NOISE POLLUTION

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TAC BIBLIOGRAPHIC SERIES NUMBER 2

QUARTERLY UPDATE
JANUARY 1 THROUGH MARCH 31, 1973

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THE UNIVERSITY OF NEW MEXICO
ALBUQUERQUE, NEW MEXICO 87131
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NOISE POLLUTION RESOURCES COMPENDIUM

QUARTERLY UPDATE
March 31, 1973

Prepared by
THE TECHNOLOGY APPLICATION CENTER
INSTITUTE FOR SOCIAL RESEARCH & DEVELOPMENT
THE UNIVERSITY OF NEW MEXICO
ALBUQUERQUE, NEW MEXICO
This is the first issue of the planned quarterly publications concerning noise pollution. The quarterly issues will be combined at the end of each year into a single volume. This method of publication makes it possible for subscribers to remain currently aware of noise pollution information and at the same time, satisfy the needs of those requiring less urgently timed information through use of the yearly publication.

The eight sections of the basic Noise Pollution Resource Compendium have been merged and/or reduced to five sections in this issue in order to more efficiently categorize the current references.

This quarterly issue features complete abstracts instead of data processed bibliographic citations. The changed format is considered more desirable from a user's point of view. The new format and subject organization will be maintained in the upcoming quarterlies and the annual supplement.

The contents of this quarterly publication are arranged under subject headings which are judged major areas of noise pollution activity. An index at the end of each subject group simplifies cross reference of interrelated articles. This publication is paginated by the accession number of the first abstract contained on the appearing page. The legend of the accession number follows the organization of the basic Noise Pollution Resources Compendium.

NP 73 - 1A - 001

Accession number within category number listings consecutively

Subsection designation

Section designation

Year of search and publication

Noise Pollution
1. NOISE SOURCES
1.A GENERAL
NP73-1A-001

Belgian environmental research index:
Research index only, SS
AIR POLLUTION . WATER QUALITY . NOISE CONTROL . SOLID WASTES PESTICIDES . BELGIUM. research indexes.
Research by Belgian investigators on water, air and noise pollution, solid waste and pesticides is documented. Legislation and treatment are also included.

NP73-1A-002

CARLESTAM, COSTA. (Lindegatan 81, Stockholm 0, Swed.)
Noise: The scourge of modern society. AMBIOS 1(3): 102-109. Illus. 1972.--The increased consumption of energy for production and transportation generates a waste problem in the form of unwanted sound. The radiation of sound from a single source, eg airplanes for example, will disturb more and more people in consequence of urbanization. Urban man is more or less constantly exposed to sounds from a technology-created environment and because of the biological exasperation of human bodies this leads to so-called direct reaction. The mental process determines exposure to disturbing noise (significant) or more noise (sound level), in the article these problems are discussed in connection with how urban and regional physical planning can eliminate the negative effects of aircraft noise for the 118,000 residents around Arlanda airport in the Greater Stockholm area.

NP73-1A-003

Environmental Health Lab Midwest AFB Colf.
TECHNICAL REPORT BIBLIOGRAPHY.
Findings.
Gole P. Hoffnagle. Aug 72, 107p Dept ed. ENV 22-72-16

Descriptors: ('Air pollution, Air Force research), ('Water pollution, Air Force research), ('Industrial medicine, Air Force research), ('Radiation hazards, Air Force research), Chemical pathology, Miscellaneous, Locom, Entomology, California.

A bibliography of all unclassified technical reports prepared by USAF Environmental Health Laboratory is presented. It contains a listing by subject matter and a listing of all reports by year with report number and abstract. The report covers most aspects of environmental topics such as air, water, noise, and radiation pollution.

NP73-1A-004


Presents a brief systems look at what seems to be very unsystematic research coverage of the field in the past decade. There has been extensive discussion of domestic noise during this period, though with notable omissions. There has been research on interference with education, and some on hospitals. Quite a number of activities of importance have hardly had comment, let alone research. Discusses some of the problems for the designer in dealing with the present situation and puts forward ideas which seem to him likely to put design on a better basis.—J. Abst., ed.
### GENERAL
(See Also)

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1. B INDUSTRIAL
NP73-1B-001

S18-01B0895

Coalesced (L S) Acceleration, Cςs $\mathcal{S}$

NL21 From INDUSTRIAL PLANTS


Design and experimental data on the sound power of the inlet noise were compared for the compressors of several stationary gas turbine plants. It appears that in spite of the different occasions of the first stages of several full-scale compressors, the parameter $X$ (the dimensionless similarity criterion) changes insignificantly.

F.R.L.

NP73-1B-002

A72-149300


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F.R.L.

NP73-1B-003

A72-491200


This paper describes the interaction between the viscous regions of successive blade rows in an axial-flow turbocharger. It is shown that viscous interactions produce regular spatial variations in the unsteady velocity field, and therefore have a significant influence on the generation and propagation of internal noise. The discussion is supported by noise measurements and flow observations at low speeds in a single-stage axial-flow compressor.

NP73-1B-004

A72-493250


The behaviour of some important aspects of fan noise is both highly complex and paradoxical. By using a qualitative theory based on the work of Kaji and Okazaki, however, it is possible to predict the behaviour of the forward one of the two noise from the aerodynamic interaction of the fan rotor and stator. In this paper the theory is developed and extensive results from a low operating an statoric tip speeds (although designed for separate operating) are used to justify and illustrate the theory.
NP73-1B-005


--Sound pressure levels in a typical air-fed head and the readings of 3 human volunteers before and during operating the air feed were measured. A simple method of reducing the noise by the new apparatus local was sought and tested.--J. E. T.

NP73-1B-006


--The noise of air suction into the compressor was measured at 3 points inside the filter chamber and at 250 and 2000 mm distances from it. The noise created by 4 different types of compressors in the plant was measured primarily to compare the existing level of the sound pressure and noise spectrum with requirements of the sanitary standards. Results showed that the noise in the air suction chamber reached the maximum at 1000, 2000 and 4000 Hz frequencies, exceeding 100-104 decibels at summary level of Lsum = 112.5 decibels. At 250 mm distance from the chamber the noise reached its maximum at the same frequencies with a level of 100-104 decibels at Lsum = 107.5 decibels, but at 2000 mm distance from the chamber the air suction chamber the level was 93-97 decibels at Lsum = 101.5 decibels. Spectral components of compressor noise were in the range of high and low frequency, and exceeded the admissible values in all 4 types of compressors. Reduction of noise was accomplished by applying a plastic muffler, a combined damper at noise peaks, and especially by reconstruction of valves.--M. B. G.

NP73-1B-007

[Characteristics of noise in mechanical wood processing shops at cellulose-paper plant] Marinenko IV. Gig. Sots. 25:116-7, Oct 71 (Ruman)
NOISE LEVELS : MINING INDUSTRY : cleaning plant noise.
In anticipation of noise regulations for coal mine surface facilities, the U.S. Bureau of Mines conducted a noise survey at 3 cleaning plants in an attempt to identify possible problem areas. Those occupations where the individual's exposure exceeded the limits of the proposed noise standards were identified. The manner in which sound energy is distributed over the audible range of frequencies was described.


NP73-1B-008

72-6TE-0180
Kraatz, Gert
Druchluft, Larm und Umweltschutz.
In German; Eng., Fr., Ger. sums., illus., refs. (Some in Du.), from AS & Text.

NOISE SOURCES : NOISE REDUCTION : COMPRESSED AIR : environmental protection.

The problems of defining noise sources besides those caused by compressors and pneumatic hammers are discussed, as well as measures for noise reduction. The use of compressed air for environmental protection e.g. with the air-bubble method or in deep sea drilling is also considered.

NP73-1B-009

72-6TE-0181
Kraatz, Gert
Druchluft, Larm und Umweltschutz.
In German; Eng., Fr., Ger. sums., 21 figs., no refs., from Sum.

NOISE SOURCES : NOISE REDUCTION : COMPRESSED AIR : environmental protection.

The problems of defining noise sources besides those caused by compressors and pneumatic hammers are discussed, as well as measures for noise reduction. The use of compressed air for environmental protection e.g. with the air-bubble method or in deep sea drilling is also considered.

NP73-1B-010

72-6TE-0180
Arvidsson, Ola
Berglund, Kannef
Berlin, Mathis
Wahlstroem, Sten
Aberg, Sven

Byggbuller som samhallsproblem, Del 2.
In Swedish; no abs., numerous figs., data tables, no refs., SS.


Tables are presented of building site noise measurements, generated by earth moving and construction equipment. Data for each machine is presented with a photograph, description and measurement results.

NP73-1B-011

72-6TE-0158
Lamonica, Joseph A.
USBM, Pittsburgh Technical Support Center, PA

Noise levels in cleaning plants.

No abs., 5 figs., 5 tables, no refs., from Introd. & Test.
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1. C HOME, OFFICE AND
NON-INDUSTRIAL
Noise levels: acoustic measurements: buildings:

Environmental planning: man's perception and sensitivity.

The new attitude toward sound and acoustics in the architectural environment is considered. Acoustic properties as such, man as producer and consumer of sounds, as well as the perception of and sensitivity to acoustics were examined in detail, and the new hypotheses and proposals were clarified by examples and discussions of position.

Observations relating to the architectural interior as a form of the environment inhabited by man are considered. In order to ensure him sonic comfort, man is initially considered as the object (construction of a new system of location and orientation of the spatial coordinates at eye and ear level): then as the subject (in terms of his faculties of spatial perception and the responses elicited by sound signals); finally, man-to-man relations. Measures of planning, technical production, and sound insulation in the created environment are described. These considerations show sound to be a component of the environment, and some aspects and criteria of a technical sonic nature that promote comfort and achievement are therefore taken into account.

NP73-1C-002

Household noise problems; P.K. BAADE (Carrier Corp., Syracuse, NY); J Acoust Soc Am 50:35 pt 1 Nov 1971 p 1398-14 Communications to the Editor make a plea for uniform sound rating on household equipment, for information on proper application and installation, and for realistic criteria on acceptable sound levels. Recent standards are cited for the Air-Conditioning and Refrigeration Institute. Data are given for noise of a refrigerator, air conditioner, and dishwasher in a typical kitchen.

NP73-1C-003

(Determination of the noise level in pharmacies)

Leifeld 12.

Farmacia 29:49-8, Sep-Oct 71 (Eng. Abstr.) (Rev)
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NP73-1D-002

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NP73-1D-002
NP73-1D-003


Noise level measurements at 150 locations around the Cape airport are discussed. Effective Continuous Primary Noise Levels (ECPNL) are given for eight aircraft types. A noise level contour map and a diagram of noise duration allowances vs aircraft distance are given for the airport.

NP73-1D-004


The procedures and results of a recent social survey examining the problem of combined aircraft and traffic noise are reviewed. Correlations with various noise exposure units are examined. The results indicate some influence of traffic background noise on annoyance due to aircraft and the overall dissatisfaction due to aircraft and traffic. The use of a unit in the form of pollution level maps to offer the possibility of a promising method for predicting dissatisfaction due to combined noise sources.

NP73-1D-005


Summary of the main features and results of the second noise and social survey conducted around Heathrow airport in 1971 for the purpose of verifying the validity of the results obtained from the first 1961 survey. A brief statement is presented of the 15 main conclusions reached.

NP73-1D-006


A review of existing guidelines and noise levels relating to aircraft indicated that they were governed, not by the acceptability of the aircraft noise to an exposed community, but by economic considerations. To examine the impact on aircraft noise requirements of a change emphasis, from vehicle economy to noise acceptability, existing literature was used to estimate the maximum noise exposure from aircraft that a community would probably find acceptable. The suggested limit is 50 dBA (at 1 mile) for nonresidential areas per day. Idiots, this noise level should fall within the airport boundary or on nonresidential land.

NP73-1D-007

A73-41159 # Possible solutions to the conflicts of achieving community noise acceptance of VTOL. W. Z. Stepanovski (Boeing Co., Vertol Div., Philadelphia, Pa.) and F. H. Schmitt (U.S. Army, Air Mobility Laboratory, Wright Field, Calif.). International Council of
NP73-1D-009

A noise survey conducted to determine whether broadcast noise conditions exist within communities, from, or military vehicles. A check was also made on the levels emitted by public transportation vehicles, ships, trucks, cars, and private communciation systems. Broadcast noise levels were found in each of the communities tested. The military design policies also observed some instances of extreme noise. The public transportation noise were generally free from any extreme noise conditions. (Author)

NP73-1D-012

The paper identifies the major alternate controllable effects of community noise and traffic on noise; air pollution; visual intrusion; physical interference; and revenue. Techniques are described for quantifying these alternate effects, and where possible, their costs are given. The paper does not cover by planning and legislation, and gives a broad definition of the controllable consequence of two public transportation systems of the future. (Author)

NP73-1D-013

The intent is to describe specific aspects of the noise problems caused by the various modes of transportation, such as the cotton field, the railroad, the highway, and the ocean, and then to suggest policies. (Author)

NP73-1D-014

The intent is to describe specific aspects of the noise problems caused by the various modes of transportation, such as the cotton field, the railroad, the highway, and the ocean, and then to suggest policies. (Author)
Highway noise. A design guide for highway engineers. C.G. GOLLON, R. J. KUGLER, D. L. NELSON, Highways Res. Bd, Nat. Camp Highw Res. Program Rep. 317, 1971, 79 p. The report describes and compares different analytical and experimentally derived models of traffic noise, and describes the model used in the Design Guide. It also discusses the sources of information and technical approaches used in determining the noise level adjustments for finite element length, acoustical barrier, elevating or depressing the roadway, gradients, and different pavement conditions, and the presence of intervening buildings or foliage between the observer and the noise source. Several approaches to the selection of criteria for traffic noise. 33 refs. 3 M. 81.


No abs., illus., refs., from Text & SS.


Diesel engines are noisier than gasoline engines, but because of their greater fuel economy, they remain in widespread use. Sources of diesel engine noise, the relation between combustion induced and piston slap noise, characteristics of combustion controlled noise, effect of timing gears and accessories, noise and engine design parameters, and consideration of the principles of noise control are discussed.

Diesel engine noise can be reduced even taking into account future trends for higher power outputs. However, research efforts must investigate high pressure charging techniques for automotive use in conjunction with studies of exhaust emissions; quiet structure design is "just as important since only by both techniques can the required demands be met."

Noise and the truck driver. See Citation No. 73-1TE-00006 p. 127. [1972].

Abs. only, from AA.


The source and character of the noise, the noise reduction achieved, and the noise reduction techniques utilized by one Industrial Hygiene Department are reviewed. The most effective combination of noise reduction techniques achieved a level of 84 dbA, under all driving conditions (with closed windows and air vents).

Noise generated by trains of the Chicago Transportation Authority were studied and analyzed relative to occupational health hazard and speech interference. Tape recordings of noise occurring inside of train cars were obtained under various operating conditions. Frequency of occurrence and cumulative distributions of sound intensities were developed through instrumental analysis of the tape recordings. Analyses were measured in terms of over-all sound pressure level, dBA, and sound intensity in each of the octave bands. In some cases, daily noise exposures exceeded the limits recommended by the American Conference of Governmental Industrial Hygienists and specified in the Walsh-Healy Act. Years of daily exposure to these noises had adverse effects on the hearing acuity of a portion of the train crew. Speech interference is extensive on these trains. Some portion of the passengers, probably a small amount of temporary hearing shift in a single trip, yet it is unlikely that any will develop noise induced permanent threshold shifts from this source.


Abs., illus., refs., from AA & SS.


A community noise survey was made of the Greater Vancouver Regional District, British Columbia, Canada, which covers 560 mi². Approximately 100,000 individual noise measurements were recorded over a 4-mo period. The statistical noise climate in residentially zoned areas was almost identical in level distribution to that observed by Donley for the mid-Atlantic states some years earlier. In deciding what maximum noise levels should be allowed, the following factors should be taken into consideration: economic impacts, community benefits, enforcement problems, and political motives.
Urban traffic noise: Strategy for an improved environment.


In English: no obs., 17 figs., 2 tables, data tables, appendix, 49 refs. (2 in Fr., 6 in Gar., 5 in Sourn.), from Text & SS.


Sources and characteristics of urban traffic noises are given and their effects on humans are listed. Control of urban traffic noise is discussed with reference to modifications in vehicular design, traffic operations and urban architecture. Current administrative and legislative shielding and directives in various member countries are reviewed. The Consultative Group on Transportation Research of Organisation for Economic Co-operation and Development makes several recommendations for the role of government relative to vehicle noise, traffic noise and urban environment, economics of noise abatement, research and development, and international cooperation.

Propagation of traffic noise in typical urban situations.

Payne, R.C.


sum., 40 figs., 26 tables, index, no refs., from AS.

NOISE MEASUREMENT: ENGLAND: traffic noise propagation.

Field measurements were carried out to investigate the propagation of traffic noise for 10 different roads and housing configurations. The shielding produced by a substantial brick wall parallel to a main road, and the effect of an aperture in such a barrier, was measured and results compared with data for open grassland. Shielding by rows of houses flanking a main road and noise propagation along side roads branching off main roads was investigated in detail, and empirical curves are presented for predicting levels of L10 (the noise level in dBA exceeded for 10% of time) in such situations.

Environmental quality of city streets: The residents' viewpoint.


Abs., 6 figs., 21 refs., from AA.

Presented at Committee on Social, Economic and Environmental Factors of Transportation Annual Meeting, 50th.


The San Francisco Planning Department did a small study of the quality of the environmental along some of the city's main traffic streets to find out what effect traffic has on the street as a living environment. Viewpoints of those people who live on the city's streets are presented. The criteria categories examined were traffic hazard, stress, noise, and pollution, privacy and home territory, neighboring and visiting, and identity and interest.

