NOISE POLLUTION

N73-33618

NOISE POLLUTION

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Jan. - 31 Mar. 1973 (New Mexico Univ.)
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JANUARY 1 THROUGH MARCH 31, 1973

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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
Belgian environmental research index.

National Center for Scientific and Technical Documentation, Brussels, Belg.

Research index only, SS.

AIR POLLUTION : WATER QUALITY : NOISE CONTROL : SOLID WASTES PEDESTICIDES : BELGIUM : research index.

Research by Belgian investigators on water, air and noise pollution, solid waste and pesticides is documented. Legislation and treatment are also included.

NP73-IA-002

† 69253. CARLESTAM, COSTA. (Linsegatan 81, Stockholm 0, Swed.)


The radiation of sound from a single source, an airplane for example, will disturb more and more people in the technology-created environment and because of the biological exasperation of human bodies this leads to so-called annoyance reaction. This mental process determines exposure to disturbing noise (significant more noise (sound level)). In the article those problems are discussed in connection with how urban and regional physical planning can eliminate the negative effects of aircraft noise for the 115,000 residents around Arlanda airport in the Greater Stockholm area.

NP73-IA-003

AB-791 000

Environmental Health Lab, Edichville AFB Calif.
TECHNICAL REPORT BIBLIOGRAPHY.


Descriptors: (Air pollution, Air Force research), (Water pollution, Air Force research), (Industrial medicine, Air Force research), (Radiation hazards, Air Force research), Chemical analysis, Microbiology, Loners, Epidemiology, California.

Identifiers: Electromagnetic radiation hazards, Noise pollution, McCherry Air Force Base.

A bibliography of all nonscientific 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 each topic of environmental topics such as air, water, noise, and radiation pollution.

NP73-IA-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 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.
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1.B INDUSTRIAL
Typical industrial plants located in urban, suburban, and rural communities were surveyed and their noise sources were identified. The plants were: glass manufacturing, oil refining, power generating, automobile assembly, and car manufacturing. The noise of communities adjacent to these plants was recorded for five-minute sampling periods during two days and nights of normal operation and during weekends. Only the outbuildings and glass manufacturing plants are principal sources of community noise. Environment noise from surface transportation on superhighways and traffic near the plants affect the community. The control of industrial plant noise on the work and the community environment, and attitudes toward noise legislation are discussed. Noise control programs for industrial plants are described, and the noise abatement technology is discussed.

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

This paper describes the interaction between the viscous wake of a transonic blade row in an axial-flow turbomachinery. It is shown that wake-wake 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 speed in a one-stage axial-flow compressor.

NP73-1B-005

2003. MARSHALL, R. (Imp. Chem. Ind. Ltd., Syret & Sons, Blooms- 
by, Nene, Eng., UK.) and N. J. STCZHE. A simple method of reduc-

--Sound pressure level in a typical air-borne task and 
the underground of 2 human volunteers before and after wearing the air-
borne were measured. A simple method of reducing the noise to 
the new- 
design level was sought and tested.--J. E. F.

NP73-1B-006

1972. GONCHARENKO, V. P. Analiz chama nemnogoemov, pri-
menyayushchich v stekol'noi promyshlennosti, puti 
uchina razrushay. [Analysis of the noise produced by compressors used in glass 
industry and 

--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 pro-
cure 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 100-120 
dB at summary level of $L_{sum}$ = 112.5 dB. At 250 mm distance from the 
chamber the noise reached its maximum at the same frequencies, with 
a level of 100-104 dB at $L_{sum}$ = 107.3 dB, but at 2000 mm distance from 
chamber of the air suction chamber the level was 63-97 dB at $L_{sum}$ = 
101.5 db. Spectral components of compressor noise were at a wide 
distance of high and low frequency, and measured the reducible value 
in all 4 types of compressors. Reduction of noise was accomplished by 
applying a plastic muffler, a combined damper of noise reduction, and 
especially by reconstruction of valves.--M. D. S.

NP73-1B-007

[Characteristics of noise in mechanical wood 
processing shops at cellulose-paper plants] 
Marinove NY. Gig Sanit. 25:116-7. Oct 71 (Rus)
NP73-1B-008

72-6TE-00889
Ven Stenbrogren, G.
Institut of Applied Physics THO, Dandish, West

Compressor: Ommen (internal combustion engines).
See citation No. 72-6TE-0049, pp. 158-166, 1971. In English, Eng., Fr., Ger., sums., illus., refs. (Some in Du.), from AS & Text.


The Netherlands' gas compressor station, Ommen, has operated for ¾ yr with 4 compressor units of 15,000 hp each, driven by gas turbines. The station is situated in a rural environment which made it necessary to fix the permissible noise levels of the rather low noise rating value of 30 outside the nearby houses. Noise production of the main gas turbines is studied and the silencing measures are made from the necessary excess attenuation. Particulars about the composition and dimensions of the silencing equipment are given. Graphs with measuring results from some noise sources are shown.

NP73-1B-009

72-6TE-0181
Krats, Gert
Wuppertal, Ger.

Druckluft, Larm und Umweltsschutz.


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-0100
Arvidsson, Ola
Berglund, Kanne
Berlin, Math
Wahlstroem, Sten
Aberg, Sven

(Both) Statens Institut for Folkhalsan, Stockholm, Sweden
Lunds Universitet, Institutionen foer Hygien, Sweden
(Both) Kungliga Tekniska Hoegskolan, Institutionen foer Bygnadsakustik, Stockholm, Sweden

Byggbuller som samhallsproblem, Del 2.
Stockholm: Statens Institut for Byggforsokrig, Byggforskningens Rapport No. R21, 231 pages, 1971. 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-0168
Lamonica, Joseph A.
USBM, Pittsburgh Technical Support Center, PA

Noise levels in cleaning plants.

No abs., 5 figs., 5 tables, no refs., from introd. & text.

NP73-1B-008

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 sources were identified. The manner in which sound energy is distributed over the audible range of frequencies was described.

NP73-1B-012

72-6TH-0097


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1. C HOME, OFFICE AND NON-INDUSTRIAL
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 n 6 pt 1 Nov 1971 p 1935-6; Communications to the Editor make a plea for uniform sound ratings 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

Determinations of the noise level in pharmacies: Leifeld 12.
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NP73-1D-001

1D-001

Aircraft Operations at Miramar Naval Air Station, California and Land Use Interpretations

Dec 1971 81 p. refs

(Avail. NTIS 05/CR 30/1)

The purpose of the report is to define the noise environment due to military aircraft operations in the vicinity of Miramar Naval Air Station. The noise environment is depicted by means of several noise contours which are interpreted in terms of suggested impacts on land usage. The major purpose of the study is to provide interpretations of the aircraft noise so as to aid in the compatible development of land surrounding Miramar Naval Air Station.

Author

NP73-1D-002

1D-001

Airport Noise and Land Use Analysis


(Avail. NTIS HC 94/50)

Two separate but related activities which were undertaken to provide a tool for the evaluation of changes in aircraft noise around airports are presented. The two activities involved, first, the development of extensive and detailed data on land use around the three major air carrier airports in the case unaccompanied by the Regional Airport Systems Study, and secondly, the creation of a computer-based system for manipulating the data so that it can be conveniently used for the study of alternative airport development plans. As inputs, the analyses used the noise contours computed for the Regional Airport Systems Study and detailed land use data prepared by the Regional Airport Systems Study. The computer program for merging the land-use data and the noise contours is described.

Author
NP73-1D-003


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

V.2.

NP73-1D-004


The procedures and results of a recent special survey assessing the problem of combined aircraft and traffic noise are presented. Correlations with various noise exposure units are examined. The results indicate some influence of background noise on both 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. M.V.E.

NP73-1D-005


Summary of the main features and results of the second noise and social survey conducted around Heathrow airport in 1967 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. M.V.E.

