary.

REFERENCES: (a) BUMEDNOTE 6260 of 13 Dec 13
(b) OPNAVINST 5100.23G