Effects of highways on urban environments.

Sturman, Gerald M.

Persons, Brinckerhoff, Quade & Douglas, Inc. New York, NY.

Effects of highways on urban environments.


Abs., 2 figs., 3 refs., from AA.

HIGHWAYS: AUTOMOTIVE POLLUTANTS: NOISE GENERATION: Impacts on an urban highway on the communities through which it passes are studied. Air pollution, noise pollution, access disruption, loss of job opportunities, and loss of housing are analyzed.
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UNIFYING THEORIES OF CONDENSED-STATE ACoustic generation are reviewed with special emphasis on conceptual adequacy and physical scope with special reference to supersonic jet noise. In this review the basic work of Stokos, Kirchhoff and Rayleigh on sound waves in fluids is reviewed and developed to provide a firm basis for the critique. The advantages and disadvantages of existing theory and how improvements made by Lighthill's are thoroughly discussed in Section 11.3. A contribution is made towards removing the criticism made by Lighthill of Lighthill's isotropic source function theory. New developments such as those by Crow, Liley and Dwyer are emphasized. On the basis of the evidence provided by the critical review, a new unified theory for jet noise has been developed. Author (GRA)

NP73-1E-002

NP73-1E-003

PRELIMINARY NOISE TESTS OF THE ENGINE-OVER-THE-WING CONCEPT. 2: 10 DEG. 20 DEG FLAP POSITION


Preliminary acoustic tests of the engine-over-the-wing concept as a method for reducing the aerodynamic noise created by conventional and short takeoff aircraft are discussed. Tests were conducted with a small wing section model having two flaps which can be set for either the landing or takeoff position. Data was acquired with the flap set at 10 degrees and 20 degrees for takeoff and 30 and 60 degrees for landing. The engine exhaust was simulated by an air jet from a convergent nozzle. For field noise data are presented for nominal pressure ratios of 1.25, 1.4 and 1.7 for both the flyover and sideline modes. Author
NP73-1E-004

NP73-1E-005

NP73-1E-006

NP73-1E-007

NP73-1E-008

NP73-1E-009

NP73-1E-010

NP73-1E-011

NP73-1E-012

Proceedings.


A73-12980 # An attempt is made to assess the officers of noise, smoke, and odors produced by aircraft on the environment. The engineering and administrative measures which are being taken to control these effects are also considered. It is suggested that, in addition to curbing noise and odors, aircraft add to pollution indirectly by enabling people to visit remote places of the earth which would normally be free from pollution. Atmospheric pollution, engine-generated noise, the sonic boom, and pollution of the stratosphere are discussed in detail. It is considered that noise in the vicinity of airports is the core of the problem.


A73-14003 # A noise source in aerodynamics. R. A. Gardner (Bell-royce, Ltd., Bristol, England). American Society of Mechanical Engineers, Aeronautics and Environment Division, Paper 22, 1972, p. 21-22. 11 p. A noise source in aerodynamics is presented for low- and high-speed engines, such as the Boeing 747 and the Boeing 707. It is shown that the source from low- to high-speed engines results in a marked noise reduction by substitution of ducted fans and low-speed noise sources (throttles, of low bypass ratios) and for the low frequency noise of the jet. The general mechanisms of jet, compressor, fan, and turbine noise are analyzed. A study of the mixing noise reveals a noise source, termed tailpipe noise, which is an internal source susceptible to reduction by design and with acoustic linings. It is shown that internal airplane quality can be a significant factor. The simplification of aircraft tailpipe noise. Turbine noise investigation also requires careful consideration to reveal the source.


An attempt is made to assess the officers of noise, smoke, and odors produced by aircraft on the environment. The engineering and administrative measures which are being taken to control these effects are also considered. It is suggested that, in addition to curbing noise and odors, aircraft add to pollution indirectly by enabling people to visit remote places of the earth which would normally be free from pollution. Atmospheric pollution, engine-generated noise, the sonic boom, and pollution of the stratosphere are discussed in detail. It is considered that noise in the vicinity of airports is the core of the problem.


NP73-1E-014


An investigation of externally blown flap impulse noise was conducted using a full-scale turbofan engine and aircraft wing. The noise produced with a dairy nozzle installed on the engine exhaust system was greater than that produced by a conical nozzle at the same thrust. The dairy nozzle caused the jet velocity to decay about 35 percent at the lip. The presence of the wing nose to the conical nozzle increased the noise, as did increasing the flap deflection. Comparison with the conical nozzle, the dairy nozzle produced slightly less noise at a flap deflection of 60 deg but produced more noise at the lower flap deflections tested. (Author)

NP73-1E-015

NP73-1E-016

A72-32482


A detailed study of the transmitted sound disturbance from the interior of an idealized jet through the mean flow profile and into the far field. The noise generator is taken to be a source of transient sound point sources traveling with the local fluid in the idealized jet. The idealized jet is two-dimensional, and cylindrical to infinity upstream and downstream. The jet velocity profile is constant except for streamwise position. For the limited set of examples considered it is shown that the velocity profile has a large effect on the magnitudes of the noise levels both in the far field and at the far field noise, especially at low Strouhal numbers. Photographs of noise levels in the far field are presented in a polar plot of far field source pressure on the downstream axis of frequency dependence. (Author)

A72-33916


The simple pressure source model of the sound radiated by a conical jet is investigated analytically and experimentally. From the simple source model, the ratio of the frequency space of the radiated sound power and the jet pressure is derived for an assumed form of the jet-pressure cross correlation. The spatial variation of the overall jet pressures, the frequency spectra of the jet pressures, the jet and radiated cross correlations of the jet pressures, and the cross correlation between jet pressure and far-field sound pressure are measured for a cold jet. Some implications of the simple source model with regard to noise suppression are also discussed. (Author)

NP73-1E-017

A72-31010


NP73-1E-018

NP73-1E-019

A72-61157


The simple pressure source model of the sound radiated by a conical jet is investigated analytically and experimentally. From the simple source model, the ratio of the frequency space of the radiated sound power and the jet pressure is derived for an assumed form of the jet-pressure cross correlation. The spatial variation of the overall jet pressures, the frequency spectra of the jet pressures, the jet and radiated cross correlations of the jet pressures, and the cross correlation between jet pressure and far-field sound pressure are measured for a cold jet. Some implications of the simple source model with regard to noise suppression are also discussed. (Author)

A72-61173


An economic analysis of hypersonic transports is presented to show projected operating costs (direct and indirect) and return on investment. Important assumptions are varied to determine the probable range of values for operating costs and return on investment. The environmental effects of hypersonic transports are discussed and compared to current supersonic transports. Estimates of sideline and flyover noise are made for a typical hypersonic transport, and the sonic boom problem is analyzed and discussed. Since the exhaust products from liquid hydrogen-fueled engines differ from those of kerosene-fueled aircraft, a qualitative assessment of noise pollution effects is made. (Author)

A72-61182

NASA research and development work on the noise of aircraft engines suitable for use on conventional take-off and landing subsonic cruise airplanes is reviewed. The work discussed was part of the NASA Quiet Engine program. Salient results in the areas of fan, jet and complex propulsion system noise are presented and briefly discussed. (Author)

A72-61792

The environmental effects of aircraft noise: Theoretical and experimental investigations at the Technical University of Munich, Munich, Germany. (German). Die neue Technik, vol. 20, Sept. 1972, p. 317-330. (In German.)

The effects are closely related to the thermal radiation, acoustic emissions, and the exhaust gas production of the engine. However, the acoustic emissions produce highly disturbing and sometimes even harmful noise effects. Certain components of the exhaust gases also have disturbing or deleterious effects. The physical mechanisms involved in the origin of the phenomenon which produces the environmental effects are examined. Quantitative predictions of general validity concerning the individual effects are discussed, and the relation of these effects with the design parameters of the propulsion system is investigated. A number of suggestions for reducing the harmful environmental effects are made on the basis of the preceding analysis. (In German.)


Description of a new method for evaluating the environmental annoyance of time-varying aviation noise on the basis of statistical data for instantaneous changes in the sound level of noise exposure. (In Polish.)


An experimental investigation has been conducted on the noise produced by a two-bladed, four-foot diam. propeller and its effect on the jet noise levels. The propeller has a spool of water containing 70% of the total propeller radius. A porous mesh on both surfaces of the symmetrical section reduced the noise levels by 30-40% compared to those of the corresponding solid propeller. A general reduction of the boundary layer noise levels of 20-30% was observed when the porous mesh was used. (In Polish.)

Propeller rotation noise (in water) has been measured and compared to the noise levels produced by a four-foot diam., four-bladed propeller. The propeller was mounted on a water-spool which contained 70% of the total propeller radius. A porous mesh on both surfaces of the symmetrical section reduced the noise levels by 30-40% compared to those of the corresponding solid propeller. A general reduction of the boundary layer noise levels of 20-30% was observed when the porous mesh was used. (In Polish.)

The noise produced by a four-foot diam., four-bladed propeller has been measured and compared to the noise levels produced by a two-bladed, four-foot diam. propeller. The propeller was mounted on a water-spool which contained 70% of the total propeller radius. A porous mesh on both surfaces of the symmetrical section reduced the noise levels by 30-40% compared to those of the corresponding solid propeller. A general reduction of the boundary layer noise levels of 20-30% was observed when the porous mesh was used. (In Polish.)

The noise produced by a two-bladed, four-foot diam. propeller has been measured and compared to the noise levels produced by a four-foot diam., four-bladed propeller. The propeller was mounted on a water-spool which contained 70% of the total propeller radius. A porous mesh on both surfaces of the symmetrical section reduced the noise levels by 30-40% compared to those of the corresponding solid propeller. A general reduction of the boundary layer noise levels of 20-30% was observed when the porous mesh was used. (In Polish.)
NP73-1E-026

AD-499 720
PCE15-71-15693
General Electric Co Cincinnati Ohio
SUPERSONIC JET EXHAUST NOISE.
Final rept. May 71-May 72.
Edward J. Bemelman, and Paul R. Kratsch.
Dept AFAPR-TR-72-52
Contract F33615-71-C-0582


The report summarizes the results obtained at General Electric during the first phase of the Air Force Super Sonic Exhaust Noise - Velocity Model Program. The overall objective of the program is to develop the technology to significantly reduce supersonic aircraft propulsion system noise with minimum uncontained performance and weight penalties. To fulfill this objective, research is being carried out to develop the experimental techniques and the necessary theory to reveal the basic mechanisms of jet exhaust noise through the range of velocities and temperatures typical of present and future military and commercial supersonic aircraft propulsion systems. A comprehensive aerodynamic analysis program describing the flow mechanism in supersonic jets is presented and compared with experimental data. A large number of theoretical models describing supersonic far field jet noise are evaluated. (Abstract)

NP73-1E-027

AD-499 729
PCE15-71-15694
Environmental Health Lab Edwards AFB Calif.
NOISE EXPOSURE AT AIRCRAFT MAINTENANCE POSITIONS.
Final rept.
Robert A. Capell. Oct 70. 29p Dept ao. EML-71-
8458-30


A noise survey was conducted at McClellan AFB, California to investigate the noise environment of maintenance personnel exposed to the F111, F-102, and F-106 A/C during in-flight run-up operations. The report includes conclusions which were used to effect the noise environment in the near field. (Abstract)

NP73-1E-028

AD-499 730
PCE15-71-15695
Environmental Health Lab Edwards AFB Calif.
ENVIRONMENTS OF CONTROL.
Final rept.
Robert A. Capell. Jan 71. 29p Dept ao. EML-71-
8458-1


Noise surveys were made at the control towers of two Air Force Bases. Measurements of the indoor and outdoor sound pressure levels during aircraft takeoff and other operations were recorded. These data are presented so that an evaluation of
Entitated noise transmitted by an airplane fuselage subjected to turbulent boundary layer excitation and evaluation of noise reduction techniques (presented at the Boeing Co., Seattle, Washington), J. F. NILBY and J. Sound Vibr 18 n 18 Oct 23 1971 p 616-64; the acoustic power radiated by an airplane fuselage structure exposed to a turbulent boundary layer pressure field has been measured at two flight Mach numbers. For a single fuselage panel the radiated power is approximately 50 and 70 dB relative to 10^-12 Watt at Mach 0.55 and 0.53 respectively. Damping and rubber wedge broadband, applied to the structure, reduces the acoustic radiation but they are more effective at Mach 0.55 than at Mach 0.53. The flight test data are in poor agreement with available wind tunnel measurements, indicating the need for improvements in testing procedure.

Community noise levels of the DH-10 aircraft; A. L. McQUEEN, Anglo-Am Aeronaut Conf, 12th, July 8-9 1971. Can Aeronaut and Spiro Inst, 1971, Prop g 75/8, 7 p. Noise levels for the DH-10 are presented and community noise levels of the aircraft are discussed, 11 rain.

Turbofan trends for short haul; L. G. DAVKON (Knowles) (1971) Ltd., Derby, England, T. D. SELLS, ASNE Prop 73-07-04 for example, Proc 72-30, 11 p. After a general discussion of the noise problem the relation between conventional and STOL options are broadly reviewed and their requirements in regard to power plant are discussed. Some of the associated acoustic and environmental considerations including variable pitch fans, reheat, reverse and the environment, noise and vibration.

Hovercraft are a relatively new and unique form of transport, capable of traversing terrains which previously were almost impassable at speed by surface transport. This high-speed capability was gained partially at the cost of ride comfort, but unlike some vehicle developments, as power and speed have increased, the noise and vibration within the hovercraft have steadily decreased with each new craft. The sources of noise and vibration are discussed, together with their possible methods of reduction in order to improve crew and passenger comfort.
Flight noise of aircraft and the subjective judgment of its annoyance.


Abs., illus., refs. (Some in Ger.; Russ.), from AA.


AIRCRAFT : ACOUSTIC MEASUREMENTS : TRANSPORTATION NOISES :
Tu-104 jet : subjective judgment of annoyance.

Take-off noise characteristics of the Tu-104 jet airliner in the far sound field was investigated. The local flight noise spectrum varies in accordance with the Doppler effect. A characteristic is given for the influence of noise persistence, number of flyovers, and population density on the subjective judgment of the noise annoyance factor. A method is described for calculating the persistence correction to the perceptible noise level.

AIRCRAFT : TRANSPORTATION NOISES : sonic booms.

Physical properties, causes, and effects of the sonic boom are discussed. Factors affecting the boom are analyzed, including aircraft shape and weight, meteorological conditions, and height at which the aircraft is flying. Maneuvering and acceleration can cause a 4- or 6-fold increase in boom intensity due to focussing. The worst booms come during initial acceleration to supersonic speed because all factors tend toward the largest pressure pulses: the airplane is relatively low and at maximum weight and high incidence.
AERONAUTIC
(See Also)
2. NOISE DETECTION AND MEASUREMENT
2.A GENERAL
A73-100846


Standard values of atmospheric attenuation determined from SAE ARP 866 are used in correcting aircraft noise measurements from test day to reference day conditions but errors are often introduced when there is a large difference between test and reference conditions. This paper describes a systematic investigation into atmospheric attenuation by simultaneous measurement of meteorological data and aircraft noise under more than twenty different conditions of temperature and humidity. Measured attenuation values are presented which show better agreement with SAE ARP 866 predictions when conditions representing the whole noise path are used rather than surface conditions. Continuing analysis will provide a direct comparison with SAE ARP 866 and consider the problems of predicting attenuation where only limited meteorological data is available. (Author)

Human responsiveness to various sound stimuli is discussed, and stress is placed on potential indicative features of noise in the environment. Physical indicators, such as the Phon, Sone, and Roy scales, and perceived noise level, are quite reliable, and the technology is sufficient for providing highly refined sound analysis. Physiological, auditory, and vestibular indicators, such as hearing threshold shifts, cochlear cell damage, and interruption of cochlear and vestibular blood supply, can also be used to define the mechanisms of noise damage. Other indicators of environmental noise include those involving education, safety, psychology, social science, politics, and economics.

Basic of Noise.
See Citation No. 197-5TE-0148. 26 pages. 1972.
No abs., 11 figs., 8 refs., from Intro.
Acoustic Measurements: Noise Sources: Sound Waves.
An introduction to acoustics as a form of wave motion is presented. Making physical measurements of sounds is covered together with the subjective side of acoustics. Those subjects are related via the fundamental datum pressure of physical measurements. Definitions are given of the decibel (dB), and some of the simpler forms of loudness scale are described. Important physical characteristics of noise sources which are necessary to know about in order to control noises at their source are covered. Various facets of sound in rooms and buildings are examined.
2A GENERAL
(See Also)

1D019 1D024 1E034 3B047 3D025 5A014 5C007
2.B INSTRUMENTS
The audio dosimeter—a system for measuring personal noise exposure. See Citation No. 73-1TE-00006 p. 127. [1972?]. Abs. only, from AA.


An accurate measurement on the 'A' scale of the sound energy reaching the ear of the employee during his work days is necessary; his exposure should be limited to prescribed values. Methods of obtaining this measurement utilizing sound level meters, plus time and motion studies, are reviewed and limitations are defined. A new method to obtain this measurement is described. In a single operation, an instrument continuously measures the sound at the ear of the employee for all values between 90 and 115 dBA, simultaneously measures time, and integrates the result. Exposure over 115 dBA other than impulsive or impact noise is also indicated. Results of 14 mo of field experience are presented and advantages over previous methods are discussed.

A wearable pocket noise dosimeter. See Citation No. 73-1TE-00006 p. 128. [1972?]. Abs. only, from AA.

ACOUSTIC MEASUREMENTS : MEASURING INSTRUMENTS : ENGINEERING : abstract only : dosimeters.