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 a change in 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 90 db(A) for 8 hr/day for community noise events per day. Ideally, this noise level should fall within the aircraft boundary or on nonresidential land. (Author)

NP73-1D-007

A73-41169 Problems and solutions of achieving community noise acceptance of VOTOL. W. Z. Szpiewakowski (Boeing Co., Vertical Div., Philadelphia, Pa.) and F. M. Schoon (U.S. Army, Air Mobility Laboratory, Wright-Patt. Air Force Base, Ohio). International Council of
A noise survey was conducted to determine whether background noise levels exist within: constructed areas, or on military vehicles. A check was also made on the level of noise of public transportation vehicles, subways, buses, tax, and private transportation. Background noise levels were found to exist in all the areas examined and in employed. The military design vehicles also showed some indications of extreme noise. The public transportation modes were generally free from any extreme noise conditions. (Author)

The paper identifies the major causes, concentrated efforts of background noise and noise traffic on noise; air pollution; visual intrusion; physical interference; and annoyance. The author is described for measuring these values and their price. The paper discusses costs by government and legislation and gives a brief indication of the concentrated consequences of two-passenger transportation systems of the future. (Author)

The volume provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to represent a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM). There can be used to simulate a wide variety of problems and technical data. The model provides a description of the operation of the Community/Library/Economic Development Model (CDSM).
Highway noise. A design guide for highway engineering. C. G. Coll-Don (Bolt Beranek and Newman, Los Angeles, Calif.), W. J. Gallo- way, B.A. Kugler, D.L. Nelson; Highway Res. Bd, Nat Consp High- way Res. Program Rep 117, 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 describes the sources of information and technical approaches used in determining the noise level adjustments for finite element length, sound level, traffic, elevating or depressing the roadway, gradients and different road surface conditions, and the presence of intervening buildings or foliage between the source and the noise source. Several approaches to the selection of criteria for traffic noise. 53 refs.

**NP73-1D-017**

**73-1TE-00009**

Priede, T. 
Southampton Univ., Dept. of Automobila Engineering, Eng.

Diesel engine noise control in the 1970's.


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


Diesel engines are noisier than gasoline engines, 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.

**NP73-1D-018**

**73-1TE-00007**

Tyler, D.A. 
Gulf Oil Corp., Houston, TX

Noise and the truck driver.

See Citation No. 73-1TE-00006 p. 127. [1972].

Abs. only, from AA.


Truck drivers may be exposed to high noise levels while driving. 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).

**NP73-1D-019**

**73-1TE-00022**

Chang, H.C. 
(both) Northwestern Univ., Evanston, IL

Hermann, F.R.

Acoustical (sic) study of a rapid transit system.

See Citation No. 73-1TE-00006 p. 172. [1972].

Abs. only, from AA.


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 overall 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 develop 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.

**NP73-1D-020**

**73-1TE-00029**

Hinton, Lloyd 
Metropolitan Aircraft Sound Abatement Council Aircraft noise as a continuing national problem.


Abs. only, from AA.

Also in: Society of Automotive Engineers. New York. Section Papers No. 720622.

AIRCRAFT : NOISE REDUCTION : URBAN PLANNING : abstract only.

The history of the aircraft noise problem is presented using many references to particularly important studies. Emphasis is placed upon the similarity of expert opinions during 20 yr of research for measures needed to resolve the problem. The views of noise-impacted airport community residents who cannot comprehend the lack of progress in aircraft noise abatement are represented. This lack of progress has persisted in spite of general agreement on measures needed, and is the basis of a call for the reallocation of authority among federal agencies having responsibility both for the regulation of aviation and for the planning and development of urban areas, including airports, with environmental protection as basic criterion.

**NP73-1D-021**

**73-1TE-00033**

Waters, P.E. 
(both) Univ. of Southampton, Highfield, Eng.

Priede, T.

Origins of diesel truck noise and its control.


Abs. only, from AA.

Also in: Society of Automotive Engineers. New York. Section Papers No. 720636.


The fundamental origins of truck noise are discussed and the rate at which the noise of each individual source increases with speed is shown. Various means of controlling noise from each component are considered. A method of predicting engine noise, and hence vehicle noise, from basic engine speed and piston diameter data is given and the significance of this information to the engine designer is emphasized.

**NP73-1D-022**

**73-2TE-00043**

Price, A.J. 
Univ. of British Columbia, School of Architecture, Vancouver, Can.

Community noise survey of greater Vancouver.


Abs. only, 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.


An English: no obs. 17 fgs., 2 tables, data tables. appendix: 68 refs. (2 in Fr., 5 in Gar., 5 in Scur.), from Text & SS.

NOISE SOURCES: NOISE CONTROL: INDIA: effects: urban areas: abstract only.

An analysis of the sources, effects and control methods of urban noise in India is presented.
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NP73-1E-001


Perry M. Davis, J. W. Kitchin, and D. W. A. Rayleigh

This report contains three sections. The first two sections are contained in Volume 1. It contains an introduction which describes the noise exposure model MOD-5 from the perspective of analyzing an airport in order to develop a program input model, and a user's manual which describes the process of developing the input model for the noise exposure model.

Author (GRA)

NP73-1E-002

NP73-1E-002

THE NOISE EXPOSURE MODEL MOD-5. VOLUME I

The first two sections are contained in Volume 1. It contains an introduction which describes the noise exposure model MOD-5 from the perspective of analyzing an airport in order to develop a program input model, and a user's manual which describes the process of developing the input model for the noise exposure model.

Author (GRA)

NP73-1E-003

NP73-1E-003

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 positions. Data was acquired with the flaps 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

Experimental studies of sound propagation from a source situated above the roof level in an urban environment have indicated the amplification and shielding effects of buildings. These experiments have been supplemented by diagnostic tests with a spot source which indicate the paths of propagation and their contribution to the received sound. A criterion for reverberation in a city street due to an aircraft is developed in terms of image sound. Charts indicating the amplification or shielding of noise from low flying aircraft are presented. (Author)

NP73-1E-005

Aeronautical acoustics involves noise in aircraft interiors, stresses in the structures, external noise near aircraft, especially in inhabited areas around airports and, with the advent of the supersonic aircraft, the problem of the 'sonic boom'. The characteristics of aerodynamic noise are discussed, as well as modifications of the equation of propagation in a turbulent fluid, and its solution. First applications of the equation to various aircraft are studied. Attention is given toantino legislation and regulation, recent studies, and future prospects.

F.R.L.

NP73-1E-006

Experimental study of the effects of primary and secondary discharge rates on the pumping performance and noise generation of a supersonic air ejector. The noise spectra obtained from the tests appear to be in fair agreement with the results found by other investigators.

M.V.E.

NP73-1E-007

NP73-1E-008

NP73-1E-009

A noise source broadened in local and extended is generated for low-thrust-airfoil engines, such as the Rolls-Royce Spey, and for high-thrust-airfoil engines, such as the Rolls-Royce RB.21. It is seen that the shock from low to high thrust engines has resulted in a marked noise reduction by substitution of aircraft nose cones and broadband noise (characteristics of fan, compressor, and turbine) for the low-frequency noise of the jet. The generation mechanisms of jet, compressor, fan, and turbofan are analyzed. A study of jet mixing noise reveals a noise source, termed tailpipe noise, which is an internal source amenable to reduction both by design and with acoustic lining. It is shown that internal cleanliness quality can be a significant factor for the single-voice fan exhaust intake guide vanes. Turbine noise investigation also requires careful examination to reveal the source.

V.P.

NP73-1E-010

Air travel is made to assess the effects of noise, smoke, and odors produced by aircraft on the environment. Attention is given to effects such as noise, odors, and other air pollutants which are being taken into account. The problem of noise is related to the effects of noise on health and environment. The engineering and administrative measures which are being taken into account are discussed. It is suggested that these effects may be reduced by the introduction of quieter aircraft, the use of noise barriers, and the development of quieter engines.

F.R.L.

NP73-1E-011

NP73-1E-012

It has been demonstrated during flight tests that the Olympic engine cycle, eight years after it was designed, is perfectly suited to supersonic operation. Engineering improvements such as intake casing assembly, annular combustion chamber, modern means of soundness monitoring, etc., were introduced to maintain the engine in the lead of advanced technology while satisfying pollution requirements. Noise reduction is being subjected to ongoing research, with continuous improvements being introduced. The area of research has been extended to transonic flight operation. Increased payload is ensured by the new type of secondary nozzle, which also contributes to noise abatement. Further engine developments are being considered. (Author)
An investigation of aerofoil blown flap impingement noise was conducted using a full-scale turbofan engine and aircraft wing. The noise produced with a daisy nozzle installed on the engine exhaust system was greater than that produced by a conical nozzle at the same thrust. The daisy nozzle caused the jet velocity to decay about 15% before the first nozzle. At this point, the nozzle increased the noise by about 5%, and increased the noise further. Compared with the conical nozzle, the daisy nozzle produced slightly less noise at a noise level of 60 dB but produced more noise at the lower noise frequencies.

