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Noise Control Feasibility Study in Meat Packing Plants FREE

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FRIDAY, 2 NOVEMBER 1973 GARDEN ROOM WEST, 1:30 P.M.

Session SS. Noise XI: Industrial Noise

LARRY H. ROYSTER, *Chairman*

Center for Acoustical Studies, North Carolina State University, Raleigh, North Carolina 27607

Contributed Papers (15 minutes)

1:30

SS1. Training of Existing Industrial Personnel in Implementing Effective In-House Noise Control Programs. L. H. ROYSTER, *Center for Acoustical Studies, Department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, North Carolina 27607.*—Over the past three years, the Center for Acoustical Studies developed and implemented over ten different types of seminars in the hearing conservation and noise control areas. To date, 500 industrial personnel types have attended these seminars. They have utilized these training experiences in solving local industrial noise problems. The results of this type of approach to solving industrial noise problems in North Carolina industry is presented.

1:45

SS2. The Noise of Forced- and Induced-Draft Fans in Power Plant Installations. R. M. HOOVER AND E. W. WOOD, *Bolt Beranek and Newman, Incorporated, 50 Moulton Street, Cambridge, Massachusetts 02138.*—In this paper, noise level data on draft fans in modern power plants are reviewed. While the need for mufflers in the air intake of some forced-draft fan installations has been recognized for some time, the growing size of draft fans combined with new noise control requirements within power plants has increased the need for more noise control information. In this paper, some noise level data taken at a number of forced-draft fan installations are presented for different fan-duct arrangements. Included are data both in the vicinity of the fan cases and at the air intake for both muffled and unmuffled systems. Noise level data are also presented for several induced-draft fan installations, primarily to emphasize the need for the control of community noise by the use of mufflers in the discharge duct-stack system. Noise level data measured in the near vicinity of several induced-draft fans are also presented.

2:00

SS3. Noise Control in Production Metal Machining and Forging Operations. ROGER W. HEYMANN, *Bio-Acoustics Division, U. S. Army Environmental Hygiene Agency, Aberdeen Proving Ground, Maryland 21010.*—Noise control programs in production metal machining and forging operations produced significant reductions of noise levels. Interaction with production engineering personnel contributed very much to the achieved successes. Operator exposure to high noise levels was the result of overlapping intermittent sources. Principal noise offenders were airjets, hydraulics, steel impact on steel tables and conveyers, furnace airjets, metal machining, TEFC electric motors, and fans. Management strived to meet 85 dB*A* (U. S. Army Tech. Bull. MED 251) and 90 dB*A* (OSHA) levels without regard for exposure time. Operator exposure and source identification was obtained by taping and statistically analyzing noise levels at operator positions. Thorough testing was undertaken before implementation. In the cases studied, increased room absorption was of little value regardless of distance. This was determined through studies of sound field from portable sound sources, impulse techniques, and standard calculations. Reductions of 20 dB*A* were achieved by installing small resistive and dispersive mufflers on pneumatic controls. Steel impact noise was reduced 15 dB*A* with combined low durometer rubber and unconstrained viscoelastic damping. Furnace fan noise was reduced by using low-pressure mufflers on the fan intake, and by relocating fans. Directional electric motor fan noise was reduced by using mufflers.

2:15

SS4. ***Abstract withdrawn.***

2:30

SS5. Noise Control Feasibility Study in Meat Packing Plants. K. NIEMIEC AND D. E. COMMINS, *Bolt Beranek and Newman Incorporated, P. O. Box 633, Canoga Park, California 91305.*—Numerous operations performed in the meat packing industry generate excessive noise levels. The size of the plants and the large number of employees involved create a severe problem if the requirements of the Occupational Safety and Health Act of 1970 are to be met. The poor acoustic qualities of the buildings and the restrictions put by the Department of Agriculture on construction materials used in food-processing plants limit the number of solutions available to the noise control engineer:

acoustical materials generally contain dangerous substances such as lead, fiberglass, and asbestos and have physical characteristics which are incompatible with health regulations. A complete noise study of a large meat packing plant has been performed and noise sources have been identified and classified according to the noise generating mechanisms involved and to the severity of their impact. The noise control measures compatible with the processing of meat have been investigated and recommendations have been made for their implementation. Particular attention has been devoted to the noisiest machines, such as choppers, peelers, and injectors.

2:45

SS6. ***Abstract withdrawn.***

3:00

SS7. Gas Valve Noise—A Review of Current Knowledge. R. J. SAWLEY AND P. H. WHITE, *Bolt Beranek and Newman, Canoga Park, California 91303.*—Available information on valve noise is based largely on the results of experiments, with minimal interpretation with respect to the known behavior of fluid dynamic noise sources. This paper examines the potential for such interpretation and shows that it is possible to postulate different mechanisms of behavior for valves which should lead to improved normalization procedures. Measurements on valves with air flow suggest the presence of dipole noise, quadrupole noise, and shock–turbulence interaction. Different valve types exhibit differing mixes of these noise mechanisms.

3:15

SS8. Fluid-Borne and Structure-Borne Noise from Valves and Orifices with Water Flow. J. F. WILBY AND P. E. RENTZ, *Bolt Beranek and Newman, Canoga Park, California 91303.*—Water flow through valves and orifice plates in a piping system is a source of high noise levels when cavitation occurs and, since the noise is propagated easily by the structure and fluid of the system, severe acoustic problems can arise. Laboratory measurements have been made to determine the fluid-borne and structure-borne noise characteristics of a series of valves and orifices in the pipe size range of 1 to 4 in., for flow speeds up to 16 ft/sec and pressures to 130 psig. The influence of parameters such as flow speed, pressure, orifice diameter, and valve size are considered with respect to level and frequency content of the noise propagating in upstream and downstream directions. The results show that, for example, orifice diameter and flow velocity have negligible effects on the dominant frequencies in the noise spectra. The use of flexible hoses to reduce noise propagation is discussed.

3:30

SS9. Department of the Army Regulations and Policies for Hearing Conservation. JEFFREY GOLDSTEIN, MANMOHAN V. RANADIVE, AND DONALD M. ROSENBERG, *U. S. Army Environmental Hygiene Agency, Aberdeen Proving Ground, Maryland 21010.*—Authority for the implementation of hearing conservation programs within the Department of the Army is established in Army Regulation 40-5, "Preventive Medicine." This regulation directs all Army installations to institute and administer active hearing conservation programs subject to frequent inspection and review. In addition, Department of the Army Circular 40-2 places command emphasis on all phases of the program. Guidance and policies for the conduct of hearing conservation programs are set forth in Technical Bulletin (Medical) 251, "Noise and Conservation of Hearing." TB MED 251 specifies (1) noise exposure criteria more stringent than those of OSHA, (2) noise hazard evaluation methodology, (3) engineering noise control techniques, (4) personnel protective measures, (5) administrative and clinical procedures for audiometric evaluations, (6) organization of health education program, and (7) the role of command, medical, and supervisory personnel in the conduct of the program. Although these policies are prescribed primarily for occupational noise exposure, there is overlap into nonoccupational activities of personnel. Additional Army documents provide noise emission standards for the procurement of Army equipment.

3:45

SS10. ***Abstract withdrawn.***

4:00

SS11. ***Abstract withdrawn.***