A noise dosimeter that meets the ANSI Type II Sound-Level Meter Standard and accumulates the OSHA percentage directly is discussed. The frequency response for noise dosimeters should be measured with 1/3-octave bands of random noise in a reverberant room since this is more repeatable and a better approximation for a device that will ultimately measure noise. These frequency response measurements will show the effects of the proximity of the wearer. The dosimeter is composed of 2 parts: a small pocket unit that accumulates and stores the digital data representing the OSHA percentage and an indicator unit that provides a digital readout on a light emitting diode display. The pocket unit includes a small ceramic microphone, a true rms detector with more than 15 db crest factor capacity, and an extremely low-power MOS digital counter to store the OSHA percentage. It weighs 7 oz and runs for over 300 hr on an ordinary 9V transistor battery.

[Low-cost classification measuring instrument for the exact determination of equivalent permanent noise level] Liebg W. Gesamte Ryg 18:318-21, May 72 (Gor)

[Improved noise meter] Knügge GP. Gig Stahl 37:81-2, Feb 72 (Rus)
2B INSTRUMENTS
(See Also)

2C008  3D052  5C013  5C022
2. C TECHNIQUES
NP73-2C-001

2C-001

NP73-2C-002

NP73-2C-003

NP73-2C-004

NP73-2C-005

NP73-2C-006

NP73-2C-007

NP73-2C-008

NP73-2C-009
This paper is concerned with the problem of removing the noise duration correction to the effective duration time when it
zero, a condition that exists when the peak pressure level
approaches a noise floor. The purpose served is for removing the
duration correction leads to extremely large negative values at the
effective duration time reproduction zero. A modification is suggested
to avoid this anomaly.

NP73-2C-010

Experimantal atmospheric absorption values from aircraft fly-
over noise analyses: D.E.BISHOP (Bellanca and Morana,
Inc., Van Nuys, Calif), NASA Report CR-1781 June 1971, 72 p; A detailed analysis of the
noise recorded on the ground during a series of 80 aircraft
flyovers by two aircraft (a four-engine turbojet transport and
a four-engine piston transport) during a single day of field
measurements has been conducted. Noise levels recorded at
five positions under and to the side of the flight path were ac-
quired from the field work. Difference in one-third octave
band noise levels observed at different ground positions for
the same angle of radiation from the aircraft were utilized to
obtain data of absorption values, 72 p.

NP73-2C-011

Perceived level of noise by Mount VII and
derived from B. E. B. Stevens, presented.
Acoustic measurements

A personal dosimeter was developed to monitor an individual's exposure to noise. The dosimeter is only 13 in² and is carried in an individual's pocket. The batteries provide for 2 months of operation and the unit features instantaneous readout of the percentage of maximum permissible exposure, true rms detection, and a continuous weighting scale. The results obtained in field testing and performance criteria for such devices are discussed. An ear muff with miniature electronics to permit the wearer to hear low level signals while exposing the muff but protect him from levels in excess of 80 dBA is also described.


The reduction of sound levels generated by a product involves determining the sources and attenuating or eliminating the noise by design. Several techniques for identifying noise sources are discussed. Spectrum, correlation and coherence functions can yield considerable insight into noise sources and transmission paths. The spectrum reveals all the frequencies contained in the sound generated by a product; the correlation functions reveal the transmission paths from various components as well as which specific frequencies each component may be generating, and the coherence functions determine whether a frequency generated at one point is coherent with an apparent same frequency located at another point. Applying the results of the coherence spectrum to the cross-spectrum yields a very valuable corrected cross-spectrum.


Digital data reduction methods for calculating aircraft engine noise characteristics are discussed. It is noted that the approach used is in support to those employing on-line electronic analyzers because of reduced analysis time, lower cost, and improved information content resulting from the analytical techniques considered that is possible. Analysis of a fan noise spectrum is used to illustrate the method.


Existing literature on different methods of calculating traffic noise is reviewed. A new method for calculating noise from road traffic is presented, based on extensive measurements and differing from other methods mainly in that it was possible to simplify the calculating procedure due to the development of new types of charts. A new method is also presented for assessing the effect of finite sources. The new method is directly compared with the other older methods of calculation.
2C TECHNIQUES
(See Also)

1D018  3A009  3C002  4B004  5A004  5B006  5C003
25001  3A025  3D017  4C001  5A012
2. D FACILITIES
Magnitude estimates by each of 31 humans were obtained for a variety of noise sources under three methods of acoustic presentation: loudspeaker presentation in an enclosed chamber, loudspeaker presentation in an anechoic soundproofed room, and otoacoustic presentation. Comparability of ratings obtained in these environments were evaluated with respect to probability of ratings from physical measurements, variability of ratings, and the scale values obtained as compared with physical measurements. Averaged environment was found to have both effects upon physical measurements and ratings of perceived noise. The results obtained were also obtained by the present experiment in which they were obtained. The results for further study of general differences between judged magnitude of sound intensity and the methods of magnitude estimation and physical measurement is indicated by the finding that in three cases the estimates, although instructed otherwise, accurately judged the maximum rather than the effective magnitude of sound-environment.
2D FACILITIES
(See Also)

2B002  5B001
3. NOISE ABATEMENT
AND CONTROL
3.A GENERAL
NP73-3A-001

NP2-18264/ HT Research Inst., Chicago, Ill.

STUDY OF NOISE IN AIR ROUTE TRAFFIC CONTROL
CENTER, FEDERAL AVIATION ADMINISTRATION, AND \N:\AVIATION
CENTERS: TYPICAL AND REMOTE FACILITIES (Final Report).


(Juneau DOT-PHP-1371, Final)

NP73-3A-002

NP72-30770  NASA, National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio

THE NASA QUALITY SYSTEM

Carl C. Kragh [1972] 10 p. reprod. of 575TH-44.430

Lewis Research Center, Cleveland, Ohio, 4-6 Oct. 1972; sponsored by NASA

NP73-3A-003

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-004

NP72-30770/ NASA, National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio

THE NASA QUALITY SYSTEM

Carl C. Kragh [1972] 10 p. reprod. of 575TH-44.430

Lewis Research Center, Cleveland, Ohio, 4-6 Oct. 1972; sponsored by NASA

NP73-3A-005

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-006

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-007

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-008

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-009

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-010

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-011

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-012

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-013

NP72-30973/ Environmental Protection Agency, Washington, D.C. Office of Air Quality and Control

NOMINEE PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS, UNIVERSITIES AND COLLEGES


NP73-3A-014
NP73-3A-004

NP73-3A-005

NP73-3A-006
The present study examines the performance and behavior of the Environmental Protection Agency.

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The present study examines the performance and behavior of the Environmental Protection Agency.
The need to limit plant noise to meet increasingly stringent regulations and standards should be considered during the plant design stage to avoid costly modifications. Design procedures utilizing a computer program were developed by Humphreys & Glaeser Ltd. The program calculates the maximum tolerable sound pressure level for each individual piece of equipment so that the total assembly will meet both community and plant noise level limits, and also provides data for preparing detailed specifications for each piece of equipment. The second part of the program shows the effect of the detailed engineering on the noise levels of the plant.

A brief history of Western Electric's mandatory hearing conservation and engineering noise abatement program is given. To augment the in-plant long-range efforts to reduce noise at its source, the Western Electric procurement specification for the purchase of new machinery is detailed. The mandatory hearing conservation program is outlined.

A history of noise problems associated with such plants as are common in the manufacture of ethylene and ammonia, are presented. The following sources are included: centrifugal compressors, piping, turbine, electric motor, gears, pressure reducing valves, vent mufflers, and oil and gas burners.

The U.S. airlines' deep concern over aircraft noise and the abatement thereof is described. The 3 basic approaches are set forth: reducing noise at the source, operational procedures, and control of
Future of gasoline engines.


Abs. only. AA.

Also in: Society of Automotive Engineers. New York. Section Papers No. 720615.

EFFECTS OF GASOLINE ENGINES: EMISSION CONTROL; NOISE REDUCTION: ECONOMICS: abstract only.

The present gasoline engine is examined against the requirements for an automotive powerplant such as performance, economy, operational factor, and availability considerations. New factors of emissions and noise are shown to modify the basic requirements. The effect of these factors on future gasoline engines is discussed.

NOISE REDUCTION: INDUSTRIAL NOISES: FEDERAL REGULATIONS. AERIAL TRANSPORTATION NOISES. Aviation noise abatement goal must be reached as early as possible. To educate industry, the government is moving too slowly. Industry can choose to sit back and do nothing or it can voluntarily expand displays of quiet. Noise control is an economic necessity, and new noise abatement techniques are needed. Topics cover progress in noise control in various countries. Aircraft noise, effects of noise on people, industrial noise, methods of noise assessment, traffic noise, and noise in construction and in buildings. Results of the participants in the 5th International Congress for Prevention of Noise regarding promotion of noise reduction are also mentioned.

NOISE REDUCTION: GERMAN DEMOCRATIC REPUBLIC. The organization of essential elements of noise control in the German Democratic Republic is described, and it is shown what way noise control will become effective. Some basic principles are stated: how they are realized and put into practice by efficacious incorporation into the managerial and operating activity in factories, complexes of factory plants, and industrial branches as well as by incorporation into the governmental and social supervision is explained.

American industry must and the tyranny of noise. Industry must take the initiative to design for quiet without waiting for legislation and proof of a large market. The motivation is preservation of the human environment. Some voluntary moves have already been made in the U.S. Manufacturers have voluntarily made silenced giant portable air compressors, a quieter garbage truck, a smokeless welding equipment. Legislation will now be needed to protect these progressive manufacturers from their noisy but cheaper competition, to protect the public from misleading advertising, to improve design goals. But the federal government is moving too slowly. Industry can choose to sit back and wait, or it can voluntarily expand displays of leadership mentioned above. To educate industry to its responsibility to man and his environment is a major goal of Citizens for a Quieter City. The ultimate noise abatement goal must be a partnership of government, citizen, and industry.
residential dwellings with which the State Research Institute for Thermal and Sonic Technology (Austria) dealt in the last 15 yr. Three separate groups of industry can be distinguished with reference to noise production and methods of reducing the external emission of noise: large plants that occupy considerable areas of land and where at least a part of the noise production is out-of-doors; fairly large enterprises operating in their own self-contained industrial premises; and smaller plants that do not require an entire industrial premises and are therefore usually housed in the basement, garage, yard or annexe of dwelling houses. The laws of extending and checking airborne and structure-borne sound are studied with practical examples and on a model.

**NP73-3A-025**

72-STE-0148

Anon.

Noise and vibration control for industrialists.


*NOISE CONTROL: INDUSTRIAL NOISE: conference papers: selected papers cited.*

A series of papers on industrial noise and vibration control is presented. Topics include basics of noise and vibration; principles of noise and vibration control; measuring techniques, acoustic materials for absorption, acoustic materials for transmission loss; vibration isolation; vibration test facilities and techniques; criteria and standards; hearing conservation; and an industrial noise control case study.

**NP73-3A-026**

72-STE-0151

Hub, D.R.

Univ. of Wales, Inst. of Science and Technology, Dept. of Applied Physics, Cardiff, Eng.

Principles of noise control.

See Citation No. 72-STE-0148. 18 pages. 1972.

- 6 figs., 2 appendices. 19 refs. from Text.

*NOISE CONTROL: technology: source: path: receiver.*

Noise control is the technology of obtaining an acceptable noise environment at a receiver consistent with economic and operational considerations. The receiver may be, for example, a group of people, an entire community, or a piece of equipment. Various aspects of noise control are discussed in separate control, economic considerations: points of attack: statistical aspects: interaction between source, path and receiver. Noise control at the source; control of the transmission path. Receiver control at the receiver, and systematic noise control.

**NP73-3A-027**

72-STE-0155

Gordon, Colin G.

Univ of Southampton, Inst. of Sound and Vibration Research, Wolfson Unit for Noise and Vibration Control, Eng.

Industrial noise control: A case study.

See Citation No. 72-STE-0148. 18 pages. 1972.

- 6 figs., 4 tables, 69 refs. from Intro & SS.

*NOISE CONTROL: INDUSTRIAL NOISE: FOUNDRIES: ENGLAND: building design.*

A case study is presented which involves the development of noise design constraints for the installation of a new plant in a foundry in the Midlands of England. The various stages of development are described.

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**NP73-3A-028**

72-STE-0107

Coortia, L.V.

American Oil Co., Texas City, TX


Abs. 3 figs. no refs. from Text & SS.

*INDUSTRIAL PLANTS : NOISE CONTROL : NOISE REDUCTION.

Texas: ammonia plant: refinery: equipment modifications; protective measures.*

A case history is presented of the noise abatement program initiated at the ammonia facility of the American Oil Co. integrated refinery. Noise sources were identified and silencers were installed at the process vent upstream of shift conversion and at a steam superheating coil outlet vent. Concurrent with equipment modifications to reduce a plant-wide program was instituted to specify protective measures to be used when work conditions require extended exposure to noise.

**NP73-3A-029**

72-STE-0061

Barnett, J.

Protection of the environment—A task of our time.


In English, no ab., 1 ref., from Text & SS.

*EMISSION CONTROL: WATER QUALITY: NOISE REDUCTION.

Government Programs: Germany: Symposium summary.*

The hazardous influence on the environment of industrial and automotive emissions, noise and water pollutants are discussed, and monitoring systems and government programs for pollution abatement are described.

**NP73-3A-030**

72-STE-0038

Anon.


Abs., figs., tables, data tables, refs. for various papers. SS.

*COAL INDUSTRY: AIR POLLUTION CONTROL: NOISE CONTROL.

Mining Industry: American Mining Congress 1972 Coal Show selected papers cited.*

Sections detail mine wastewater treatment, noise abatement, and emissions reductions in coal-burning power plants. The control of dust in mines through the use of foam and strip mine land reclamation are also discussed.

**NP73-3A-031**

72-STE-0039

Anon.

Environmental pollution and its control.

Environmental Pollution and Its Control. Seminar Abstracts. (Held in Baroda, India, April 15-17, 1972). Institution of Engineers (India). Baroda Sub-Centre. 79 pages. [1972].

Abs. only, SS.


Abstracts on air and water pollution and control of such pollution...
are presented, covering areas like wastewater treatment theory, treatment methods, unit processes—theory and design, industrial waste treatment, noise pollution, air pollution control theory, analytical procedures, surveys, hazards, automotive pollution and its control, and development of standards.

NP73-3A-032

[Assessment of noise and sound protection] Logho A. von.
Z Laryngol Rhinol Otol 51:211-28, Apr 72 (Eng. Abstract)
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3.2 METHODS

59
NP73-3B-001

NP73-3B-001

A SHIELDING CONCEPT FOR THE VARIATION OF EXHAUST ENGINES USING EXHAUST GAS TO REDUCE ACoustics

David W. Sitting, NASA, M.S., 4515 S. Hanover Ave., Los Angeles, CA

NP73-3B-002

NP73-3B-002

A SHIELDING CONCEPT FOR THE VARIATION OF EXHAUST ENGINES USING EXHAUST GAS TO REDUCE ACoustics

David W. Sitting, NASA, M.S., 4515 S. Hanover Ave., Los Angeles, CA

NP73-3B-003

NP73-3B-003

A SHIELDING CONCEPT FOR THE VARIATION OF EXHAUST ENGINES USING EXHAUST GAS TO REDUCE ACoustics

David W. Sitting, NASA, M.S., 4515 S. Hanover Ave., Los Angeles, CA
NP73-3B-004


The study of optimization problems is based and scaled for supersonic aircraft flight subject to the condition that the shock conical appears only inca in the sonic boom signal at a given point. The principal result is one giving the minimum effective mass weight of an aircraft given effective length under given flight conditions. The relationship of the minimum effective mass to the given features of a non-ideal axisymmetric rotation are derived on an upper bound on a control variable. (Author)

NP73-3B-005


Nilsson (1971) proposed the use of microphones for recording the 'sonic boom' noise as a means of monitoring the airways placed above the path of supersonic aircraft. The test is that the supersonic flight, a local focus of shock waves can be detected over a region of the sonic boom. In contrast to this, he does not claim that by applying a given technique, which is possible to plot the local focus directly, one achieves the type as proposed by Nilsson. It is found that regions of single, double, and even triple shocks can occur, however, as shock shadows are involved. (Author)

NP73-3B-006


The results of a study conducted by Arndt (1971) indicated that a substantial attenuation of noise intensity can be realized through the insertion of a screen into the jet flow. An extension of this study is reported. The noise measurement includes detailed surveys of the noise pressure and velocity in a large subsonic turbulent jet. Emphasis is placed on the mixing characteristics of the jet and their relation to the mixing radius and its effect on the noise reduction. Background material is discussed, giving attention to basic theory, turbulent jet coandaogy, and the turbulent distribution of sound sources and characterestic parameter spectra. The study was confined to the region of jet flow from zero to eight diameters from the nozzle. It was found that there is a substantial reduction of turbulence structure in the mixing region. (Author)

NP73-3B-007


The problems of acoustical noise generation, propagation, and attenuation in both at night and unilluminated regions, are, together with the direction of the eye flow speed and cylindrical ducts, as well as 80 deb in, within the cabin air-conditioning distribution system are studied. It was found to be possible to double the existing air flow velocity in the Boeing 747 air-conditioning ducts without violating cabin sound level criteria. It is possible to attenuate this noise by using a fraction of the duct's length with caused duct material, and by proper choice of R/D tolerances for the E-4208, 608-1401 of the cylindrical ducts. (Author)