(Author)

Detailed study of the transmission of acoustic disturbances from the interior of an isolated jet through the mean velocity profile and into the far field. The noise generator is to be a source of transient acoustic point sources traveling with the local fluid in the isolated jet. The isolated jet is two-dimensional, and contains to infinity upstream and downstream velocity profile and acoustic disturbance streamwise position. For the limited set of examples considered it is shown that the velocity profile has a large effect on the magnitude of the noise radiated to the far field. Much of the noise from are due to the jet, especially at low Strouhal numbers, originates near the source but is often transmitted into a plane wave propagating through the mean velocity profile.声波 scattering in a far field mean-source pressure approaches the downstream axis as frequency increases.

(Author)

The simple pressure source model of the sound radiated by a conical jet is investigated experimentally and theoretically. From the simple source model, the ratio of the frequency spectrum of the radiated sound power and the jet pressure is derived for a given model of the jet pressure, and the sound pressure is determined by the source function. This source function was applied to a conical source model with respect to noise suppression. The results indicate that the simple pressure source model is a useful tool for predicting the noise suppression potential of conical sources.

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(Author)
NP73-1E-022


Noise effects are mainly connected with the thermal radiation, the acoustic emissions, and the exhaust gas production of the engine. The effects of thermal radiation have no harmful characteristics. 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 phenomena which produce the environmental effects are examined. Quantitative prediction 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.

G.R.

NP73-1E-023


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 signals. The procedure is illustrated with statistical data collected by measurements near the approaches and on the runways of the Warsaw-Okecie airport.

T.D.

NP73-1E-024

A study of propeller noise including the effects of boundary layer control. G. J. Kunitz (Lockheed-California Co., Environmental Sciences Laboratory, Burbank, Calif.). Acoustical Society of America, Spring Meeting, 82nd, Buffalo, N.Y., Apr. 18-21, 1972, Paper. 37 p. 9 refs.

An experimental investigation has been conducted on the noise generated by a two-bladed, four-foot diameter propeller capable of boundary layer removal. The propeller has a spinner comprising 70% of the total propeller radius. A porous cowl on each surface of the symmetrical section allowed removal of the boundary layer. Water flow measurements were made in an enclosed chamber of finite height, containing four He speeds 1800, 914.2 and 335.5 ft/sec and four blade angles (0, 9, 6, and 10 deg) both without and with boundary layer control. Agreement with theory was good within 2%.
The report summarizes the results obtained at General Electric during the first phase of the Air Force Superpower Extensive 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 associated 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 generated noise through the range of velocities and temperatures typical of present and future military and commercial supersonic aircraft propulsion systems. A comprehensive aerodynamic analytical model describing the flow mechanism in supersonic jets is presented and compared with experimental data. A large number of theoretical models describing supersonic flowfield jet noise are evaluated. (Author)

NP73-1E-027

AD-432-230
ECOC-182009
Environmental Health Lab Edition AFB Cold
Homes Exposure at Aircraft Maintenance Positions.
Final Rept.

The report is about the exposure to noise from aircraft maintenance positions. The study was conducted at Edwards AFB, California, to investigate the noise environment of aircraft maintenance personnel exposed to the F-111A, F-106, and F-100 A/C during maintenance and repair operations. The report describes the conditions and analysis of the noise exposure in these environments. (Author)

NP73-1E-028

AD-432-230
ECOC-182009
Environmental Health Lab Edition AFB Cold
Homes Environments on Control
Final Rept.
Robert A. Capell. Apr 72. 25p (Ref no. EML-72-251).

The report describes the noise exposure in homes and control environments. The study was conducted at the Air Force Base, California, to investigate the noise environment of homes and control positions. The report provides information on the noise levels and control measures implemented. (Author)

The comprehensive environments can be made by using certain operations of the noise from aircraft. An evaluation of the noise measurements provided by each tower is also made. (Author)

NP73-1E-029

AD-432-230
ECOC-182009
Arnold Engineering Development Center, Arnold
Air Force Base, Dayton, Ohio.
PERFORATED WALL HOMES IN THE ABDC-FT-16. FT. AND 4. ST. TRANSONIC TUNNEL.
Final Rept.
O. P. Credle. Oct 71. 72p (Ref no. AFB-TR-71-216).

The report presents the results of recent studies of noise in wind tunnels. Noise levels in the free stream and at the test section walls were measured in two tunnels as a function of Mach number, Reynolds number, wall angle, and wall porosity. The noise levels in the free stream were also evaluated with solid (unstitted) test section walls. Test results revealed that the perforated test section walls generate discrete frequency, high energy noise. A critical Mach number range was noted. (Author)
Inertial noise transmitted by an airplane fuselage subjected to turbulent boundary layer excitation and evaluation of noise reduction techniques (presented at 1971 AIAA Meeting). W. V. BHAT (Boeing Co., Seattle, Washington), J. F. NILBY; J Sound Vib v 18 n 1 Oct 22 1971 p 614-66; The noise levels transmitted by an airplane fuselage structure excited by a turbulent boundary layer pressure field have been measured at two flight Mach numbers. For a single fuselage panel the transmitted power is approximately 90 and 70 dB relative to $10^{-6}$ v at Mach 0.5 and 0.85 respectively. Damping rings and rubber wedge brake-plates, applied to the structure, reduce the acoustic radiation and they are more effective at Mach 0.85 than at Mach 0.5. The flight test data are in poor agreement with available wind tunnel measurements, indicating the need for improvements in scaling laws.

Community noise levels of the DC-10 aircraft; A.J. SMITH; Anglo-Am Aeronaut Conf, 12th, July 7-9 1972, The Aeronaut and Aerospace Inst, 1972, Proc a 73/6, 7 p; Note: local data for the DC-10 are presented and community noise levels of the aircraft are discussed. 4 pages.

Turbine trends for short haul; L.G. DAVISON (Dux-Megamotor, Ltd., Dorby, England), T.D. SELLS; ASME Pop 75-07-00 for acoustic data 30th-31st 1972, 11 p; After a general indication of the noise problem the relation between conventional and STOL option is briefly reviewed and their requirements to regard the power plant are discussed. Some of the associated interest of engine noise are considered including variable pitch fans, aeroelastic response, health, environment, noise and safety. 8 pages.

Hovercraft noise and vibration. J. E. LOVESEY, E. J. (Eng. Phys. Dep., R. Aircraft Establ., Farnborough, Eng., U.K.) Hovercraft noise and vibration. J SOUND VIB 20/2: 241-245. Illus. 1972. Hovercraft are a relatively new and unique form of transport, capable of traversing terrain which previously would have been impassable 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.

That sonic boom.


Sum., illus., no refs., from Text & SS.

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.
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2. NOISE DETECTION AND MEASUREMENT
2.A GENERAL

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)
ACOUSTIC MEASUREMENTS: BIOINDICATORS: social, psychological, economic indicators: noise damage.

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.

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.

2B INSTRUMENTS
(See Also)

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

NP73-12972 # Techniques for determining the noise levels in the vicinity of the central Berlin-Schönefeld airport, and related problems of noise level and noise forecasts for different aircraft types as a function of altitude, for noise levels across airport boundary lines, and for the effects of microclimatic and topographical features on noise propagation in the airport area. 

NP73-2C-002

AIP-19625 # Microwave cross-section of flying and stationary objects in the theoretical consideration of the problem of scattering objects by the ground and the object being observed. The results obtained are demonstrated for the case of a satellite in orbit around the earth, for various positions in the orbit, and for different altitudes. 

NP73-2C-005


NP73-2C-006


NP73-2C-007


NP73-2C-008


NP73-2C-009

AIP-19630 # A test of the detection system for measuring EXOL, G. Benson (U.S. Department of Transportation, Office of Noise Abatement, Washington, D.C. Journal of Sound and...
This paper is concerned with the problem of computing the noise duration correction in the effective duration time zero to zero, a condition that results when the peak pressure level approaches a noise floor. The present method for computing the duration correction leads to extremely large negative values as the effective duration time approaches zero. A modification is suggested to avoid this anomaly.

NP73-2C-010

Experimental atmospheric absorption values from aircraft flyover noise signals; D.S. BISHOP (Bell Aerospace and Honeywell, Inc., Van Nuys, Calif.), M. SIMPSON, D.C. WIDEMAN, NASA Contract Rep CR-1761 June 1971, 73 p.; A detailed analysis of the noise recorded on the ground during a series of 28 aircraft flyover by two aircraft (a four-engine turboprop transport and a four-engine jet aircraft) 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 acquired from the field data. Differences in one-third octave band noise levels recorded at different ground positions for the same angle of radiation from the aircraft were utilized to obtain sets of absorption values, 7 refs.