NP73-3B-008


The experimental study on noise generation by the influence of a forward traveling waves by the actuator scheme of the airplane engine on the radiation and noise reduction by the actuator scheme of the airplane engine on the radiation. It has been shown that efficiency of the main gear and noise level lowered by inducing the noise. Noise level is then effectively lowered when the forward traveling waves is 12 deg. Indication of the noise level is due to the neighboring region, and the noise radiation is also decreased. (Author)

NP73-3B-009


The scope of investigations conducted with coaxial jet exhausts is (1) acoustic measurements in both far noise field and near noise field, (2) surveys of mean flow properties and shapes on the coaxial jet, the annular jet and shock structure changes, the noise field, (3) the effects of different geometrical parameters of the coaxial nozzles, and (4) thrust measurements. It is shown that the flow interaction between two suitable controlled jet flows results in substantial noise reduction based on equivalent thrust considerations. This flow interaction technique appears to be potentially an attractive approach for suppression of noise from supersonic jet exhausts. (Author)

NP73-3B-010


Questions of the toleration of aircraft noise by the public are considered, giving attention to the concept of the noise contour. The end of the aircraft noise problem is likely only when the area of the critical contour is contained within the confines of the airport. Approaches for achieving this objective are based on the use of quiet engines and improved operational techniques. It is pointed out that at present there are advanced technology engines capable of powering subsonic aircraft which can gradually replace the existing fleets of noisy jet aircraft. Such a reequipment program would lead to a reduction of noise exposure areas by at least a factor of five. A further halving of exposure areas could be accomplished with suitable development work directed at a further reduction of engine noise. (Author)

NP73-3B-011


Results are given of several analytical studies of noise suitable...
the possibility of boomless lifting configurations. Overall nozzle designs, synthesized on the basis of the individual component studies, are briefly discussed. (Author)

NP73-3B-012


NP73-3B-013


These devices, developed under a European cooperation of the French, German, and British aviation authorities, have been developed for the variable pitch fan to reduce noise by increasing the turbulence level of the fan blades. The reduction of high frequency noise emission depends on the turbulence level of the fan blades. The experiments show that the reduction of high frequency noise emission depends on the increase in the fan blade's turbulence. (Author)

NP73-3B-014


The extent to which the reduction of jet noise can be achieved by circulating a common jet with an annular flow is examined. Acoustic experiments have been performed on a model hot jet which was a coaxial jet with a low noise number very close to one, surrounded by a second cold annular flow of variable velocity and area ratios of the coaxial convergent nozzle. The experiments show that the reduction of high frequency noise emission depends on the secondary flow velocity. In most cases, this reduction seems to be not compensated by an increase in low frequency noise power. (Author)

NP73-3B-015

A73-16179 1 Thermodynamic considerations for the design of a sonic-boom reducing powerplant. N. Goloubev (Sherbrooke University, Sherbrooke, Quebec, Canada). American Society of Mechanical Engineers, Pressure Annual Meeting, New York, N. Y., Nov. 28-30, 1972. Paper 72-WA/Aero-2. 6 refs. Members, $1.00; nonmembers, $3.00. NASA-sponsored research.

Third-order analytical expressions are obtained for the lift and wave drag coefficients of a two-dimensional wing. The expressions are used to demonstrate the possibility of boomless lifting configurations when the propagation area of the airframe is reduced. The reduction in the area of the airframe to such a small size that the area is smaller at the point of the center. Calculations by these expressions are shown to be in good agreement with actual results obtained from aeroelastic thin airframes. It is also shown that three-dimensional effects when a propulsion powerplant is employed for the reduction of the propulsion system of a twin-symmetric configuration. Thermodynamic guidelines are given for power plant design to be used for this purpose. (Author)
include logical reasons why noise is generated by these processes at the lower mesh frequencies and the effect of typical distributing system design elements which may be useful for noise reduction at these frequencies. Comparison of theoretical viewpoint amplitude with measured variations can be expected to yield both a qualitative understanding of the noise problem and also detailed design techniques which can be applied to other design. (Author)

**NP73-3B-021**


Reduced magnitudes and nature of recent and current work performed or sponsored by NASA in the field of noise abatement technology. Figures of NASA 1971-1973 research continues to expand quiet and quiet STOL aircraft programs are presented. The briefly reviewed program included the 1200 and the General Electric of a 220 million contract to supply and test an engine of equivalent quiet engine, the Bell/GEVZ1 achieves two performed at NASA's Langley Research Center in Chicago, and the minimum and equivalent quiet STOL aircraft design. (Author)

**NP73-3B-022**

A72-32970 Internal noise reduction in hovercraft. D. Anderson (Southampton, University, Southampton, England). Aerospace Acoustic Society, Sound Acoustic, St. Albans, England, Apr. 5-7, 1971. Journal of Sound and Vibration, vol. 22, June 5, 1972, p. 303-350, 11 refs. Research supported by the Department of Trade and Industry. The aim of this paper is to summarize the results of several years work on the internal noise of hovercraft. The basic problem of noise production is described and methods for controlling it are evaluated. A case history is also described. Internal noise measurements from other forms of transport are compared to those of hovercraft, and it is shown that comparatively small overall noise reductions of 5 DBA would make the internal noise more so that of short-haul jet aircraft. Structural-turbine noise is shown to be a major source of noise in at least one current production craft. Low structural damping combined with lightweight and rigidly mounted machinery are found to be the major causes of structural-turbine noise. (Author)

**NP73-3B-023**


The NASA, working with American Airlines, has completed the first phase of research to evaluate the operational feasibility of two-dimensional noise for noise abatement. For this phase, one navigation was used to establish the upper glide slope and an ILS was used to establish the lower. The flight director was modified to provide command information during the entire approach. Three engines represent the aircraft, professional pilot association, FAA, and NASA participation. With an ILS approach for space, the procedure gave a noise reduction of 18 DB at the start and 6 EPMB 1.1 n. mi. from touchdown. (Author)

**NP73-3B-024**


The probability that situations can be presented with the noise problem which occurs when the exhaust gas emerges from the jet nozzle. The study of noise from jet engines noise lines in high exhaust escape velocity. This is now possible with the advent of variable engines, where a large diameter permits the mass flow and thrust to be maintained with much lower speeds. Mixing noise should dominate the field of engines with subsonic exhaust speeds. Moreover, the conclusion reached in this case is quite different, and noise reduction devices are needed to ensure that mixing noise is no longer a problem. (G.R.)

**NP73-3B-025**

A72-47170 Quiet propulsion. R. J. Stack (London, England). Aerospace Acoustic Society, Sound Acoustic, St. Albans, England, Apr. 5-7, 1971. Journal of Sound and Vibration, vol. 22, June 5, 1972, p. 303-300, 11 refs. Research supported by the Department of Trade and Industry. The aim of this paper is to summarize the results of several years work on the internal noise of hovercraft. The basic problem of noise production is described and methods for controlling it are evaluated. A case history is also described. Internal noise measurements from other forms of transport are compared to those of hovercraft, and it is shown that comparatively small overall noise reductions of 5 DBA would make the internal noise more so that of short-haul jet aircraft. Structural-turbine noise is shown to be a major source of noise in at least one current production craft. Low structural damping combined with lightweight and rigidly mounted machinery are found to be the major causes of structural-turbine noise. (Author)

**NP73-3B-026**

A72-01200 Closed form solution for the sonic boom in a polytropic atmosphere, R. Staff (Deutsche Forschungs- Ver- suchsanstalt für Luft- und Raumfahrt, Institut für theoretische Hydromechanik, Aachen, West Germany). Journal of Aircraft, vol. 9, Aug. 1972, p. 555-562, 22 refs. Analytic solution of the sonic boom problem for typical aircraft munition's in a polytropic atmosphere by means of the analytic method of characteristics. Solutions for singularities in a polytropic atmosphere are derived. Using the analytic methods of singularities and of characteristics, the sonic boom of a body traveling in a periodic arc is obtained. The asymmetric Whitham formula for the bow wave is improved by an explicit formula which gives sufficiently accurate results for distances of about 20 body lengths or more. (A.B.K.)

**NP73-3B-027**

A72-26820 NASA's quiet engine program, P. F. Jackson N-185, Washington, D.C. Journal of Aircraft Control, vol. 14, Sept. 1972, p. 18-19. It is the goal of NASA to provide the technology that will make the aircraft environment in its environment. The primary work in propulsion source noise reduction concerns the technology to modify existing engines and the technology to design new propulsion systems for STOL, SHORT, and VTOL that opens at small speed. More concern should be for the development of new engines. Another consideration is the incorporation of noise reduction technology in military aircraft propulsion developments. (G.R.)

**NP73-3B-028**

It is shown that focused beams that arise in evening flight can be suppressed by a simple (although not always acceptable) expedient of discharging down the aircraft. The correct deceleration will eliminate the local curvature of the wave front responsible for the focusing. Specifically, the tangential deceleration resolved along the tangent to the wavefront is adjusted to cancel out the contraposed curvature critically related. The normal turns of a prescribed limiting deceleration are not of concern for this suppression technique: their focused beams will be cut off from reaching the ground by atmospheric absorption. The minimum turn radius for focus cutoff is related linearly in a simple fashion to the tabulated width of the cone beam except for rectilinear flight, as a function of angle number and altitude.

Points out necessity of protecting the ears of armed forces personnel against noise and the ears of combat troops against blast without interfering with normal hearing. Measured the shock wave attenuation of a number of different combinations: muslin cloth, polyurethane foams, wire meshes and nylon and cotton net, and presents the shock and acoustic wave transmission characteristics for each.—E. J. Moncada
NP73-3B-031

MECKLENBURG, ROY A., WILLIAM F. ESTRADA, DANIEL R. SCHUMACHER, CEEL VAN DEN BERN and LEONARDO FLORES. (Mich. State Univ., East Lansing, Mich., USA.) The effect of plants on microclimate and noise reduction in the urban environment. \textit{Nortscience} 7(1): 37-39. Illus. 1972.--Plants have a great impact upon the urban microclimate in contrast to dry structural materials. Infrared surface temperature can be substantially modified by evaporative cooling and the interception of radiant energy by plants to reduce the heat island characteristic of the summer urban microclimate. High temperature characteristic of surfaces such as artificial turf can be reduced by irrigation. Outdoor athletic areas covered with artificial turf should be either irrigated to permit evaporative cooling or shaded to intercept solar radiant energy. Coniferous trees are capable of providing a small amount of attenuation for environmental noises that are either predominantly low or high frequency in composition. However, dense wide plantings are necessary to achieve effective environmental noise attenuation from vegetation alone in urban areas and the practical value of plants as an urban "sound barrier" appears questionable.

NP73-3B-032

HYNES, KEVIN M. (Mansonelle Inc., Herndon, Virginia, USA.) The development of a low-noise constant area throttling device. \textit{Instrum Soc Am. Trans.} 10(4): 416-421. Illus. 1972 (1973).--With the recent revision to the Walsh-Healey Act, possible high noise levels produced by control valves are a concern to industry. A comprehensive effort to determine an effective and practical approach to reducing aerodynamic valve noise resulted in the development of a fixed area, throttling device designed to reduce the production of aerodynamic noise at its source. This paper outlines the method of valve noise and investigates the parameters affecting sound through a series of qualitative tests. The influence of effective orifice diameter, system energy losses, resonant damping, and pressure drop variations are discussed. These factors, when properly incorporated in the finished product, result in a substantial and predictable noise reduction. Test results indicate excellent agreement with predicted SPL (Sound Pressure Level) values.
NP73-3B-033

NP73-3B-034

NP73-3B-035

NP73-3B-036

NP73-3B-037
Noise fades into the background when workers wear muffs. K. Gale. NF Engineer 523:103-10, Dec 71.

The role of the coal industry in environmental pollution is discussed, considering water and air pollution, thermal discharges, and noise. Successful means to control pollution are surveyed. Crystals of freeze concentrates can be applied in some cases to reduce water pollutants. Cool production in facilities with closed water systems forestalls water pollution of surface water by Fe salts. Air pollution can be decreased by condensation of noxious substances in exhaust gases. Thermal discharges are prevented through a closed cooling-water system with an air cooled condensor. Noises are reduced by adequate choice of compressor types, vibration free installation, and adequate acoustic insulation of machine chamber walls.


A hearing conservation program at a large petroleum and petrochemical plant that is based on past experience and the Occupational Safety and Health Act of 1970, is reviewed. Plan surveys, problem area definition, and medical and engineering control are discussed. A multidisciplinary approach is used in which medical, engineering, and operations departments share in the responsibilities for providing a suitable noise environment. The control of furnace and pipeline noise is examined in some detail.

A variety of noise control techniques for common noises encountered in existing refineries and petrochemical plants is examined. The engineering concepts and designs, the materials used, the amount of noise reduction anticipated and/or achieved, and the approximate costs are discussed. A check list, used by one group for actions required by the Occupational Safety and Health Act of 1970 Standard on occupational noise exposure, is demonstrated as an example. Also a method for the choice and priority of controlling noise sources is reviewed. Examples of Noise Control Data Sheets formulated for engineering departmental use are presented.


Wilson, G. Paul


A summary of data obtained from various operational and experimental rail transit vehicles and systems, the noise characteristics to be expected from new and proposed systems and equipment were determined to be much less than traditionally expected due to modern design concepts and equipment. The known and specified noise characteristics can be used during the planning of transit systems to determine the expected noise levels at any type of way structures, vehicles, and operational conditions, and can also be used to determine noise control features or system characteristics which should be included for control of noise. This permits the inclusion of noise as one of the factors affecting system planning and design.


To date, new transportation systems have failed to avoid the impact of noise on the surrounding community due to lack of adequate planning in terms of depth of research and analysis; lack of attention to the whole problem of noise pollution; and lack of coordinated planning of communities and the transport system that serve them. Several ways are discussed to achieve greater coordination between community planning and transportation planning in order to reduce noise. A systems approach should include the steps of identification of objectives, identification of programs, prediction of effectiveness, and evaluation of alternatives. Several means of doing this are discussed.

Practical aspects of engine noise reduction in commercial motor vehicle applications. See Citation No. 73-ITG-00052 pp. 33-42. (1972). No abs., illus., no refs., from Text. INTERNAL- Combustion ENGINES: EMISSION CONTROL: NOISE REDUCTION: LEGISLATION: GREAT BRITAIN: diesels.

Some techniques and developments, which have resulted from noise investigation programs, now being used on production engines are reviewed, including test methods and techniques. Practical developments involving engine speed, engine covers, and turbocharging are outlined. Installation problems, smoke control, legislation, and practical smoke reduction are also discussed.
Baltimore plans highways for minimum noise.


Abs. illus., refs., from Sum.


Noise level prediction of a proposed highway design is explained. Several case histories of highway design and planning in Baltimore (Maryland) are presented and represent difficult urban problems—those not solvable by handbook methods. The design and use of earth berms and acoustical barriers to attenuate noise are illustrated.

Noise identification and reduction methods for hydraulic units are discussed. Identification is accomplished through use of the human ear, precision sound level meters, and 1/3 octave band analyzers. Noise reduction can be accomplished by containing it or by 'designing out' procedures such as pump and motor rpm reduction, use of flange mounted pumps, employment of isolators for components and major sub-units, use of manifolds, and use of isolators in hydraulic lines.
Aircraft noise in the 1980's.
No abs. 7 figs, no refs., from Text & SS.

AIRCRAFT: NOISE SOURCES: future control.
Aircraft noise is a nuisance. Conservationists, government research establishments, universities and industry are working together to minimize the noise nuisance without ruining the economy of the air transportation industry. New aircraft can be made quieter, they may be assessed by means of a "noisiest footprint," so-called because of the footprinted pattern of the ground area exposed to noise in excess of a specified level during take-off and landing. Footprint area is directly proportional to the number of people disturbed. Noise curbs for existing aircraft are being studied as well. Better engines and enforcement of noise regulations are helping to alleviate the problem. A low noise engine is described.

NP73-3B-052

72-SRE-0139
Rink, Charles N.
Rink Corp., Hazleton, PA
Noise control in air handling systems.
Sum. 2 figs. 3 tables. 1 ref. SS

AIR CONDITIONING: NOISE EFFECTS: NOISE SOURCES: NOISE CONTROL: ECONOMICS
Generation, propagation and control of noise in air handling systems require careful engineering. Unitary air conditioning systems are compared to central station systems. Today's systems incorporate smaller machines, less ductwork and the proper amount of acoustically absorbent material. Information available to sound engineers on sound frequencies, the threshold of hearing, sound curves of equal loudness and annoyance, permissible noise limits for occupational exposures, and sound levels which cause discomfort and pain, is discussed. Causes of unwanted noise in a building's mechanical system are examined, with special emphasis on the fan. Oversizing must also be avoided because other mechanical noises then become audible and more annoying to the human ear. The various components which generate sound are described and suggestions are made for achieving more efficient and lower cost systems.

NP73-3B-053

72-SRE-0148
Wanaska, Glenn E. (all) Lord Corp., Lord Manufacturing Co., Miller, H.T. Erie, PA
Zalas, J.M.
Structural damping as a technique for industrial noise control.
Abs. 11 figs. 3 tables. 15 refs. (2 in Ger.), from AA.
Damping, although often used synonymously for attenuation, refers to an energy conversion process where the energy of mechanical vibrations is converted to heat energy. On this basis, damping is shown to be a useful tool for noise reduction where structural resonance or wave propagation at sonic speeds is responsible for noise radiation. Structural damping reduces noise radiation from structures by attenuating both the temporal and spatial components of flexural waves traveling in the structure. Structural damping is further shown to be useful in reducing noise originating from mechanical impact and from steady-state excitation. Examples of the effect of structural damping in reducing the noise from industrial machinery are presented, and data is given indicating the noise control obtained.