NP73-2C-011

A personal dosimeter was developed to monitor an individual's exposure to noise. The dosimeter is only 13 in. square and is carried in an individual's pocket. The batteries provide for 2-mo 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 semiconductor electronics to permit the wearer to hear low-level signals while excluding the muff but protect him from levels in excess of 80 dBa is also described.


Existing literature on different methods of computing 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. The new method is also presented for assessing the effect of traffic sources. The new method is directly compared with the other older methods of calculation.
### 2C TECHNIQUES
(See Also)

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2.D FACILITIES
Magnitudes estimated by each of 31 observers were obtained for a variety of scale elements under three modes of stimulus presentation: two-dimensional presentation in an actual aircraft cockpit, two-dimensional presentation in a normal airplane cockpit, and three-dimensional presentation. Comparability of ratings obtained in these environments was evaluated with regard to variability of ratings from physical magnitude, variability of ratings, and the scale values obtained in various scale methods. Aircraft environment was found to have both effects upon physical magnitude estimates and ratings of perceived magnitudes were less affected by the actual environment in which they were obtained. The need for further study of perceived differences between judged magnitude of complex scale elements and the methods of magnitude estimation and paired comparisons is indicated by the finding that in some cases the estimated, though indicated otherwise, apparently judged the magnitude rather than the absolute magnitude of complex-scale elements.
FACILITIES
(See Also)

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

N92-123456/7 N.R. Research Inst., Chicago, Ill.
STUDY OF NOISE IN AIR ROUTE TRAFFIC CENTER
UNIT, RAYMOND ROBERTS STATION, AND HOPWOOD
AIRPORT, WEST VIRGINIA AND REMOTE FACILITIES
20 June 1971 - 10 May 1972
(Revised DOT-PAF-73-A-1)
L-3603; FAA-NO-72-10-4 Amend. 1178 NS 03.03
Various methods of reducing noise in several FAA air traffic
control and navigational facilities that central the environmental
impact noise scenario can be described. Noise control practices for
each facility under consideration are discussed as well as the
methods for reducing specific noise reduction examples. Author

NP73-3A-002

N92-234567/8 National Aeronautics and Space Administration.
Lewis Research Center, Cleveland, Ohio
THE FINISH QUALITY ECONOMIC
Carl E. Cokker (1973) 10 pp. Prepared by N973/55-5312
P2, Washington, D. C. 0-0 Oct. 1973; sponsored by Div. of
Aeronautical Engineering
NASA-TD-3-09121: 0-7600 Amends: 1177 NS 03.08 03.52
22A

Efforts to develop an engine noise reduction technology
adequate for use on inlets and exhaust stacks. The following
methods were developed: (1) High bypass ratio engine, (2) Large
noise-absorbing material in stack, (3) Exhaust noise by exhaust.
(4) Speed degrading known as eddy-current damper, and (5) An
optimum ratio from valve to intake blower. Tests results show that
if these features are applied to higher overall, the associated
reduction in overall noise levels will be excessive. NASA

NP73-3A-003

N972-301234/5 Environmental Protection Agency, Washington,
D.C. Office of Health Abatement and Control.
PROGRAMS OF PROFESSIONAL/INDUSTRIAL
ORGANIZATIONS. UNIVERSITIES AND COLLEGES
(Revised DOT-509 CO.75)
Information, concerning to noise programs being sponsored
or carried out, either directly or indirectly, by professional,
industrial, and voluntary associations (classified in the above).
Information is also given on private industry research and
educational and research programs. A bibliography of selected
publications referring to noise is included. -- Further
NP73-3A-004

APLA 9364 1 A comparison of noise suppression
by no exhaust nozzles, D. 0. Neve and G. D. Newton (Dunton
Co., England). Aeronautical Engineering Symposium on Air

Summary of the evaluation of an exhaust nozzle with regard to
the reduction of jet noise using the noise measurement of
commercial aircraft. The paper presents data obtained from
experiments with regard to the use of these nozzles, andTable
in combination with C/D and C/P results will be presented. Com-
bined operation of noise suppression and three noise are used, and it is
shown that these data support the capability of an SST with the
community. The conventional designs of a nozzle system is reduced
in the light of current and predicted noise regulation. Recent test
operation is reviewed and an estimate is made of the apparent jet
noise floor which can be economically assessed. The jet noise
problem for future SSTL or short-haul aircraft is discussed and the
operating data of operation at noise level in the low-velocity, 250 x
EEO fahig range is indicated. The combination of jet noise due to
flow impingement on an EOS could possibly be reduced. (Author)

NP73-3A-005

APLA 9367 1 The modified Lluch fan - Preparation for quiet
SSTL. E. D. G. Carter (Rooney, Ltd., Chorlton, England). Aeronau-
tical Engineering Symposium on Air
Breaking Engines, T., Marzullo, France, June 18-20, 1970, Paper
50, p. 9.

Review of design and development work on the concept of
variable pitch fan for preparation for a quiet SSTL aerospace aircraft. The
model of the fan is a gear of engine and is a demonstration of the
feasibility of a fully variable pitch fan driven by an engine with a tilt-rotor!
engine and the fulfillment of ascent and descent design criteria to use the
advantages of variable pitch. Sp metical content is given to the development
and comparison tests on different blade designs testing the engine pitch
range. A compressor fan rig with the blade pitch tested at rotor
between 20% and 70% pitch range and an Aerofoil model device is used to
the tests. The advantages of this SSTL propulsion design concept are
indicated. V. L.

NP73-3A-006

APLA 12752 1 Recent progress in the field of exhaust noise
Suppression (Progress report on the course of the investigations on noise
reduction). L. G. Napoliello and G. D'Elia (Bologna, University,
355-387, 30 refs. in Italian.
**NP73-3A-007**

**Measurements and Methods of Control from Automotive Exhausts**

**Description:** The project involved measuring the noise produced by proposed vehicles and developing a program for reducing emissions. The data collected were used to order a program on the variability of noise levels and vehicle specifications. The project emphasized systematic data collection, analysis, and planning.

**NP73-3A-008**

**Measurements and Methods of Control from Automotive Exhausts**

**Description:** The project involved measuring the noise produced by proposed vehicles and developing a program for reducing emissions. The data collected were used to order a program on the variability of noise levels and vehicle specifications. The project emphasized systematic data collection, analysis, and planning.

**NP73-3A-009**

**Measurements and Methods of Control from Automotive Exhausts**

**Description:** The project involved measuring the noise produced by proposed vehicles and developing a program for reducing emissions. The data collected were used to order a program on the variability of noise levels and vehicle specifications. The project emphasized systematic data collection, analysis, and planning.
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 developed by Humphreys & Glasgow 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.

**Programs: Plant Design.**

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.

**Aircraft Noise.**

Western Electric, Hawthorne Works, Chicago, IL. Noise control of high volume gas handling plants. Summary only. See Citation No. 73-1TE-00006 p. 170 [1972].

Abs. only, from AA.

**Hearing: Noise Reduction: Occupational Health:**

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.

**Aircraft Noise:**

E. du Pont de Nemours and Co., Wilmington, DE. Aircraft noise and the airlines. Summary only. See Citation No. 73-ITE-00028 p. 171 [1972].

Abs. only, from AA.

**Aircraft Noise: Government Funding:**

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.

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: LEGISLATION: adjacent environment disturbance. See Citation No. 73-2TE-00049 pp. 143-146. 1971.

In English; Eng., Fr., Ger. sums., no refs., from AS.

NOISE REDUCTION: GERMANY DEMOCRATIC REPUBLIC.

The organization of essential elements of noise control in the German Democratic Republic is described, and it is shown in 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 legal structures of factories, complexes of factory plants, and industrial branches as well as by incorporation into the governmental and social supervision is explained.

NOISE REDUCTION: INDUSTRIAL NOISES: FEDERAL REGULATIONS: adjacent environment disturbance. See Citation No. 73-2TE-00049 pp. 143-146. 1971.

In English; Eng., Fr., Ger. sums., no refs., from AS.

NOISE REDUCTION: INDUSTRIAL NOISES: FEDERAL REGULATIONS.