NP73-3B-054

72-SRE-0146
Holmar, C.I.
Bott, Berenak and Newman, Inc., Cambridge, MA
Legace, A
National Research Corp., Cambridge, MA
Effect of structural damping in the sound radiated from impacted structures.
Abs. 9 figs. 2 tables. 1 ref. from AA.
Theoretical and experimental evaluations of some damping treatments utilized to control noise from transfer of materials in a foundry are presented. A theoretical investigation is outlined which indicates that the change in peak radiated sound pressure level from an impact is proportional to the change in mass and stiffness of the impacted surface. The change in total sound power radiated is proportional to the change in mass, stiffness and the loss factor of the impacted surface. The energy noise reduction has application in predicting the reduction of the total average reverberant field sound pressure level from a large number of impacts occurring throughout a period of time.

NP73-3B-055

72-SRE-0147
Doolie, Leslie L.
Montreal, Que. Can.
Environmental acoustics.
No abs. Numerous figs., 18 tables, 4 appendices, index, numerous refs. SS.
A detailed analysis of environmental acoustics in architectural design is presented for practical application to present-day building practices. Properties of sound and various aspects of room or space acoustics are described. Environmental noise control, including sound-insulating construction, noise criteria, control of mechanical noise and vibration, and noise control in specific types of buildings, is discussed. Detailing, specification and supervision are included.

NP73-3B-056

72-SRE-0282
Anon.
Study of feasible methods for reducing the noise levels of turbojet and turboshaft aircraft.

NP73-3B-057

72-SDG-0564
National Industrial Pollution Control Council, Wash., DC
Airports and Aircraft Sub-Council.
Noise from gas turbine aircraft engines.
Sum. 3 figs. No refs., from AS & SS.
The reduction of noise from gas turbine aircraft engines is discussed. The introduction of low-bypass ratio turbofan engines reduces exhaust noise but adds fan tones particularly noticeable in landing. Fan design and acoustic treatment technology for reducing fan noise in high-bypass engines are considered. The high-bypass ratio engine provides good fuel economy and low jet exhaust noise levels.

NP73-3B-058

72-5T1-0682
Macdonald, Howard R. San Diego, CA
Method and apparatus for suppressing the noise of a fan-jet engine (3,673,803).
Filed Oct 6, 1969. Ser. No. 863,796. Int. Cl. F02k 1/26; U.S. Cl. 60-
226 R. 3 Claims.
PATENTS: NOISE DAMPING; JET ENGINES; assignor to Rohr Corp., Chula Vista, Calif.
3B METHODS
(See Also)

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<th>LB006</th>
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3.C MATERIALS
Four types of materials are available for dealing with noise and vibration control problems: sound absorption materials, sound barrier materials, vibration/shock isolation materials, and vibration damping materials. Two or more of these materials are often incorporated in a single commercial product to obtain the benefits of their combined effects. Properties of these materials and their performance when used singly and in combination are discussed. Transformer enclosures, engine test cells, appliance enclosures, railroad wheels, and pipes and values illustrate typical applications of noise/vibration/shock control materials.

A survey is made of the techniques and materials which can be utilized for the control of noise transmission and vibration induced failure in structures. Consideration is given to dynamic behavior of damping materials as a function of temperature and the effect of various damping treatments on the response and modal damping of a variety of structural elements exhibiting many different stiffness and geometrical characteristics. Examples are given of prior applications of damping to the solution of a variety of vibration and noise control problems, and of materials available for vibration control.

For satisfactory airborne sound insulation between dwellings, more insulation than the usual minimum requirement in Western Europe is necessary. This goal is attainable if thick external walls and floors are combined with lightweight internal walls. Improved insulation values of 6-9 dB were measured in apartments of a building system for social housing.
3C MATERIALS
(See Also)

1C001  3A025  3B025  3B029  3B031  3B033
3.D REGULATIONS AND STANDARDS
NP73-3D-001

712-10846/ Committee on Commerce (U. S. Senate).
NOISE CONTROL ACT OF 1971 AND AMENDMENTS.
PAGE 1
Washington GPO 1971 828 p ref: Hearings on S. 1019
and S. 1986 before Comm. on Com., 92d Cong., 2d Sess.,
28, 30 June and 28 July 1971
Appea: Subcom. on the Environment
The hearings concerning noise pollution and the Noise
Control Act are reported. The comments from the following
agencies are included: Department of Interior, Department of
State, Comptroller General, Department of Agriculture, Civil
Aeronautics Board, National Science Foundation, EPA, and
NCSA. Additional attacks, lawsuits, and statements concerning
effects of noise and sound rating of outdoor equipment are
included.

FDS.

NP73-3D-002

712-30559/ Committee on Public Works (U. S. Senate).
REPORT TO THE PRESIDENT AND CONGRESS ON NOISE
Washingt: GPO 1971 472 p ref: Presented by the
Administrator of EPA to Comm. on Public Works, 92d Cong., 2d
(S-Dc-92:03) Avail: SOG 51:75
The effects of noise on living things and property, noise
sources and their current environmental impact, and control
technology and estimates for the future are considered. The
following topics are discussed: auditory, sociological, psychological,
and psychological effects; effects of noise on wildlife; effects of
noise on roads; aircraft noise; community noise; transportation
systems, devices powered by internal combustion engines; noise from
industrial plants; construction equipment and operations; household
and building noise; transportation industry programs; noise reduction
for industrial plants; construction and appliance industry efforts;
and regulatory schemes for noise abatement: government, industry,
professional, and voluntary association programs; and assessment of noise
concern in other nations.

KPD.

NP73-3D-003

712:30566/ Environmental Protection Agency, Washington,
D.C.
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS
FROM REPORT TO THE PRESIDENT AND CONGRESS ON
NOISE
31 Dec. 1971 18 p ref
(N4C500:1) Avail: SOG 50:30
General observations, conclusions, and the future program
are briefly summarized from the study on noise sources, noise
pollution, and noise abatement. It is pointed out that noise
effects are difficult to define and evaluate and available information
on typical exposure is sparse. Noise control technology and possible
changes in the noise problem to the year 2000: methodologies for noise
measurement and evaluation, and economic implications of noise and noise
abatement are mentioned. Recommendations for achieving noise reduction over
the next 5 to 10 years are outlined.

NER.

NP73-3D-004

712-33984/ A prototype standard and index for environ-
MENTAL NOISE QUALITY
1971. Submitted for publication
(IPB-210121, MTF-258) Avail: NTIS HC 83:00 CSL 20A
A prototype technical standard for environmental noise is
proposed in terms enabling an index of noise quality to be
developed and calculated. The standard takes into account the

3D-001

SUMMARY: AREAS OF NOISE EXPOSURE TO LOUD NOISE AS WELL AS
PSYCHOLOGICAL DISTURBING ASPECTS OF TYPICAL COMMUNITY NOISE
WHICH ARE NOT LOW ENOUGH TO BE PHYSICALLY DANGEROUS. IN SOMECH.
EXPERIMENT is intended to portray environmental quality
rather than to reflect damage risk criteria. It is generally
reasonable with respect to work-related noise standards, such as
those specified by the Alach-Hepsey Act. The basic standard
specifies a distribution of noise intensities to which an individual
could be exposed in a 24-hour period. The distribution may be
approximated by the combination of three Gaussian distributions
plotted and tabled for individual and population exposure (30 and 3),
and (70 and 85) dBA.

Author (GRA)
3D-007

NP73-3D-007

3D-008

NP73-3D-008

3D-007
NP73-3D-009


NP73-3D-010

† 51655. MEYER, ALVIN F. (Off. Noise Abatement Control, Environ. Pro. Agency, Washington, D. C. 20446, USA.) The need for standards on noise. J ACOUST SOC AM 51 (3 Part I): 800-802. 1972.--The problem of noise is reviewed from the standpoint of environmental pollution. The regulation of noise by government at every level demands the setting up of standards which take into account not only scientific criteria but also economic, sociological and political considerations.
FOX, M. S. Occupational hearing loss—Recent guidelines and statutes of interest to the otolaryngologist. *Laryngoscope*, 82(7), 1972, 1226-1230.

Recent federal and state guidelines for permissible noise exposure levels have created renewed interest in the industrial noise problem. Reviews the provisions of the noise criteria, discusses the role of the otologist, and calls attention to areas of inconsistency and conflict in the medical legal evaluation of hearing loss claims.—*J. Abst.*
NP73-3D-012

(Town-planning and building regulation in areas surrounding airports, in relation to noise produced by planes. Medical-social aspects of the problem.)

Paccagnella B.,
Ann Sanita Pubblica 22:594-6, Nov-Dec '75 (Ita)

NP73-3D-013

Noise-exposure: the legal viewpoint.
Fredrikson HM,
Trans Am Acad Ophthalmol Otolaryngol 75:1272-82, Nov-Dec '75

NP73-3D-014

New industry anti-noise law requires hearing tests and sound controls.
Fredrikson HM,
Arch Surg 111:34-5, May '76

NP73-3D-015

Next federal cleanup target: aircraft noise and emissions.
Environ Sci & Tech 6:220-2, Mar '72

NP73-3D-016

Noise control and government regulation.
H. V. Smithe,
Jr. Foundry 100:53-5, F. '73


Urban noise and its general impact on the environment are discussed. Methods by which noise levels can be measured or calculated are presented, and the physiological and psychological effects of urban noise on man are considered. Major noise sources, including air and surface transportation systems, residential sources (apartments, playgrounds, and neighborhood pets), and commercial and manufacturing sites are discussed. Policy recommendations for the reduction of urban noise levels given include: adopt a quantitative noise standard for operations at Los Angeles International Airport, limiting noise levels to 90 PNdB (perceived noise level) or lower at the airport boundary; modify the westerly take-off pattern at the airport to effect its extension to the west, apply an 85 PNdB standard to all commercial helicopter operations; propose the passage of stricter quantitative noise standard and enforce current noise regulations governing motor vehicle operations; requiring the use of acoustical insulation in all residential buildings; and adopt quantitative noise standards governing all construction equipment operating in the city.


Several lectures and discussions from the meeting of the Institute for Noise Control in Internal Combustion Engines held in January 1972 are summarized. Topics reviewed include noise standards, source isolation, attenuation factors, measuring procedures, and methods for reducing noise levels of combustion, fans, mufflers, hydraulic systems, and other components.


The enforcement program was preceded by several years of studies, legislative proposals, and evaluations of procedures, before enforcement by instrumentation (sound level meters) was feasible. Because of the detailed preliminary planning, the law operated very well and produced significant results. Noise teams were trained and judges and district attorneys were consulted before initiating the program in different areas of the state. The 1st enforcement efforts resulted in a number of new vehicle models, both muscle cars and trucks, being recalled by manufacturers for refitting with quieter exhaust systems. Yearly reductions were made in levels in one or another part of the noise law based on compromises between desired levels of quieting and the numbers of vehicles that might have to be reworked if particular levels were enforced.

Coal mine noise standard enforcement under the provisions of the Federal Coal Mine Health and Safety Act. See Citation No. 73-1TE-00006. p. 141. [1972?]. Abs. only, from AA.


Various aspects of implementing the noise standard are discussed, including some of the salient data, conclusions, and recommendations. Noise control and abatement measures which the EPA will undertake to protect the health and welfare of the public are also included.

Legislation et réglementation sur le bruit, See Citation No. 73-1GD-00017. 6 pages. [1971?]. In French; no abs., no refs., from Text.

NOISE LEVELS: LEGISLATION: GOVERNMENT REGULATIONS: FRANCE: urban: transportation: industrial noise. Regulations and legislation on noise in France are surveyed. Special rules for the soundproofing of buildings and maximum noise levels for motor vehicles in different categories are specified. The vicinity of airports is divided into zones according to sound intensity. The maximum noise levels recommended for housing areas are presented as well as suggestions for new regulations of machines, engines, industrial noise, protection of workers, and insulation of buildings.
A survey of governmental agencies, studies and publications concerned with the environment of the Southern California coastal zone. Los Angeles, University of Southern California, Sea Grant Program. Publication No. 2-72. 150 pages. Jan. 1972.

No abs., illus., numerous refs., from Text.

Grant: NOAA 2-3527.


Agencies, activities, and studies are cataloged. The listings include state agencies and local governments in Los Angeles and Orange counties, as well as selected resource libraries for government publications located in the Los Angeles area. A bibliography of government reports on air resources, land use, solid waste management, noise abatement, and water pollution is included.

NP73-3D-024

73-ITG-00032
Mayo, Louis H. George Washington Univ., School of Law, Wash., DC


Abs. only, from AA.

Also in: Society of Automotive Engineers. New York. Section Papers No. 720627.

TRANSPORTATION NOISES: NOISE REDUCTION: GOVERNMENT REGULATIONS: abstract only.

The increasing public concern in recent years over the problem of environmental noise has resulted in the enactment of technology-based regulatory agencies and statutory measures to control technological applications. Most of the earlier controls, however, were reactive measures rather than positive efforts to assure development of a new technology in the public interest. This situation is beginning to change as new environmental codes are being implemented in various states and cities. A description is presented of how the noise factor has influenced the planning of transportation systems by various legislative and regulatory entities at the federal, regional, state, and local levels.

NP73-3D-025

73-ITG-00035
Cooper, A.S. California Highway Patrol


Abs. only, from AA.

Also in: Society of Automotive Engineers. New York. Section Papers No. 720655.


Reasonable and effective laws for the enforcement of motor vehicle noise were enacted and successfully applied in California. Specific laws to prohibit both sale and operation of noisy vehicles were necessary. Measurements by both instruments and human ear judgments are practical and necessary at this time. Noise limits would be gradually reduced commensurate with the needs of the public and the capability of the technology. Future controls on noise producing components, in addition to the complete vehicle, appear to be necessary to obtain desirable maximum levels. California has pioneered interim solutions to portions of this environmental problem and has developed the expertise along with the practical experience to achieve further advancements in solving the problems.

NP73-3D-026

73-ITG-00040

Abs. illus., refs. for various papers, from Text.


A comprehensive review and analysis of environmental issues in Los Angeles are presented. It is a framework through which governmental and private agencies and citizen groups can perceive interrelationships between various aspects of environmental problems. Specific policy recommendations needed for formulation of additional standards and legislation pertaining to environmental quality are provided, and guidelines for modification of city procedures so as to minimize the negative impact of city operations on the environment are given. Areas covered are air pollution, water quality, noise control, land resource conservation, solid waste disposal, and pesticides. Factors affecting the particular issue, dimensions of the problem locally, measures currently being taken to alleviate the problem, and policy recommendations are discussed for each area.

NP73-3D-027

73-1GT-00043

No abs., illus., no refs., SS.


The problems of noise, its damaging effects, and the need for noise pollution control are discussed. Governmental action related to noise control in Illinois is described, including the comprehensive Illinois Environmental Protection Act, new regulations proposed for adoption by the Pollution Control Board, the work of the Illinois Division of Noise Pollution Control, and the prosecution of noise violators.

NP73-3D-028

73-1GT-00097
Torrey, J.D. U.S. Dept. of Labor, Denver, CO

Some preliminary experience with the Occupational Safety and Health Act in the Rocky Mountain region. See Citation No. 73-ITG-00053 p. 194. [1972?].

Abs. only, from AA.


The Williams-Steiger Occupational Safety and Health Act was signed into law on Dec. 29, 1970. Most of its health provisions became effective on Aug. 27, 1971. The states in Region VIII have a normal complement of industries excluding the Maritime. Response to complaints and normal plant inspection work indicated exposures to common contaminants as well as noise and exotic materials. CO, free silica, nuisance dust, and welding fumes are some of the commonplace materials. Polyurethane foams, pesticides, and organic solvents represent some exotics. Citations were issued for alleged violations of the noise standards and occupational health and environmental control standards in both the construction industry and usual industrial production or service plant.

Abstract only, from AS.

Also in: Society of Automotive Engineers. New York. Section Papers No. 720646.

TRANSPORT SYSTEMS: EMISSION CONTROL: NOISE LEVELS: abstract only: Personal Rapid Transit systems.

Qualitative and quantitative data on the relationship of emerging Personal Rapid Transit systems and the environment are presented. Specific reference is made to comparison of these systems with the U.S. air pollutant inventory and with the automobile. Thermal pollution and reduction of power supply requirements for these transit systems are considered. Definitive specification information for interior/exterior noise levels in comparison with other transportation modes and with background conditions, are provided. Visual aesthetics of guideway, station, and vehicle design are presented as the most challenging remaining problem in the integration of Personal Rapid Transit systems into the society.


In English and German; no abs., no refs., ss.

NOISE REDUCTION: GREAT BRITAIN: Noise Abatement Society.

The Noise Abatement Society (Great Britain) was formed to eliminate excessive and unnecessary noise from all sources. Concerns and actions of this group are in the areas of present noise law, enforcement, new laws, educational programs, public health effects, machinery noise, aircraft noise, and traffic noise.

The conquest of noise in Finland.

See Citation No. 73-2TE-00049 pp. 32-33. 1972.

In English, Ger., Fr., sus., refs., from AS & SS.

NOISE REDUCTION: LEGISLATION: FINLAND.

Noise reduction legislation in Finland is briefly reviewed. The 1958 Finnish Law on Safety in Work considers occupational health and noise abatement in industry. In 1966, the Finnish Council for Air Conservation and Noise Abatement was appointed: the council is responsible for dealing with general problems concerning air pollution and noise abatement. Conservation of nature in 1970 created several committees for the planning of how to increase the efficiency of noise legislation.

Municipal corporations: Noise pollution.


No abs., no refs., from Text & SS.

NOISE CONTROL: LEGISLATION.