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 sound-attenuated metal garbage can, a silent calculating machine. Legislation will now be needed to protect these progressive manufacturers from their noisier but cheaper competition, to protect the public from misleading advertising, and 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 Quiet City. The ultimate noise abatement goal must be a partnership of government, citizen, and industry.

NOISE REDUCTION: INDUSTRIAL NOISES: TRANSPORTATION NOISES: adjacent neighborhood disturbance. Research which examines methods of reducing and avoiding noise disturbance from industrial establishments is presented. A basis is provided by the cases of disturbance from factory noise to adjacent
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 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, ground floor, 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
72-5TE-0148
Anon.
Noise and vibration control for industrialists.

A series of papers on industrial noise and vibration control is presented. Topics include basic principles 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
72-5TE-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. 72-5TE-0148. 18 pages. 1972.
No abs.; 7 figs., 2 appendices, 19 refs., from Text.

NOISE CONTROL: VIBRATION - INDUSTRIAL NOISE: conference papers: selected papers cited.

NP73-3A-027
72-5TE-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. 72-5TE-0148. 18 pages. 1972.
No abs.; 2 figs, 4 tables, 69 refs., from Introd. & 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.
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] Léghé A. von.
Z Laryngol Otol 51:124-29, Apr 72 (Eng. Abstr.)
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3.B METHODS
NP73-3B-001

A METHOD OF THE VARIOUS INFLUENCE BURSTING CONCEPT AS A MICROPORE MUSCLE GROWTH FROM AIR INTERACTION WITH HYPOTHETICAL ATOMIC FRACTURE

Ralph S. Kragel, Vernon Klinken, and Robert E. Cumming
10 Jul. 1972 107 p. (Contract NAS1-15000)

The feasibility of creating the commercially-acceptable high-temperature cast ceramic air curtains and eddies to increase the jet engine size with decreased engine sizes and chemical oxygen for combustion. The solid flow characteristics were measured, and results were compared with those in some of the previous studies. The data for the 0.01-inch model showed increased lift coefficients of up to 30 db resulting from combination of results expressed the 1.000-inch and 0.300-inch placed in the jet flow systems at the ends. Further studies are needed, and additional attention was given to material costs and weight to reduce materials' treatment. See also

NP73-3B-002

AED TURBULENCE REACTOR NUCLEAR Patent Application

An exhaust nozzle is provided for reducing the noise of gas turbine engines by mixing two velocity secondary gas (2) with high velocity primary gas (1) and secondary exhaust. A helical string is centrally disposed in an exhaust nozzle comprising of an outer housing, and an inner ventilated shell. Air from the engine exhaust flows into the string, and between the combustion chamber and the outer housing. The string or radially into the nozzle plug and, when it is directed, and covers a low velocity core of secondary gas which provides noise reduction for the primary exhaust gas, while the second gas provides an impeller velocity layer for further noise reduction. See also

NP73-3B-003

AED TURBULENCE REACTOR NUCLEAR Patent Application

A turbine exhaust is directed by combining the noise and deposition of emitted material with ducting by varying location and applying the resulting pressure through the end of the nozzle.

60

A number of optimization problems are posed and solved for supersonic aircraft flight subject to the condition that a shock wave appears only incipiently in the sonic boom region. The principal result is giving the minimum effective gross weight of an aircraft of given effective length under given flight conditions. The calculus of variations with inequality constraints is used, with the novel feature of a non-local invariance relation and of only an upper bound on a control variable. (Author)


It is shown that the use of microphones for studying the 'boom' noise as a means of identifying the aerodynamic sources of the flight path of supersonic aircraft. The tests show that the sonic boom results from a local focus of shock waves and that, in general, is due to the impact of uncertain quantities. In this, shock does not form. By applying a technique, which makes it possible to plot the shock from directly, the results of the type proposed by悌子, it is found that regions of single, double, and even triple shocks are seen. However, no shockless regions are observed. (F.R.L.)


The results of a study conducted by Arndt (1971) indicate 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 new investigation includes detailed surveys of both pressure and velocity in a large subsonic turbulent jet. Emphasis is placed on the mixing characteristics of the jet and their relation to noise radiation. Background material is discussed, giving attention to basic theory, turbulent jet dynamics, and the radial distribution of sound sources and characteristic power 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. (G.R.)


The problem of acoustical noise generation, propagation, and attenuation in both lined and unlined straight cylindrical ducts, as well as 90 deg bends, within the cabin air-conditioning distribution system are studied. It was found to be possible to double the existing airflow velocity in the Boeing 747 air-conditioning ducts without violating cabin sound level criteria. It is possible to attenuate excess noise by lining a fraction of the duct's length with coated foam material, and by proper choice of R/D ratios for the 90-deg bends upstream of the straight cylindrical ducts. (F.R.L.)


Research on noise control studies of jet engines suitable
for advanced subsonic commercial transport aircraft. The interest in the noise of reduced aircraft noise, and uncooled nozzle flows number is complicated and initially developed in terms of the individual nozzle components: inlet, fan, exhaust, etc. This is achieved by relating the noise and cruise speed concepts to which the aircraft system must be designed to specific limitations on the individual nozzle components. Performance improvements on these models (especially for such nozzle components) are generally design concepts. Overall nozzle design, synthesis on the basis of the individual component studies, are briefly discussed. (Author)

NP73-3B-012

NP73-3B-013

The annular nozzle design and application of the coplanar convergent nozzles. The expriments show that the primary jet which had a Mach number very close to one, surrounded by an annular jet had a Mach number very close to one, surrounded by the primary jet. The sound pressure level of the noise and cruise speed concepts to which the aircraft system must be designed to specific limitations on the individual nozzle components. Performance improvements on these models (especially for such nozzle components) are generally design concepts. Overall nozzle design, synthesis on the basis of the individual component studies, are briefly discussed. (Author)

NP73-3B-014


The extent to which this reduction can be achieved by surrounding a circular primary jet with an annular flow is determined. Acoustic experiments have been performed with a model hot coaxial jet which had a Mach number very close to one, surrounded by a secondary cold annular flow of variable velocity and area ratios of the coannular convergent nozzle. The experiments show that the reduction of high frequency noise emission depends on 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


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 configu-

NP73-3B-016


NP73-3B-017


NP73-3B-018


NP73-3B-019


Description of tests in the development of a quiet helicopter by cylinder design modifications aimed at a combined contribution to the overall sound pressure level. Cylinder core results on tests to establish general noise requirements and to verify design modifications in terms of noise improvement. Acoustical treatments were applied to system components improving for noise on a noise measurement test support. The world's quietest helicopter design was developed as a result of these tests and development program. (V. E.)

NP73-3B-020


This paper presents the results of calculations of the vibration response to external meanflow disturbances for the exhaust nozzle. The Boeing Vertol CH47 forward rotor gantry and the Bell UH-1D main rotor-driven gantry. The calculations
The probable cause of the high noise level in jet transport is associated with the engine design, which makes the exhaust gases emerge from the jet noise. The only way to avoid jet noise is to design engines that do not produce excessive noise levels. Mixing noise will continue to be a problem with current engines and any attempt to reduce it will only be partially successful. This problem will continue to exist even if new engines are designed.

A.R.B.
It is shown that focused beams that exist in turning flight can be suppressed by the simple (although not always respectable) expedient of closing 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 normal to the wavefront is adjusted to cancel out the contracted curvature magnified resolved. The actual turns of a prescribed limiting deccrease are not of concern for this suppression technique: their focused beams will be cut off from reaching the ground by atmospheric extinction. The minimum turn radius for focus cutoff is evaluated (even in a simple fashion to the tabulated widths of the central beam except for rectilinear flight, as a function of block 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-030

3B-029

The report presents the results of the Phase II Quiet Helicopter Program. A Hughes OH-6A Light Observation Helicopter was extensively modified to obtain a maximum of quieting. The purpose was to apply the latest known sound-suppression techniques available to industry to an actual helicopter and then to measure the results. An acoustic goal was set which required a balanced treatment of each noise-producing source throughout the full frequency range. Noise reductions ranged from 14 to 20 db depending on the flight conditions. The report describes the detailed configuration changes, the test and development programs, and the final sound level measurements compared to the standard OH-6A. (Author)

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.


With the recent revision to the Walsh-Healey Act, possible high-noise levels produced by control valves are a subject to concern by 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 describes the design of valve noise and investigates the parameters affecting noise 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 SP 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. H Engin 22:03 5 8'71
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 pollution. Coal 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. Noise is reduced by adequate choice of compressor types, vibration free installation, and adequate acoustic insulation of machine chamber walls.

Noise control process equipment. See Citation No. 73-TE-00006 p. 171. [1972?]. Abs. only, from AA.

Noise control process equipment. See Citation No. 73-TE-00006 p. 171. [1972?]. Abs. only, from AA.

A hearing conservation program at a large petroleum and petrochemical plant is based on past experience and the Occupational Safety and Health Act of 1970, is reviewed. Plans 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.

High speed train noise control. See Citation No. 73-TE-00034 p. 171. [1972?]. Abs. only, from AA. Also in: Society of Automotive Engineers. New York. Section Papers No. 73-TE-00018.

Noise control process equipment. See Citation No. 73-TE-00006 p. 171. [1972?]. Abs. only, from AA.

Also in: Society of Automotive Engineers. New York. Section Papers No. 73-TE-00006.

Also in: Society of Automotive Engineers. New York. Section Papers No. 720665.

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.

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 described.
problems—those not solvable (Maryland) are presented and represent difficult urban antidrumming compound, the enclosure is improved.

Civil Engineering. New York, 42(9):

Anderson. Grant


Safeer. Harvey

Paullin, Robert

Illustrated,

use

transportation system is also discussed.

achieving reasonable noise reduction consistent with an integrated transportation mode. Results of this study as they relate to motor vehicles are presented. The program of the Office of Noise Abatement of the Office of the Secretary, Department of Transportation, for

magnitude of the transportation noise problem and its potential question of developing building methods low in noise and of carrying out' execute,

and to

noise. Because of the

major stages, construction of the

sound protection wall totaling a

noise of takeoffs and expansion construction of the airport—especially 45 freight loading places and a new W runway. Construction of a series of hangars, and administrative and clearance buildings, while utilizing 15 m high sound protection wall with a sectioned, horizontal absorption plate on the upper side, was recommended as a practical means to reduce the noise. Because of the nearness of this wall to loading places and runways, this measure aims at sound absorption and deflection resulting in a protective action which is more effective than that of sound protection barriers. The airport administration has resolved to adopt this suggestion and to execute, by stages, construction of the sound protection wall totaling a length of 3.8 km.

Identifying and reducing radiated noises.


Abs. illus., no refs., from AA.


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.

In German: Eng., Fr. sums., illus., no refs., from AS & SS.

NOISE REDUCTION: CONSTRUCTION INDUSTRY: BUILDINGS: reduced-noise methods.

Ideally, a building method considers requirements of the building site and those of a neighbor, economics, and noise production. It is a question of developing building methods low in noise and of carrying them out with low-noise machines. Excessive building noise is only acceptable if no other absorbent planning is combined with a lower-noise method would mean enormous extra costs. One example of a low-noise building method is the cavity wall method, which can be used instead of ramming iron bulkheads.

Inhabitants of the town of Kelsterbach, Germany, N of Frankfurt airport, are harassed by noise of takeoffs and expansion construction of the airport—especially 45 freight loading places and a new W runway. Construction of a series of hangars, and administrative and clearance buildings, while utilizing 15 m high sound protection wall with a sectioned, horizontal absorption plate on the upper side, was recommended as a practical means to reduce the noise. Because of the nearness of this wall to loading places and runways, this measure aims at sound absorption and deflection resulting in a protective action which is more effective than that of sound protection barriers. The airport administration has resolved to adopt this suggestion and to execute, by stages, construction of the sound protection wall totaling a length of 3.8 km.

In English; no abs., illus., ref. from Text & SS.

MACHINERY: NOISE REDUCTION: INDUSTRIAL NOISES: pneumatic machinery.

Noise in pneumatic tools comes from 2 main sources: discharge to the atmosphere of high pressure air through exhaust outlets, and vibration produced by metallic impact of tool components. Noise reduction in pneumatic road breakers can be accomplished by a hard durable plastic double-chamber silencer. Also available are 2 silenced portable compressors of a type normally used in developed areas and on construction sites to operate road breakers and other hand tools. Silencing is achieved by the following improvements: the glass fiber canopy is lined with absorbent material combined with an antirumbling compound, the enclosure is improved by incorporation of trays under the compressor and a transparent gauge panel access door, engine exhaust noise is reduced by a pair of tandem exhaust silencers, a lined cooler duct directs cooling air downwards, and the canopy is flexibly mounted.

In English; no abs., illus., ref. from Text & SS.
Aircraft noise in the 1980's.
No abs. 7 figs. no refs. from Text & SS.

AIRCRAFT NOISE SOURCES: future controls.
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 "noise foot-print," so called because of the foot-shaped pattern of the ground area exposed to noise in excess of the specified level during take-off and landing. Foot-print 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-STE-0139
Rink, Charles
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, 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. Overloading 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-SGE-0148
Warnaka, Glenn E. (a) Lord Corp., Lord Manufacturing Co., Miller, H.T. Eric, PA
Structural damping as a technique for industrial noise control.
Abs. 11 figs. 3 tables. 15 refs. (2 m Gen.) 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.
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-STI-0682
Macdonald, Howard R. San Diego, CA
Method and apparatus for suppressing the noise of a fan-jet engine (3,673,803).
PATENTS: NOISE DAMPING: JET ENGINES: assignor to Rohr Corp.
Chula Vista, Calif.
### 3B METHODS
*(See Also)*

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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 valves illustrate typical applications of noise/vibration/shock control materials.

Damping treatments for noise and vibration control.

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.
MATERIALS
(See Also)

LC001  3A025  3B025  3B029  3B031  3B033
3.D REGULATIONS AND STANDARDS
Economic effects of noise, pollution, and industry on the environment. The study examines the causes and consequences of noise, pollution, and industry on the environment. The report presents findings on the effects of noise and pollution on living things and property, their current environmental impact, and control technology and estimates for the future. The following topics are discussed: auditory, sociological, physiological, and psychological effects; effects of noise on wildlife; effects of sonic boom and other impulsive noise on property; physical effects of noise on structures and property; community noise; transportation systems, devices powered by internal combustion engines; noise from industrial plants; construction equipment, household and building noise; transportation industry programs; noise reduction for industrial plants; construction and appliance industry efforts; laws and regulatory schemes for noise abatement; government, industry, professional, and voluntary association programs; and assessment of noise concern in other nations.

Summary conclusions and recommendations from report to the president and congress on noise abatement.

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 exposures 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 discussed. Recommendations for achieving noise reduction over the next 5 to 10 years are outlined.

A prototype standard for environmental noise is proposed in terms enabling an index of noise quality to be defined and calculated. The standard takes into account the

77
The report presents the criteria and a proposed standard for preventing occupational diseases arising from exposure to noise. These criteria and the recommended standard were developed by the National Institute for Occupational Safety and Health (NIOSH). A majority of the NIOSH Review Consultants recommended an 85 dBA noise limit with mandatory hearing protection and audiometric testing for the most complete protection. Data are provided in this document which indicate that approximately 14% of workers in manufacturing are exposed to noise above 93 dBA, but no data are available relative to the number exposed to 85 dBA or to the technological feasibility of meeting the proposed 85 dBA standard in a given time period. The present recommendations defer the 85 dBA standard until after an extensive feasibility study and limit mandatory audiometric testing to new employees. With a recommendation that employers consider the results of a full hearing conservation program.

The report describes the impact that implementing highway noise standards will have. The standards provide for a weighting of the costs of noise abatement measures on a case-by-case basis, including the need for additional land to serve as buffer strips so that in each case there will be a weighing of the use of resources against the benefits achieved. It is possible that the standards may lead to more land being required for future highways. Much of the report consists of responses to the new guidelines.

383. FOX, M. S. Occupational hearing loss—Recent guidelines and statutes of interest to
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.
(Town-planning and building regulation in noise surrounding airports, in relation to noise produced by planes, Medico-social aspects of the problem)
Paccagnella B.
Ann Sanita Pubblica 22:603-6, Nov-Dec 73 (Ital)

NP73-3D-014

Noise-exposure: the legal viewpoint. Fredriksson RM.
Trans Am Acad Ophthalmol Otolaryngol 75:1272-82,
Nov-Dec 71

NP73-3D-015

New industry anti-noise law requires hearing tests and
sound controls. Ind Med Surg 57:144-5, May 72

NP73-3D-016

Noise control and government regulation.
H. V. Scalling, Jr. Foundry 100:53-5, F 72
Noise pollution.


Abs., illus., refs., from AA.