As a source of environmental pollution, noise is not presently
receiving as much attention as industrial waste or automobile exhaust, but it is a subject of growing concern. To indicate the nature and scope of this issue, the law as it now stands as related to the problem of noise is examined. Whether the law provides effective means of regulation and control is analyzed.

NP73-3D-036
72-STE-0153
Peterczewicz, S.A.
Univ. of Bath, School of Engineering. Eng
Criteria and standards.
See Citation No. 72-STE-0148. 14 pages. 1972.
No abs. 4 figs., no refs., from introd.
NOISE STANDARDS: INDUSTRIAL NOISE: INTERNATIONAL COOPERATION: GREAT BRITAIN.
Almost every major industrial country has issued standards relating to noise, noise measurement and criteria. A high degree of standardization and similarity between national standards was achieved by the International Organisation for Standardisation (ISO) where participating countries agreed on a common new standard and then based their national standards on ISO. British standards are either identical with ISO, or have some differences to suit particular conditions. Noise criteria are generally not standards (although the method of derivation is) and are usually either recommendations which cannot be legally enforced or Acts of Parliament which can be legally enforced. All British Noise Standards are considered; most commonly used criteria applicable to industrial noise are described fully.

NP73-3D-037
72-5GD-0538
Anon.
Sum. only, from Sum.
The Organization for Economic Cooperation and Development Council approved a report recommending measures to reduce and control urban traffic noise. The report will be published under the title "Urban Traffic Noise — Strategy for an Improved Environment."

NP73-3D-038
72-5GD-0540
Anon.
Sum. only, from Sum.
Also in: Sammelblatt: 677. 1971.
AIRPORTS: NOISE SOURCES: LEGISLATION: GERMANY: summary only.
A law to control aircraft noise came into force on March 31, 1971. It defines areas around civil and military airports outside which operators are limited to a low level of noise and it prohibits development of certain amenities (hospitals, schools, etc.) in the areas around airports.

NP73-3D-039
72-5GD-0541
Anon.
Environment.
Sum. only, from Sum.
GOVERNMENT PROGRAMS: POLLUTION CONTROL: SWITZERLAND:
summary only: environmental protection council.
The Bundesrat decided to set up a council for the protection of the environment to be approved by referendum. The council would deal in particular with water pollution and conservation, clean air and noise control; it would also control and coordinate research and work in the whole field of environmental matters.

NP73-3D-040
72-5GD-0542
Anon.
Noise control.
Sum. only, from Sum.
The Canton Luzern enacted a law to control noise levels for the protection of health. It will be enforced beginning July 1, 1971.

NP73-3D-041
72-5GD-0548
Anon.
Environment.
Sum. only, from Sum.
SST: LEGISLATION: AIRCRAFT: summary only: United States.
A bill that could lead to the banning of all supersonic airliners in the USA was introduced in the House of Representatives. It would make it unlawful to operate a supersonic aircraft unless the government agencies are satisfied that its operation would not have detrimental effects on people on the ground or on the environment.

NP73-3D-042
72-5GD-0547
Anon.
Noise.
Sum. only, from Sum.
NOISE CONTROL: LEGISLATION: SST: NEW YORK: summary only.
The State Senate approved an anti-pollution Act which includes control of noise, including aircraft noise. It could be used to prohibit the landing of supersonic aircraft.

NP73-3D-043
72-5GD-0551
Hildebrand, James L. Harvard Univ., School of Law. Cambridge, MA
Noise pollution: An introduction to the problem and an outline for future legal research.
Noise pollution: An Introduction to the Problem and an Outline for Future
AIRPORTS: SITING CRITERIA: NOISE CONTROL: LEGAL ACTIONS.

The siting of airports is discussed, with emphasis on problems created by land use and noise. Legal actions in New York and Okeechobee County, Florida, are discussed, and the liability of airlines regarding noise control is examined.

NP73-3D-048

72-5GD-0658
Lewicki, Carol Knapp
Environmental Science and Technology, Wash., DC


No abs. 2 figs., data tables. 1 ref. from Text.

AIRCRAFT: EMISSION CONTROL: NOISE REDUCTION: GOVERNMENT POLICIES: EPA.

Industry and government efforts to reduce aircraft and jet engine noise and emissions are discussed. Industry reduced jet noise by switching from "low bypass" to "high bypass" jet engines which move the air at a lower velocity through the jet exhaust, thereby creating less "whine." The Federal Aviation Association promulgated the 1969 Federal Air Regulation 38 which sets noise limits for commercial aircraft. The Environmental Protection Agency's standards and studies of aircraft emissions are discussed, and the industry's smog retrofit program for jet engines is described.

NP73-3D-049

72-5GD-0617
Anon.

In German; no abs., no refs., from Text, (225 col. in.).


Owners of homes located on new or rebuilt federal roads will be able to claim indemnity for soundproofing when the traffic noise reaches a certain level, according to a new law. Indemnity will be paid by the state when traffic noise causes equivalents exceeding 75dB, measured on the exterior walls of the houses during a representative period.

NP73-3D-050

72-6TE-0183
Mayo, Louis H.
Ware, Robert C.
(both) George Washington Univ., Program of Policy Studies in Science and Technology, Wash., DC


No abs. 20 refs., from Text.


The evolution of laws and regulatory structures to control environmental noise are discussed. Sources, regulatory efforts, and trends in the private sector, and at the local, state, and federal levels are investigated.

NP73-3D-051

72-6TE-0184
Cohn, Louis F.
Kentucky Dept. of Highways, Noise Abatement, Frankfort
The necessity of developing a federal traffic noise control law is examined. The results of noise level profile studies are discussed in terms of providing the technical basis for the drafting of a Kentucky traffic noise control law that would be applicable nationwide. Recommendations for vehicle noise limits are made and methods for the enforcement of standards are suggested.


The mandatory noise standards developed in response to the Coal Mine Health and Safety Act of 1969 specify maximum personnel noise level-time exposures for underground coal mines. The Act further specifies that personal protective devices shall not be used to meet the standards where the protective devices may otherwise impair the safety of a miner; this specifically refers to the use of earmuffs or plugs that planes. This decision reversed a lower court order that held the government liable in damages caused by Air Force jets.


A draft of planning guidelines for traffic noise, submitted in Jan. 1971, recommended that the effective indoor noise level in a dwelling unit should not exceed 35 db in the daytime and 25 db at night. The draft also recommended that traffic noise within playgrounds and recreational areas not exceed 55 db. Other recommendations are given for suitable limits in factories, offices, schools, and hospitals, together with outdoor recreational areas attached to those areas. The guidelines also account for the means available to highway engineering and physical planning to achieve the desired protection against noise, and they include a simple estimation model for prediction of noise levels, given a particular planning situation, which would appear when the plan layout is adopted. The effects of these norms as presented in the guidelines on urban and regional planning are evaluated.


NOISE CONTROL: SST: GOVERNMENT PROGRAMS: summary only: proposed legislation.

A federal anti-noise program which includes provisions to prohibit commercial supersonic flight over the U.S. and its territorial waters was proposed in the Senate.

NP73-3D-059

72-6GD-0783
Meyer, Michael B. Environmental Affairs, Inc., Brighton, MA
Air and noise pollution surrounding airports: East Haven v. Eastern Airlines, Inc.

No abs., 93 refs., from Text.

AIR POLLUTANTS: NOISE CONTROL: AIRPORTS: LEGAL ACTIONS:
East Haven v. Eastern Airlines, Inc.

Rights of property holders near airports to a quiet and clean environment have increasingly come into conflict with whatever rights the public has to relatively unrestricted air travel. In East Haven v. Eastern Airlines, Inc., the United States District Court for the District of Connecticut dealt with such a conflict, and ruled for the public’s right to relatively unrestricted air travel. The court’s decision is subject to three major criticisms. Most importantly, it does not recognize nuisance as a legal theory most applicable to complex controversies involving airports. In addition, it does not recognize trespass as an appropriate legal theory for dealing with invasions of property by either aircraft or physical agents. Finally, the court’s decision limits the class of property holders who may recover and allows only for money damages, an inadequate remedy in view of the continuing nature of the problem.

NP73-3D-060

72-6TG-0794
Anon.
Environmental health planning.

No abs., 1 fig., 1 table, numerous refs., from Introd. & SS.

GOVERNMENT PROGRAMS: URBAN REFUSE: PUBLIC HEALTH:

This manual is intended to guide state and local environmental health planners and managers in development of appropriate and effective programs through systematic planning, either for the development of new programs or the evaluation and upgrading of existing ones. Basic planning information is provided, as well as special considerations relating to planning state or local programs in each of the principal environmental health areas. The specific areas covered include air, water, solid wastes, radiation, noise, vectors, pesticides, the residential environment, institutions, injuries, occupational health, recreation, food, drugs, therapeutic devices, and cosmetics.
3D REGULATIONS AND STANDARDS
(See Also)

1A001  1D012  1D023  1E005  3A017  3A024  3B046
1B001  1D017  1D027  3A010  3A019  3A025  5A012
1C002  1D020  1D028  3A011  3A020  3A029  5C071
1D008  1D022
4. PHYSICAL EFFECTS OF NOISE
4.A GENERAL
NO CITATIONS THIS ISSUE
4.B STRUCTURAL
NP73-4B-002

TITLE: Structural Damage Claims Resulting from Acoustic Environments Developed During Static Test Firing of Rocket Engines

ABSTRACT: During static testing of the multi-million pound thrust rocket engines used to power the space shuttle, damage claims were filed by NASA and subcontractor contractors. The damage consisted of: (1) damage due to rocket engine vibrations and (2) damage to the test stands used to support the engines. A detailed analysis of the engine vibrations and test stand configurations was conducted using laboratory techniques. It was shown that the damage occurred because of the high amplitude vibrations. The damage was characterized by large, structural deformations. The damage was caused by the interaction of the engine vibrations with the test stand configurations. The damage was characterized by large, structural deformations.

NP73-4B-003

TITLE: Acoustic Environments and Rocket Engines

ABSTRACT: The acoustic environment created by rocket engines is a complex interaction of sound waves, engine vibrations, and test stand configurations. The study of this environment is important for the design and operation of rocket engines.

NP73-4B-004

TITLE: A Study of the Design of Rocket Engines

ABSTRACT: The design of rocket engines is a complex process that requires the integration of various engineering disciplines. The study of the design of rocket engines is important for the development of new rocket engines.

NP73-4B-005

TITLE: Rocket Engine Acoustics

ABSTRACT: The study of rocket engine acoustics is important for the design and operation of rocket engines.

Authors:

NP73-4B-002

M. R. A. Abell, J. H. C. Johnson, and R. W. G. S. Brown

NP73-4B-003

M. R. A. Abell

NP73-4B-004

M. R. A. Abell

NP73-4B-005

M. R. A. Abell

4B-001
An experiment determined the noise and vibration levels caused by pumps and motors in a building, and definite frequency band pass region existed for a concrete slab. The vibrations of the floor slab decayed rapidly to 10% of its amplitude at the source and only slightly thereafter at frequencies above 100 Hz, and the noise level in the room could be significantly affected by force input into the floor slab. The wall was not affected transversely by floor vibrations of the amplitude considered, and significant transmission losses would occur if the slab were not continuous at the wall and if the wall did not have substantial contact with the joints.

The wave motion from a single boom with an extra overpressure of 1 lb/ft² has a sharp rise at the beginning and a gradual fall away. The wave motion of a sonic boom of the magnitude tested over London recently differs in that it has a 2nd shock wave immediately following the 1st which creates the characteristic double boom. One of the difficulties with sonic booms is the peculiar shape of the double boom, inducing resonance, thereby considerably increasing the effective power of the boom. Adverse effects on building components such as plate glass, steel, masonry, or timber, are briefly considered. The most serious point and a real concern which has not yet been studied is that of the cumulative effect of prolonged vibration from sonic boom impulses which will occur if they become part of everyday life. Specifically, the effects of sonic booms on historical structures in Great Britain are considered in light of the economics involved in preserving the landmarks vs supersonic transport.
4B STRUCTURAL
(See Also)
3B011 3C002
4.C ENVIRONMENTAL
External acoustic environments, structural responses, noise reductions, and the acoustic environments have been predicted for a typical shroud/spacecraft system during lift-off and various critical stages of flight. Spacecraft responses caused by energy transmission from the shroud and mechanical and acoustic paths have been compared and the importance of the mechanical path has been evaluated. Theoretical predictions have been compared extensively with available laboratory and in-flight measurements. Equations for laboratory acoustic fields for simulation of shroud response during the various phases of flight have been derived and compared in detail. Techniques for varying the time-space correlations of laboratory acoustic fields have been examined, together with methods for varying the time and spatial distribution of acoustic amplitudes. Possible acoustic testing configurations for shroud/spacecraft systems have been suggested and trade-off considerations have been reviewed. The problem of simulating the acoustic environments versus simulating the structural responses has been considered and techniques for testing without the shroud installed have been discussed.

Author
PROPAGATION OF A WEAK SHOCK WAVE THROUGH A TURBULENT MEDIUM
Ralph E. Phinney, and Leonard S. Taylor. 31 May 72, 26p Report, NOLTR-72-110


The propagation of a weak nearly plane shock wave through a slightly inhomogeneous medium was studied. The equations for a finite strength shock wave are used as a starting point in order that the cumulative effect of second order terms will not be lost. The motivation for the study was the experimental observation that atmospheric turbulence can alternately focus and defocus weak waves from an aircraft. A more detailed understanding of the influence of atmospheric turbulence on this problem was sought. The basic equations are derived, and some preliminary results are obtained. (Author)

A major environmental effect of supersonic flight that sets it apart from other aircraft operations is the sonic boom. The wave pattern that travels with the aircraft—rather like the bow wave of a ship—sweeps over underlying areas and mimics the advancing shock wave of a mild explosion. Impelled by the prospect of civil supersonic transport (SST) aircraft, there has been a great volume of research on the sonic boom and its effects, particularly during the last decade. The state-of-the-art as of 1965 was summed up in the first Sonic Boom Symposium sponsored by the Acoustical Society of America, held in St. Louis. The state-of-the-art as of 1970 was largely summed up in the second Sonic Boom Symposium held in Houston five years later on 3 November 1970. The 1970 Symposium consisted again of a series of invited papers, for the most part of a survey nature. The authors were drawn from the international community of researchers on sonic boom and its effects. (Author)
ENVIRONMENTAL
(See Also)
1E035  2A001

100
5. SOCIAL EFFECTS OF NOISE
5.A GENERAL

102
NP73-5A-001

NOISE ABATEMENT AND CONTROL. VOLUME 1: CONSTRUCTION NOISE
Avail. SOO 50.75

The public hearings on construction noise are reported for Atlanta, Georgia. The statements of 33 witnesses are presented and include discussions on hearing loss, noise control in office buildings, noise in industrial plant construction, and noise control in construction equipment. F.O.S.

NP73-5A-002

NOISE: THE ULTIMATE INSULT
Avail. NTIS HC $3.00

The inhumanity of man’s noise in the cities is protested. The effects of noise on animals forced to listen to noise are briefly discussed. The traditional use of noise to ridicule, embarrass, denigrate, and curse is contrasted with silence being used for worship, respect, anticipation, and love. It is concluded that the cities have destroyed nature, and created a tumult of noise borne of their demands for every convenance, every novelty, and every protection from exposure. F.O.S.
Community reaction to airport noise and airport operations, NASA Contract Report CR-1761, July 1971, 97 p; Report describes a study of the relationships of large numbers of variables—physical, psychological, and social—with community reaction to the noise of aircraft around international airports in large United States cities. The seven major airports involved were Logan International-Boston, O'Hare International-Chicago, Dallas International-Dallas, Stapleton International-Denver, Los Angeles International-Los Angeles, Miami International-Miami, and Kennedy International-New York. 56966

Preferred noise criterion (PNC) curves and their application to rooms; L.L. BERANEK (Bolt Beranek and Newman Inc, Cambridge, Mass), W.E. BLAZIER, J.J. FIGWER; J Acoust Soc Am v 50 n 3 pt 1 Nov 1971 p 1223-8: A new set of noise criterion curves were developed to specify acceptable noise levels in rooms occupied by human beings for specifying noise-control design goals. The new criteria are a modification of those published by L.L. Beranek in 1957, specifying lower levels and new octave bands. Data are given for recent noise-control projects in office buildings and theater-concert halls, 13 refs.

A report of research having 3 interrelated objectives: (a) to evaluate the social basis for the existence of noise pollution; (b) to investigate methods of abating noise and the status of the noise abatement programs; and (c) to assess the subject of noise as an urban environmental health problem, noting consciously perceived as well as insidious effects. Surveyed, by questionnaire, 2 communities in Pennsylvania and the responses to the survey and noise measurements of the communities represent most of the data reported here. Describes his method for evaluating the health hazard of noise in a community and presents a model showing how noise can be managed. Includes a bibliography of over 500 items arranged in 6 major categories: noise, general; physical effects; psychosocial effects; law; noise abatement; and noise sources.—I. M. Ventry


On the basis of the literature and own investigations, emphasizes that noise (industrial, domestic) threatens health. Neurosensory elements of the organ of hearing proved to be affected by noise. Sudden noise acts negatively on the function of the cardiovascular system causing vascular contraction. Refers noise to an intermediate stress. A more severe form of atherosclerosis of the aorta developed in animals subjected to the action of noise than in control animals. Considers that the loudness of many sources of noise can be diminished by technical means and believes that measures for effective control of noise should be introduced. 16 ref.—J. Abst.
NP73-5A-007

NP73-5A-008

NP73-5A-009

NP73-5A-010

NP73-5A-011
The prevention, abatement, and control of noise are considered. A noise ordinance enacted by the city of Chicago and an information retrieval system being used by the U.S. Environmental Protection Agency are described. A digest of EPA hearings is provided, along with abstracts of research on noise emission and suppression; physiological, psychological, and sociological effects of noise; economic aspects of noise control; building acoustics; measurement methods; planning, design, and architectural siting; legislation, standards, and legal precedents; enforcement and educational techniques; and government programs.