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 local sources of noise, including air 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 westly 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 new 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 a history of the noise regulations, training of mining industry personnel, requirements of the industry and the Bureau, and the enforcement of violations.

The existing authority and responsibilities of the Environmental Protection Agency's (EPA) noise control program and its impact on federal, state, and local governments are discussed. The role of the Office of Noise Abatement and Control is covered. Proposed standards and regulations are considered and a synopsis of a report to the President and Congress on the national noise problem is 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.

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

Grant: NOAA 235227.


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

Consideration of environmental noise effects in transportation planning by governmental entities.


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-ITE-00035
Cooper, A.S. California Highway Patrol
California laws and regulations relating to motor vehicle noise.


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

73-1TG-00040
Anon.

An environmental-conservation element for the Los Angeles city general plan.


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

73-1GO-00043
Anon.

Noise pollution control in Illinois.

Noise Pollution Control in Illinois. Report, Illinois Environmental Protection Agency, Division of Noise Pollution Control, Springfield. 10 pages. [April 1972?].

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

NOISE REDUCTION : STATE REGULATIONS : LEGISLATION : ILLINOIS : pamphlet

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

73-1TG-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. 73-1TG-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.
Noise reduction legislation in Finland is briefly reviewed. The 1958 control towards stated objectives is briefly reviewed. These objectives include collation of experience on neighborhood noise problems; information on legislation, standards, and codes; noise levels of particular types of equipment information on noise suppression measures; agreement on a standard method of assessing refinery noise levels, and development of a standard method of specifying noise levels for new equipment.
NP73-3D-036

72-STE-0153
Paszewicz, S.A., Univ. of Bath, School of Engineering, Eng
Criteria and standards.
See Citation No. 72-STE-0148. 14 pages. 1972.
80 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
generation 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-SGD-0638
Anon.
Noise control.
British Institute of International and Comparative Law, London. Bulletin
of Legal Developments No. 7: 60. April 24, 1971.
Sum. only, from Sum.
NOISE CONTROL : NOISE REDUCTION : INTERNATIONAL
COOPERATION : summary only. OECD council report: traffic noise.
The Organisation 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-SGD-0540
Anon.
Aircraft noise.
British Institute of International and Comparative Law, London. Bulletin
Sum. only, from Sum.
Also in: Sammelblatt. 877. 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-SGD-0541
Anon.
Environment.

NP73-3D-040

72-SGD-0642
Anon.
Noise control.
British Institute of International and Comparative Law, London. Bulletin
Sum. only, from Sum.
NOISE CONTROL : LEGISLATION : PUBLIC HEALTH : SWITZERLAND :
summary only: Luzern.
The Canton Luzern enacted a law to control noise levels for the
protection of health. It will be enforced beginning July 7, 1971.

NP73-3D-041

72-SGD-0648
Anon.
Environment.
British Institute of International and Comparative Law, London. Bulletin
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-SGD-0547
Anon.
Noise.
British Institute of International and Comparative Law, London. Bulletin
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-SGD-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 Dade County, Florida, are discussed, and the liability of airlines regarding noise control is examined.

NP73-3D-048
72-5GD-0850
Lewicki, Carol Knapp
Environmental Science and Technology
Washington, DC

Next federal cleanup target: Aircraft noise and emissions.


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

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

Industry and government efforts to reduce aircraft and jet engine noises 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.

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No abs., data table, numerous refs. (In Fr.). from Text & SS.


NOISE CONTROL: LEGAL ACTIONS: research.

The harmful effects of noise on the environment are discussed, and sources of noise pollution and their elimination are considered. An outline for future legal research is suggested.

NP73-3D-044
72-5GD-0552
Law, Stuart F. National Inst of Municipal Law Officers Wash., DC

Law and the municipal ecology. Part two: Noise pollution.


No abs., 1 fig., 3 tables, 2 appendices, 89 refs. from Text & SS.

See also: PA Citation No 71-2GD-0370.

NOISE CONTROL: LEGISLATION LEGAL ACTIONS: municipal control.

Legal alternatives available to city attorneys to reduce noise pollution in cities are discussed. Municipal noise ordinances, limitations on municipal action and the enforcement of noise ordinances are considered. Court cases are presented.

NP73-3D-045
72-5GD-0557
Meyer, Alvin F., Jr. EPA, Office of Noise Abatement and Control Wash., DC

EPA's noise abatement program.


No abs., 1 ref. SS.

Presented at National Organization to Insure a Sound-Controlled Environment National Meeting Second (held May 19, 1971).

NOISE CONTROL: GOVERNMENT REGULATIONS

Government programs and regulations concerning abatement of noise are discussed, with emphasis on the Clean Air Act of 1970, P.L. 91-604 and a proposed noise control act. (1016).

NP73-3D-046
72-5GD-0586
Anon.
Aircraft noise.


Sum. only, from Sum.

Also in: Le Monde. 9: July 8, 1971 and 10: July 9, 1971.

AIRPORTS: NOISE SOURCES: LEGAL ACTIONS: FRANCE: summary only.

The Cour d'Appel de Paris affirmed the judgement of a lower court which awarded damages against 3 airlines (Air France, Pan American and Trans World Airlines) which had caused damages to inhabitants of houses bordering Orly Airport through the noise caused by their aircraft landing and taking off.

NP73-3D-047
72-5GD-0605
Lathey, Gordon
Air Travel, New York, NY

Airports need space to grow: so do some humans and wildlife.


No abs., 3 figs., no refs. SS.
NOISE MEASUREMENTS: NOISE Sub-Centre. particularly pneumatic drills. Also in
of LeUal Developments No. 12: 121, June 17, 1972. Sum. only, from Sum.
NOISE CONTROL: SST: LEGISLATION: NORWAY: summary only.
The parliamentary transport committee of Norway approved the
Government Bill to prohibit supersonic flight by aircraft over Norwegian
territory.

NP73-3D-055
72-6GD-0679
Anon.
Noise control.
of Legal Developments No. 12: 121, June 17, 1972. Sum. only, from Sum.
NOISE CONTROL: SST: LEGISLATION: NORWAY: summary only.
The parliamentary transport committee of Norway approved the
Government Bill to prohibit supersonic flight by aircraft over Norwegian
territory.

NP73-3D-056
72-6GD-0678
Anon.
Noise.
of Legal Developments No. 12: 124, June 17, 1972. Sum. only, from Sum.
Also in: International Herald Tribune: 3, June 8, 1972.
SONIC BOOMS: LEGAL ACTIONS: summary only: property damage
United States.

The U.S. Supreme Court ruled that the government is not liable for
property damage caused by the sonic booms of high-flying military
planes. This decision reversed a lower court order that held the
government liable in damages caused by Air Force jets.

NP73-3D-057
72-6GD-0757
Buecher, Goesta National Board of Urban Planning. Sweden
The evaluation of traffic noise in Swedish urban and regional
planning — from research to norms.
in English; sum. 1 fig., data table, 1 ref. from Text.
NOISE SOURCES: MOTOR VEHICLES: NOISE STANDARDS: NOISE
LEVELS: HIGHWAYS: SWEDEN: traffic noise: urban and regional
planning.
A final 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 53 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.

NP73-3D-058
72-6GD-0760
Anon.
Pollution (noise).
of Legal Developments No. 7: 73, April 8, 1972.
Sum. only, from Sum.
Also in: International Herald Tribune: 1 March 1972.

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. 33 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
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 are 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.
U.S. Public Health Service, Wash., D.C. Publication No. 2120, 134
No ab. 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)

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4. PHYSICAL EFFECTS OF NOISE
4.A GENERAL
NO CITATIONS THIS ISSUE
4.B STRUCTURAL

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The problem of accurate fatigue life of a structure introduced in jet noise is introduced. A framework of a damage parameter capable especially to allow precise is described. A method of calculating the noise field sound pressure levels from high velocity jet noise is described, including its limitations. Methods are described to predict the first few groups of natural frequencies of flat and simply curved thin-elastic structures with four different and conditions. The parametric discussion and (1) damage accumulation, (2) stress ratio of a typical section, and (3) the number of half-waves across the primary pitch. A method of calculating the root mean square in incidence are damage subject to random acoustic loading is presented. Another

NP73-4B-002

NP73-4B-003

NP73-4B-004

NP73-4B-005
NP73-4B-006

73-1TE-00023
Mahig, J.
Elliott, H.B., Jr.
Gentile, R.J.
Noise and vibration transmission floors and walls.
No abs., illus., no refs., from Text & SS.
NOISE REDUCTION: VIBRATIONS: BUILDINGS: CONFERENCES:
concrete slab transmission.
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.