Construction noise accompanying the rehabilitation of old and the development of new transportation modes is extremely destructive to the quality of life and the environment. With few exceptions, industry has failed to internalize the cost of muffled equipment and procedures, and the cost of this intense noise exposure is an 'external cost' borne by both the worker and the exposed public. Engine equipment manufacturers, contractors, and project sponsors resist design for quiet. Engineers have an ethical imperative to protect the noise receiver. Citizen demand for quieter construction is growing and a few manufacturers are voluntarily marketing quieter compressors and paving breakers. Government, on all levels, is beginning to raise the question of unlimited noise emissions. The Walsh Healey noise exposure limits are now applicable to construction operations. Industry should be given financial incentives and assistance to expedite the necessary change-over to design and operation for quiet.

The measurement of noise is discussed, along with its destructive effects on the human mind and body. Methods of combating noise pollution (including legal actions) are described.
5A GENERAL
(See Also)

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5.B BEHAVIORAL
NP73-5B-001

Radoslaw R. Oborski, Naval Submarine Medical Center, Groton, Conn. Problem Lab.

PSYCHOLOGICAL EFFECTS OF PROLONGED EXPOSURE TO SONAR SIGNALS AT AN ELEVATED INTENSITY. 2: THIRTY-FOUR DAYS EXPOSURE TO SIGNALS AT 00 DB (A) OVER 80 DB (A) LEVEL


The overall noise problem was associated with outdoor noise in a community as considered. Provision is a quantitative framework for understanding the nature of the outdoor noise environment and the reactions of people and community to噪声 exposure.

Author

NP73-5B-002

NP73-5B-003

NP73-5B-004
NP73-5B-006

28401. BREGMAN, HOWARD L. and RICHARD G. PEARSON. (N. C. State Univ., Raleigh, N. C., 27607, USA.) Development of a noise annoyance sensitivity scale. NASA [NATL. AERONAUT SPACE ADM] CONTRACT REP CR(194): 1-40. Illus. 1972.--Examining the problem of noise pollution from the psychological rather than the engineering view, a test of human sensitivity to noise was developed against the criterion of noise annoyance. Test development evolved from a previous study in which biographical, attitudinal, and personality data had been collected on a sample of 166 subjects drawn from the adult community of Raleigh North Carolina, USA. Analysis revealed that only a small subset of the data collected was predictive of noise annoyance. Item analysis yielded 74 predictive items that composed the preliminary noise sensitivity test. This was administered to a sample of 80 adults who later rated the annoyance value of 6 sounds (equated in terms of peak Sound Pressure Level) presented in a simulated home, living-room environment. A predictive model involving 20 test items weighting scheme was evaluated. --J. F. L

NP73-5B-007

† 5072. MOREIRA, NAOMI M. and M. E. BRYAN. (Audiol. Res. Unit, Dep. Electr. Eng., Univ., Salford, Salford M5 4WT, Engl., UK.) Noise annoyance susceptibility. /SOUND VIB 21(4): 449-462, Illus., 1972.--The variations of annoyance due to tape recorded noise were investigated in a group of 34 normal hearing subjects. There were significant differences between subjects in their rating of 3 different types of noise, 20 sec samples of which were played at levels varying from 55-95 dBA [noise rating vs. noise level]. Subjects were stable in their judgments of annoyance over a 2 mo. period. Those subjects most sensitive to noise showed greater initial annoyance but their annoyance grew less rapidly with increasing noise level than that of those least sensitive to the noise. The former tended to have a steeper loudness functions than the latter. While sensitivity to annoyance by noise (or noise annoyance susceptibility) does not appear to depend upon such personal factors as age, sex, education, job responsibility, nor such personality traits as determined by the EPI [Eysenck Personality Inventory] and the MMPI [Minnesota Multi-Phasic Personality Inventory], it is apparently quite strongly related to various measures of personality given by the Rorschach Projection Test. A tentative personality profile of a noise sensitive individual is proposed and some support for this is found from noise annoyance field studies and from individual loudness function data. In order to predict an individual's annoyance to a particular noise, it may be necessary to know not only the level of the noise but also his personality.

NP73-5B-008

57625. VOLKOV, A. M., I. L. KARAGODINA, A. I. TSYSAR', S. A. SOLDATKINA and V. V. SHISHKIN. (F. F. Erisman Mosc. Res. Inst. Hyg., Moscow, USSR.) Otsenka naseleniem shuma zhelezodorozhno'gO transporta (po dannym oprosa i slovesno-assotiativenogo eksperimenta.) Evaluating railway traffic noise by questionnaire information and verbal association experiment with populations. GIG SANIT 37(2): 29-32, 1972. [Engl. summ.]--The paper deals with data on high noise levels created by railway traffic on territories surrounding its tracks. The noise causes great inconvenience to the population, 87% of whom presented mass complaints. The nuisance effect produced by the noise on the CNS manifested itself in the prolongation of the latent period in the reply reaction time during a verbal-association experiment. --J. F. L
NP73-5B-009


Examines the motives of those people joining associations aimed at the control and reduction of aircraft noise. Pressure groups have increased in their sophistication and now seem able to exert powerful influence upon the authorities.—*J. Abst.*

NP73-5B-010

NP73-5B-011

72-STE-0143
Anderson, C.M.B.
Robinson, D.W.
The effect of interruption rate on the annoyance of an intermittent noise.
Teddington, Eng. National Physical Laboratory Acoustics Report No. 53,
Sum. 8 figs., 2 tables, 24 refs., from AS.
NOISE LEVELS: PSYCHOLOGICAL FACTORS: ENGLAND
psychophysiological noise annoyance models: intermittent noise.
An experiment designed to test a prediction made from the Noise Pollution Level (LNP) formulation is described. During each test session of 30 min, subjects were exposed to 15 min of road drill noise at 87 dB(A), the experimental variables being the number and duration of the noise bursts. The results were broadly consistent with the formula when compared with experiments using steady noise, but secondary effects are found which depend on the intermittancy rate. The results are used to illustrate a psychophysiological model of noise annoyance, and are also discussed in relation to the noise fluctuation term in the LNP formula. Of the personality indices taken, extraversion was the only measure to show significant effects.

NP73-5B-012

72-STE-0156
LeVere, T.E. (both) North Carolina State Univ., Dept. of Psychology, Raleigh
Bartus, Raymond T.
Hart, F.E. North Carolina State Univ., Dept. of Mechanical and Aerospace Engineering, Raleigh
Electroencephalographic and behavioral effects of nocturnally occurring jet aircraft sounds.
Abs., 5 figs., 2 tables, 11 refs., from AA.
Grant: NASA NGL 34-002-095.
JET NOISE: AIRCRAFT: NOISE EFFECTS: PHYSIOLOGY: human:
Electroencephalogram: behavior: sleep.
Data relative to the objective evaluation of the effects of a specific complex auditory stimulus presented during sleep are presented. The auditory stimulus was a jet aircraft flyover of approximately 20-sec duration and a peak intensity level of approximately 80 dB (A). The physiological effects (changes in electroencephalographic, EEG, activity) produced by the jet aircraft stimuli outlasted the physical presence of the auditory stimuli by a considerable degree. Both behavioral and EEG changes were noted during waking performances subsequent to nights disturbed by the jet aircraft flyovers which were not apparent during performances subsequent to undisturbed nights. Even limited exposure to nocturnal stimuli which do not necessarily produce behavioral awakening can nonetheless produce significant changes in an individual's pattern of sleeping and waking EEG and overt waking performance.

NP73-5B-013

72-STE-0172
Desai, D.D. Bhartiya Vidyapeeth Sardar Patel College of Engineering, Bombay, India
Environmental pollution due to noise.
See Citation No. 72-STE-0170 p 26 [1972?].
Abs. only, from AA.
NOISE LEVELS: ACOUSTICS: NOISE CONTROL: abstract only.
The anatomy of the human ear and the behavior of man and animals in an exceedingly noisy environment is discussed. The effect of distance on sound levels and sound-intensity level phenomena is considered in studying the noise problem acoustically. Several protective and preventive measures for industrial workers and people associated with noisy machinery are suggested. It is recommended that the noise problem be studied psychologically as well as statistically.
BEHAVIORAL
(See Also)

1A002  1D005  1E034  3D004  5A003
1D004  1D007  3D002  3D017  5A012  5C077
5.C HEALTH AND PERFORMANCE
EFFECTS OF LOW INTENSITY NOISE ON HUMAN EQUILIBRIUM


(AF Prog. 7231)

(AD-737828, AMRL-TR-67-411) Avail: NTIS CSCL 009/19

Author: (GRA)

THE EFFECTS OF HIGH INTENSITY NOISE ON HUMAN EQUILIBRIUM


(AF Prog. 7231)

(AD-737828, AMRL-TR-67-411) Avail: NTIS CSCL 009/19

Five experiments were conducted on the effects of broadband, high intensity noise on human equilibrium. The ability of subject to balance on narrow rails was measured during exposure to the noise and immediately after termination of the noise. Four different noise conditions were used in each experiment: control, 120, 130, and 140 dB (re 0.0002 dyne/cm²), in the first experiment subjects were earplugs and earplugs; in the second, only earplugs were worn; and in the third experiment, subjects were earplugs and one earplug to produce an asymmetrical exposure. At an ambient level of 160 dB, a detrimental effect was obtained in all three experiments. At lower intensities of noise, there were performance decrements only for the asymmetrical exposure. In the remaining two experiments, conducted after termination of the noise, detrimental effects were obtained for asymmetrical auditory exposure but not for equal auditory exposure. The results of these experiments are interpreted as a possible quantitative demonstration of the direct effect of high intensity noise on the vestibular system.

Author: (GRA)

THE EFFECTS OF OIL OUTLET NOISE ON HUMAN PERFORMANCE OF A MANUAL TASK: VIBRATIONS AND TEMPERATURE. W. Thomas Robert P. Loomis, May 1971 37 p. rolls Sponsored by the Navy

(AD-728432) Avail: NTIS CSCL 009/10

The effects of two environmental factors, noise and temperature, upon human performance of a simple, two-handed, external consistency task were examined. The experimental design was a 2 × 2 factorial, using twelve subjects. The data obtained were analyzed as a two-factor, repeated measures was analyzed using a two-factor, repeated measures analysis of variance. Results indicated that temperature had a significant effect on performance, while noise and the temperature × noise interaction did not.

Author: (GRA)


(AD-728432) Avail: NTIS CSCL 009/10

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Author: (GRA)
NP73-5C-007


Measurement of the closed-loop compensatory tracking performance of the human operator in terms of the environmental stress of a 95-db white noise, using the critical tracking task of Jex et al. (1966). Following a description of the equipment and subject methodology, the results obtained are shown to indicate that the zero-order Jex task performance measures of total time and critical divergence frequency are sensitive to noise stress, whereas the switching times is not. These results suggest that control and human factors engineering researchers in environmental stress must be extremely careful in their selection of performance measures. M.E.

NP73-5C-008


To determine whether high intensity broadband noise has an adverse effect on human performance when special conditions related to type of task, length of testing, and intensity of noise exposure are met. 3 groups of 20 subjects each were tested on a serial search task. The first group was presented continuous broadband noise, the second received intermittent noise, and the third served as a control group. Performance was measured for 38 min continuously on a practice day and 4 test days. Both noise groups produced approximately the same results. Both groups found significantly fewer numbers on the task than the control group on the last two days of testing. The results support the contention that when certain conditions of testing are met, a reliable effect of noise on performance can be demonstrated. (Author)

NP73-5C-009

NP73-5C-010

AB-72-23
Environmental Acoustics Center
EVALUATION OF HEARING LEVELS OF RESIDENTS LIVING NEAR A MAJOR AIRPORT.
Final rep.,
Tech Rep AMD-72-72.
Contract DOT-FH-71-106.

Descriptors: (Aircraft noise, Aircraft), (Acoustic, Acoustics), (Threshold, Threshold level), (Exposure, Environmental exposure). Identification: Noise pollution, Los Angeles International Airport.

Noise and other data related to aircraft noise and noise exposure were obtained from residents living near two major airports in the greater Los Angeles area. Acoustic measurements were made at a distance of 26.8 miles from the busiest Los Angeles International Airport. Noise levels were measured at a distance of 26.8 miles from the busiest Los Angeles International Airport. Noise levels were measured at a distance of 26.8 miles from the busiest Los Angeles International Airport. Noise levels were measured at a distance of 26.8 miles from the busiest Los Angeles International Airport.

NP73-5C-011

AB-72-23
Environmental Acoustics Center
EVALUATION OF HEARING LEVELS OF RESIDENTS LIVING NEAR A MAJOR AIRPORT.
Final rep.,
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382. BARRY, J. P. & THOMAS, I. B. A clinical study to evaluate rock music, symphonic music and noise as sources of acoustic trauma. J. Audio Eng. Soc., 20(4), 1972, 271-274. Undertook to evaluate, under carefully controlled clinical conditions, the relative damage potential of rock music, symphonic music, and band-limited white noise. Exposed 10 normal hearing Ss to each program source for 60 min. at an average SPL of 95 dB binaurally through electrostatic headphones. After each exposure, obtained a TTS, by Békésy audiometry at each of 10 frequencies. An octave-band analysis demonstrated that both the rock and symphonic music had very similar frequency spectra, being within ±4 dB from 125 Hz-8000 Hz and having maxima at 500 Hz. The TTS,s for both rock and symphonic music were nearly identical with maximum TTS,s from 2000-5000 Hz and averaging 8-10 dB. The white noise, being richer in high frequencies, produced average TTS,s of 11-17 dB for the same test frequency range.—J. Abst.

385. NIEMEYER, W. Gibt es eine Habituation des Innenohres? (Is there habituation of the inner ear?) H. N. O., 20(7), 1972, 198-202. Explains habituation of the auditory system to strong, permanent noise. Measured the stapedius reflex in 105 persons suffering from noise-induced hearing-loss with frequencies from 0.5-4 KHz, and compared it with the threshold of discomfort. It appeared that only the latter in noise workers was raised (transfer of the habituation to permanent noise immission to the test stimuli of the loudness tolerance test). Correspondingly, the difference level stapedius reflex threshold vs. threshold of discomfort was raised from normally 10-20 dB to 30-50 dB; at least 2 yr. after the end of the noise exposure, the difference level was found normal again or even decreased by recovery of the threshold of discomfort. The stapedius reflex threshold remained in the normal level range, even in the frequency band of greater hearing losses. Hence, the hair cell responds to great sound intensities with an unchanged metabolic expenditure. Only the central rating of strong noise is habituated; the peripheral receptor remains in unchanged susceptibility to acoustic overload. There is no habituation of the inner ear; the inhibitory efferents are not able to provide an effective protection against metabolic exhaustion—and consecutive degeneration—by the nonbiological noxae of industrial noise. 18 ref.—J. Abst., ed.

386. PELI, S. An evaluation of a hearing conservation program. Amer. Industr. Hyg. Assoc. J., 33(2), 1972, 60-70. A long-term study of noise and hearing loss in the Du Pont Co. was started in 1966 to evaluate the Company's hearing conservation program. The study population consisted of about 30,000 men and women, of whom about 7000 worked in areas of high noise levels. Presents a preliminary, cross-sectional analysis of the data, with a longitudinal study to be forthcoming later. Loss of hearing acuity with age, at each test frequency, occurred at about the same rate in 2 levels of noise exposure and in quiet areas. Age-adjusted median thresholds were slightly greater among exposed workers at 3000, 4000, and 6000 Hz. Although some of the differences were statistically significant, primarily because of the large sample size, the magnitude of the differences was considered too small to be biologically important. Furthermore, the differences could be explained by factors other than noise. Tentatively concluded that the protection afforded by the Company's hearing conservation program was effectively preventing hearing loss among noise-exposed workers.—J. Abst.

4465. Theckray, Richard J. (FAA, Civil Aeronautical Inst., Oklahoma City, Okla.) Sonic boom exposure effects II: Startle responses. Journal of Sound & Vibration. 1972. Vol. 20, 519-526.—Reactions of both humans and animals to impulsive acoustic stimuli, including sonic booms, may involve startle reflexes or orienting responses. The former usually tends to disrupt performance; the latter may actually facilitate it. The lack of consistent findings in the literature regarding the effects of sonic booms on performance may reflect a general failure to differentiate between these 2 basically different types of reaction. Thus, objective criteria for distinguishing startle from orienting reactions and methods for measurement are suggested. Relevant stimulus parameters of impulsive stimuli and other factors which may modify the evoked reaction are discussed. Suggestions are offered for needed research. (35 ref.)—W. E. Collins.

5411. Young, I. M. & Habert, F. (Jefferson Medical Coll., Philadelphia, Pa.) Noise effects on speech discrimination score. Journal of Auditory Research, 1970(Apr). Vol. 10(2), 127-131.—Studied effects of ipsilateral and contralateral presentation of masking noise on speech discrimination (DS) scores of 7 normal-hearing Ss, 65 Ss with unilateral total hearing loss and normal hearing in the opposite ear, and 15 Ss with bilateral symmetrical hearing loss. Speech and noise were combined and presented monaurally. The normal and the bilateral-loss group yield similar results: a DS greater than 70% when the signal/noise (S/N) ratio is +5 db. and higher, and less than 50% when the S/N ratio is +5 db. and lower. Ss with unilateral total hearing loss require a S/N ratio about 10 db. higher to approximate the DS obtained by normals.—P. N. Herman.
psychosomatic diseases.--M. F.

The acoustic reflex in response to these 2 types of sounds. Low-frequency bands of noise because of the differential effects of amounts of TTS. Low-frequency pure tones produce more TTS than more errors were obscured by noise as a function of greater.

The observation of pure tones increased in the range of 3000-6000 cycles/sec; in some cases they also spread to median frequencies. Two types of curves were singled out: steep and sloping. The effects of loud noise on the efficiency of human work led to an examination of differences between individuals in the extent to which efficiency is affected. Noise is regarded as producing a narrowing of attention towards work components of high priority, an effect seen as providing a basis for understanding previous contradictory interpretations in this area. Exaggerated people seem more susceptible to this narrowing of attention, while the performance of introverts is more stable. Related research on individual differences in performance and preference for noisy environments is also discussed.

The temporary threshold shifts produced by pure tones and by noise in the absence of an acoustic reflex. J. Accoust. Soc. Am. 50(1/Part 2): 1355-1360. July, 1971. Subject(s) (6) with an acoustic reflex and 6 subjects without an acoustic reflex were exposed on asymptomatic occasions to a 710 Hz pure tone and to a 1/8-octave band noise with an upper cutoff frequency of 710 Hz. Both exposures were 10 min at 110 db sound-pressure level (SPL). Temporary threshold shift (TTS) was measured at 1600 Hz. For the subjects with an acoustic reflex, the pure-tone exposure produced 10 db more TTS than the noise exposure. For the subjects without an acoustic reflex, the pure-tone exposure and the noise exposure produced the same amount of TTS. Low-frequency pure tones produce more TTS than low-frequency bands of noise because of the differential effects of the acoustic reflex in responding to these 2 types of sounds.

Effect of loud noise on the efficiency of human work. J. Sound Vib. 20(3): 299-304. June, 1972. --Research concerning the effects of loud noise on the efficiency of human work led to an examination of differences between individuals in the extent to which efficiency is affected. Noise is regarded as producing a narrowing of attention towards work components of high priority, an effect seen as providing a basis for understanding previous contradictory interpretations in this area. Exaggerated people seem more susceptible to this narrowing of attention, while the performance of introverts is more stable. Related research on individual differences in performance and preference for noisy environments is also discussed.

Effect of noise on articulation scoring. A methodeological study. J. Commun. Disord. 4(9): 199-207. July, 1971. --A video-tape of children's responses to an articulation test of 1250-sound words was played once in the ambient quiet of a television studio, and once while electronically mixed with noise at levels of 60 db. The responses were scored. Differences in scoring between the play and replay showed: errors heard in both quiet and noise decreased, and more errors were obscured by noise as a function of greater noise levels. Responses, scored as errors in noise but not scored as errors in quiet, were maximized when the broadband noise was between 60 and 85 db. The noise affected the listeners' judgments of the apparent detectiveness of the articulations they heard in complex and confusing ways. Control of noise in experimental studies of articulation and in articulation testing is needed.
NP73-5C-028

The influence of the rise time on the loudness of sound pulses perceived by humans and the meaning of the sound spectrum were examined. A "paired comparison" method was used. The sound pulses had a duration of 0.7-1.0 sec and the rise time was varied between 0.03 and 1.0 sec. For most of the measurements, a signal level of 95 db re 2 x 10^-5 m²/sec was used. The signals with the fastest onset showed the highest loudness. The influence of the rise time on the loudness was significantly dependent on the signal spectrum. The possibility of explaining the observed effects on the basis of changed synchronism of the neural activity and on the basis of a rapid adaptation in the nervous system is discussed.

NP73-5C-029

H. L. ABBOTT, SHARON M. (Dep. Psychol., Univ., Toronto, Toronto 181, Ont., Can.) Duration discrimination of noise and tone bursts. J. Acoust. Soc. Am. 51(4 Part 2): 1219-1223. 1972.--The human observer's ability to discriminate a difference in duration for noise bursts and gated sinusoids was investigated. Two observers compared 2 durations (T and T + ΔT) in a 2-alternative forced-choice procedure. The value of ΔT ranged from 0.16-600 msec. For each T the value of ΔT for 75% discrimination was determined. For most of the range investigated, ΔT was proportional to T 1/2. Performance was not affected by a change in bandwidth from 3500-200 Hz. Values of ΔT for 75% correct did decrease when the observers were given audible special cues from very short pulses sinusoids. The theory best describing the results was a neural counter model.

NP73-5C-030

S. L. SHEPELIN, O. P. (Vladivostok Med. Inst., Vladivostok, USSR.) Kompleksnyj ostechnika usloviy truda i sostoronya zdorovya rabotnich audorobchikh audorobchikh pryazhishchnosti. [Complex evaluation of working conditions and the health of workers in the ship-repairing industry.] GIG SANT 36(8): 114-116. 1971[Recd. 1972].--The effect of industrial factors on 1789 workers, 165 of whom had regular contact with hand power tools was studied. Functional changes in the nervous and cardiovascular systems, acoustical, vestibular, visual, cutaneous and motor analyzers and morphology of the blood were considered. Intensive noise associated with local vibrations was the greatest unfavorable effect. Functional disorders were related to specific jobs. Hypertension, tachycardia, increased excitability of centers of parasympathetic and sympathetic innervation, increased thresholds of hearing and decreased muscle strength were observed in different groups.--N. L.

NP73-5C-031


NP73-5C-032

J. A. L. GOERING, A. (Calif. Hear. Speech Cent., 1500 Inwood Rd., San Ramon, Calif., 94583, USA.) Medical aspects of noise control. TAPF (Tech. Assoc. Pulp & Paper Ind.) 58(8): 863-874. Illus. 1973.--Noise produces a significant hearing loss for speech when the exposure is above 90 db (A-weighted) is continued over several years. Ear protection will prevent that loss but noise control at the source is the eventual solution. The nonauditory health effects of noise exposure are never established. Major claims of general health effects are made but no supporting evidence exists. In spite of the need for more research, enough is known to institute hearing conservation programs in industry.

NP73-5C-033

N. L. KOZLOV, Y. N. and N. P. KISELEV. (Sarat. Res. Inst. Rural Hyg., Saratov, USSR.) Opyt elektroentenburgchanskago obolanija traktoristov v protsesse poleznoj raboty. [Electroencephalographic investigation of tractor operators during field work.] Gig. SANT 36(6): 106-107. Illus. 1971.--EEG data are given for 16 tractor operators working in the field under conditions of intense noise, vibrations and other factors which have a considerable effect on the functional state of the CNS.--M. D. S.

NP73-5C-034


NP73-5C-035

J. F. THOMAS, THOMAS D. (Nat. Sci. Inst., Univ. Calif., Santa Cruz, Calif., 95060, USA.) The effects of continuous, high intensity, while noise on the human sleep cycle. PSYCHOLOGICAL (Baltimore) 9(2): 227-232. Illus. 1972. --Eight male college students slept for 8 consecutive nights under conditions of noise (-92 + 2) db while noise (N) and under normal quiet conditions (Q). On N nights the percentage of total sleep time spent in REM [rapid eye movement] stage was decreased (p < .001), the percentages of stages 1 and 2 were increased (p < .05, p < .001, respectively) and REM latency was increased (p < .02) compared to Q nights prior to N nights. On Q nights following N nights the percentages of stage REM increased above baseline levels indicating compensatory recovery effects from REM sleep deprivation on the prior N nights. Stages 3 and 4 remained unchanged throughout the study. The reduction in stage REM on N nights was directly attributed to the effects of noise on the CNS and not a secondary result of an increased number of awakenings on N nights.

NP73-5C-036

In the presence of noise provides support for routine clinical measurement of discrimination in noise for these individuals. Individual performance in noise could not be predicted with a high degree of certainty from discrimination scores measured in quiet.--E. S.

NP73-5C-038

69254. WAHI, P. N. (Indian Counc. Med. Res., New Delhi, Delhi, India.) Noise pollution and health. INDIAN J MED RES 59(7): 1148-1153. 1971.--Many possible sources of noise pollution are reviewed. Possible fetal and infant damage of humans and rodents, hearing impairments, and the relationship between coronary ailments and mental disorders and noise are stressed.--S. G. B.

69262. TARASENKO, N. Yu., A. A. KASPAROV, E. M. SMIRNOVA and B. V. ANAN'EV. (I. M. Sechenov Ist Med. Inst., Moscow, USSR.) O kombinirovannom deistvii faktorov vneshnei sredy na proizvodstve i ikh normirovani. [Joint action of environmental factors in industry and their standardization.] GIG SANIT 36(7): 27-32. Illus. 1971. [Engl. summ.]--In the chemical industry, the action of toxic substances prevails on a background of other occupational noxious factors (noise, high air temperature). Hygienic investigations carried out in boric acid production proved that noise intensity was at a permissible level, but the functional state of hearing in workers presented a number of unfavorable shifts. The 80th curve, accepted as a standard of permissible noise level, is quite unfit for a number of chemical productions. In winter time, the air temperature of work shops did not exceed 27-29°, but signs of thermoregulatory stress were observed in the workers. The standardization of the microclimate in the chemical industry should be regulated on the basis that workers experience a joint action of factors.--J. L. S.

NP73-5C-041

69584. SHAPIRO, MARK T., WILLIAM MELNICK (Ohio State Univ., Columbus, Ohio, 43210, USA.), and VICTOR VERMEULEN. Effects of modulated noise on speech intelligibility of people with sensorineural hearing loss. ANN OTOL RHINOL LARYNGOL 81(3): 241-248. Illus. 1972.--Twenty-four adult male subjects, 12 with normal hearing and 12 with sensorineural hearing loss, were tested to compare their speech discrimination in quiet and in a noise background. The wide-band noise used was either continuous or modulated and was presented at various signal-to-noise ratios. The speech test material was monosyllabic words. Subjects with sensorineural loss showed markedly poorer discrimination under all experimental noise conditions. Performance improved as the signal-to-noise ratio increased and as the modulation rate decreased. The poor discrimination of subjects with sensorineural hearing loss...


Environmental noise is growing--is it damaging our hearing? Lipscomb DM. Clin Pediatr (Ohio) 11:374-5, Jul 72


Temporary threshold shift in hearing from exposure to different noise spectra at equal dlt level. A. Cohen and others. biblio Acoustical Soc Am J 51:503-7 pt 2 F '72


Effects of noise, tranquilizer and increased delay time of tracking performance and heart rate. Strasser H. Pfluegers Arch 332:Suppl 332:RE2, 1972
Effects of varying levels of interruption on temporary threshold shift. See Citation No. 73-1TE-00006 pp. 139-140. [1972?].
Abs. only, from AA.
Intermittency is a noise exposure variable which must be considered in proposing standard limits. A noise interruption is a period in the noise exposure when the level falls below 80 dbA for more than 5 min or for 20% of the duration of the preceding noise burst. Interruption levels below 80 dbA may have variable effects on resultant temporary threshold shifts. Thirty subjects were exposed to noise bursts wherein the only variable was the level of noise during interruption. The resultant temporary threshold shifts from these exposures are discussed.

Survey of chain saw operators: Nature of intermittent problems involved in establishing such programs, and to determine the nature of intermittent operations interruption intervals can range from 5 sec to about 5 min, with a reciprocal relationship between the frequency of interruption and the duration of each period of exposure. A survey was conducted of the population of men and women, of whom about 7,000 workers employed in the manufacture and operation of chain saws, by the National Institute for Occupational Safety and Health. The survey included both the plant and the field operations of these establishments.

Survey of hearing conservation programs in industry. See Citation No. 73-1TE-00006 p. 140. [1972?].
Abs. only, from AA.
NOISE LEVELS: OCCUPATIONAL HEALTH: HEARING: NOISE STANDARDS: abstract only; temporary threshold shifts.
Intermittent noise exposure is an occupational hazard that is difficult to identify and monitor. Depending on the nature of the operations, interruption intervals can range from a fraction of a second to an hour or more, while the number of these interruptions might vary from one to thousands. Since hearing can recover to some degree when a noise exposure is interrupted, resultant shifts in hearing thresholds can be variably affected. A survey was conducted of U.S. Forest Service workers employed as chain-saw operators. Types of intermittent exposures, resultant temporary threshold shifts and subsequent recovery rate, and hazard risk related to proposed standards associated with intermittent noise exposures were studied.

Survey of hearing conservation programs in industry. See Citation No. 73-1TE-00006 p. 140. [1972?].
Abs. only, from AA.
Excessive noise at the workplace poses risk of hearing loss to workers. The occupational noise exposure standard in effect under the Occupational Safety and Health Act directs industry to develop programs for the purpose of conserving workers' hearing. Because there are no generally accepted standards for such programs, the National Institute for Occupational Safety and Health conducted a survey to find out about occupational hearing conservation programs and to assess the extent and nature of their variability to learn of the range of problems involved in establishing such programs, and to determine apparent measures of effectiveness. Forty-three hundred questionnaires were sent out; as of Dec. 1, 1971, responses were received from 62% of the mining companies, 56% of the manufacturing companies, 55% of the transportation companies, and 40% of the construction companies.

An evaluation of a hearing conservation program—a five-year longitudinal study. See Citation No. 73-1TE-00006 p. 141. [1972?].
Abs. only, from AA.
HEARING: INDUSTRIAL PROGRAMS: OCCUPATIONAL HEALTH: NOISE STANDARDS: abstract only; hearing conservation.
A long-term study of noise and hearing loss was undertaken by the National Institute for Occupational Safety and Health to evaluate the company's hearing conservation program. About 30,000 men and women, of whom about 7,000 work in areas where the noise levels are above the company's hearing conservation criteria, were studied. Findings of changes in hearing threshold levels over a 5-y period are presented. Changes among nonexposed workers are compared with those among workers in 2 levels of noise exposure.

Relation of hearing impairment to noise exposure and age. See Citation No. 73-1TE-00006 p. 141. [1972?].
Abs. only, from AA.
HEARING: MATHmatical analysis: abstract only; hearing impairment: age: noise exposure.
A mathematical analysis relating prevalence of impaired hearing to age and noise exposure is based on the assumptions that the probability of developing impaired hearing at any age is proportional to the fraction of the population of that age which has already developed impaired hearing. The probability of impairment is also proportional to the fraction of the population remaining unimpaired and, therefore, is available for impairment. The solution of the differential equation resulting from these assumptions reveals a complex relationship of age and noise exposure to impairment. The effect of age and noise are not simply additive as is often assumed.

The effects of noise pollution are surveyed, considering the resulting physiological and psychological effects. Permanent fatigue without relaxation or recuperation can lead to irreversible injuries. Noise must not be considered an inevitable nuisance. A solution to the problems requires education and regulations to reduce noise levels where its production is inevitable and the exposed areas, such as homes, sufficient quiet where recuperation is possible.

All Austrian hearing troubles caused by noise and measured audiometrically are classified in 4 groups according to their course and extent. It clearly appears that the risks of hearing troubles are...

Walker, J. G.

Southampton Univ., Inst. of Sound & Vibration Research, Eng.

Noise control.

See Citation No. 72-STE-0148. 26 pages. 1972.

No abs. 5 figs., 4 refs. from Text & SS.

NOISE CONTROL: AIRCRAFT: AUTOMOBILES: INDUSTRIAL NOISE.

The biological effects of noise can best be considered by classifying them into five categories: physical, psychological, physiological, pathological, and performance. Effects of noise on the ear and hearing, practical effects of noise-induced hearing loss, and a hearing conservation program are discussed.

NP73-5C-078


Grether, W. F.

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Harris, C. S.

Ohlbaum, M.

Sampson, P. A.

Guignard, J. C.

Wright State Univ., Dayton, OH.

Abs., 4 figs., 4 tables, 4 refs., from AA.


NOISE MEASUREMENTS: VIBRATIONS: PHYSIOLOGY: stress effects.

As a follow-up to an earlier study of combined heat, noise and vibration stress, the same levels of heat (120°F), noise (105 dB) and vibration (5 Hz, 0.30 peak g) were studied but with some modifications. Physiological measures included skin and rectal temperature, heart rate, weight loss and biochemical urine analyses. Performance measures included two-dimensional compensatory tracking, choice reaction time, a voice communication test of logical alternatives, mental arithmetic, visual acuity and subjective ratings of the stress conditions. As in the previous study the combination of stresses produced no additive stress interactions. On tracking and reaction time tests the greatest impairment of performance was produced by vibration alone. Transmissibility of vibration was not altered by heat or noise. Subjective ratings of stress severity progressively increased with the number of stresses in the combination. Subjective ratings of stress intrusiveness, however, did not show such a trend.

NP73-5C-079

Combined effects of noise and vibration on mental performance as a function of time of day.


Harris, C. Stanley

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Guignard, Robert

Wright State Univ., Dayton, OH.

Abstract. 4 figs., 3 refs., from AA.


To determine combined effects of noise and vibration on mental performance as a function of time of day, 10 subjects were randomly exposed to each of the following conditions: stress (5 Hz vibration-0.25 g; 110 dB noise) at 6:00 a.m.; no stress (no vibration-0 dB noise) at 6:00 a.m.; stress at 3:00 p.m.; and no stress at 3:00 p.m. Subjects' performance on a mental arithmetic task was measured during each of these exposures on consecutive days. Significant interaction between time of day and stress was due to both a slight improvement in performance in no stress condition at 3:00 p.m., and a slight decrement in performance at 3:00 p.m. in the stress condition. Results suggest that phase of the circadian cycle may be a variable to be considered in studies on the effects of stress on human performance.
### HEALTH AND PERFORMANCE
(See Also)

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