NP73-4B-007

73-2TE-00083
The effect of sonic bangs on buildings.
See Citation No. 73-2TE-00049 pp. 289-291, 1971.
In English; no abs., no refs., from Text & SS.
TRANSPORTATION NOISES: AIRCRAFT: BUILDINGS: GREAT BRITAIN:
sonic boom effects.
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.

NP73-4B-008

72-66D-0677
Anon.
Noise.
Sum. only. from Sum.
Also in: Times, 4, June 2, 1972.
NOISE SOURCES: SST: PUBLIC HEALTH: UNITED KINGDOM:
summary only.
Britain's sub Committee for Environmental Conservation's recent report states that there is now sufficient circumstantial evidence to indicate that supersonic flying over land on a large scale is likely to cause damage to old buildings and severe disturbance to people, birds and animals, and lead to widespread public alarm.
4B  STRUCTURAL
(See Also)

3B011    3C002
4.C ENVIRONMENTAL
EVALUATION OF ACOUSTIC TESTING TECHNIQUES FOR SPACECRAFT SYSTEMS

James A. Cochran


Computations of the pressure as a function of time conducted by Witham (1950) for the sonic boom are considered. The computations showed the existence of a wave consisting of two compressive shocks. The calculation had been performed on the basis of idealized conditions. Deviations of the real temporal pressure relationship from the ideal relations obtained by Witham are discussed, giving attention to a broadening of the shock and to statistical fluctuations of the sonic boom parameters. Phase changes in the wave were further investigated by studying the scattering of an ideal wave in a suitable model atmosphere, giving attention to low and high frequencies.

G.R.

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)
4C ENVIRONMENTAL
(See Also)

1E035  2A001

100
5. SOCIAL EFFECTS OF NOISE
5.A GENERAL
NP73-5A-001

Environmental Protection Agency, Washington, D.C.

NOISE ABATEMENT AND CONTROL. VOLUME 1:
CONSTRUCTION NOISE
9 Jul. 1971 192 p. (Reprint) Copies $0.75

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

Environmental Protection Agency, Washington, D.C.

NOISE: THE ULTIMATE INSULT
Alfred Etter 29 Jul. 1971 4 p. (Reprint) Copies $0.75

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 convenience, every novelty, and every protection from sacrifices.

F.O.S.

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 modifications 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.


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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.
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5.B BEHAVIORAL
PHASES THE RATHER LARGE SIGNIFICANT PHASES (PRE-BEAM, DURING SLEEP, POST-SLEEP) PROVIDED SIMULATED RESULTS. PERFORMANCE DEVICE INVOLVING MONITORING, MENTAL ARITHMETIC, AND PATTERN DISCRIMINATION. THREE AGE-GROUPS WERE TESTED: 20 TO 29, 40 TO 45, AND 60 TO 72. SUBJECTS WERE TESTED FOR 30 MINUTES EACH MORNING AND EACH EVENING FOR A 21-DAY PERIOD. THE RESULTS INDICATE THAT NOISY ENVIRONMENTS CAN HAVE A DEPRESSIVE EFFECT ON PERFORMANCE DURING SLEEP. THE RESULTS ALSO SHOW THAT THE EFFECT OF NOISE ON PERFORMANCE DECREASES AS THE SUBJECTS AGE. THE EFFECT OF NOISE ON PERFORMANCE IS STRONGER DURING SLEEP THAN DURING THE DAY.

AUTHOR

NP73-5B-004

NP73-5B-002

NP73-5B-003

NP73-5B-005

NP73-5B-001

NP73-5B-004
Development of a noise annoyance sensitivity scale. NASA (NASA AERONAUT SPACE ADMIN) CONTRACT RP.F CR(194): 1-40. rlius. 1972.--Examinating 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 106 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

Noise annoyance susceptibility. J 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 judgements 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 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.

Evaluating railway traffic noise by questionnaire information and verbal association experiment with populations. GIG SANIT 37(2): 25-32. 1972. [Engl. summ.]-The paper deals with data on high noise levels created by railway traffic on territories surrounding the tracks. The noise causes great inconvenience to the population, 67% of whom presented mass complaints. The various effects 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

The effect of interruption rate on the annoyance of an intermittent noise.

As. 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.

Electroencephalographic and behavioral effects of nocturnally occurring jet aircraft sounds.

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.

Environmental pollution due to noise.
See Citation No. 72-GTE-0170 p 26 [1972?].

The anatomy of the human ear and the behavior of man and animals in an exceedingly noisy environment is discussed. The effect of distance 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 psychophysically as well as statistically.
5B BEHAVIORAL
(See Also)
1A002 1D005 1E034 3D004 5A003 5A012 5C077
1D004 1D007 3D002 3D017
5.C HEALTH AND PERFORMANCE
An initial study was made concerning the effects of noise on performance. It was found that noise caused more errors and increased the time to perform the task.

**Author**

**NP73-5C-002**

**NP73-5C-003**

**NP73-5C-004**

**NP73-5C-005**

**NP73-5C-006**
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.V.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 36 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-97-29
Environmental Health Lab, Inc. Los Alamos Project Office

title: Environmental Acoustic Countermeasure Evaluation
Descriptive: (Airplane noise, Aircraft noise, Threshold of hearing, Physiology, Exposure, Urban area, Analysis of data, Auditory acuity)

NP73-5C-011

AB-97-32
Environmental Health Lab, Inc. Los Alamos Project Office

Evaluation of Hearing Levels of Residents Living Near a Major Airport


NP73-5C-012

AB-97-33
Environmental Health Lab, Inc. Los Alamos Project Office

Exposure of Hearing threshold shifts from noise measurements to noise measurements at a major Los Angeles International Airport.


Counteracts DOT-FA70-WA-1-1C, WH-76-018

Descriptive: (Airplane noise, Aircraft noise, Threshold of hearing, Physiology, Exposure, Urban area, Analysis of data, Auditory acuity)

Identification: (Noise pollution, Los Angeles International Airport)

Audioscopes and other data related to noise confidence and noise exposure were obtained from residents from two schools at the greater Los Angeles area. Counteracts has measured Los Angeles International Airport noise levels and found a range of noise levels from 70 to 100 dBA, with a median of 85 dBA. The second measurement was similar to the airport one in demography but less of significant aircraft noise exposure. Noise levels were rarely exceeded 60 dBA and commonly more than 60 dBA.

The overall levels at the two schools were comparable to the Los Angeles International Airport. The overall levels were comparable to the Los Angeles International Airport. The overall levels were comparable to the Los Angeles International Airport. The overall levels were comparable to the Los Angeles International Airport. The overall levels were comparable to the Los Angeles International Airport.

The overall levels were comparable to the Los Angeles International Airport. The overall levels were comparable to the Los Angeles International Airport. The overall levels were comparable to the Los Angeles International Airport. The overall levels were comparable to the Los Angeles International Airport. The overall levels were comparable to the Los Angeles International Airport.
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 TTSs for both rock and symphonic music were nearly identical with maximum TTSs from 2000-5000 Hz and averaging 8-10 dB. The white noise, being richer in high frequencies, produced average TTSs of 11-17 dB for the same test frequency range.—J. Abst.


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.


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. Throckmorton, Richard L. (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 6S. 65 6S with unilateral total hearing loss and normal hearing in the opposite ear, and 15 6S 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.
NP73-5C-019

2726. FYATAEY, G. E. (Res. Inst. Forensic Pathol., Minist. Health Ken., Shin, Aina, Yota, USSR.)--Kropnug o bhulukonskem rozvitku zvukovogo antagonistu pri deteli koshchay vyzyvalo shhuma. [Functional state of the auditory analyzer under the effect of noise-induced mental noise.] VESTN OTGNOLNOREGAL. 33(5): 31-35. Illus. 1991. [Engl. summ.].--A complex audiological investigation was conducted of 121 men who were subjected to the effect of a powerful intermittent noise in combination with the shock wave developing from explosions of discharging gas from tests of tonal threshold, supratonal and speech audibility were used. In the majority of the examinees, threshold of pure tones increased in the range of 3000-6000 cycle/sec, in some cases they also spread to median frequencies. Levels of curves were singled out; slope and sloping. The differential load threshold in most cases was within the limits of 0.2-0.4 db, whereas the differential threshold of the height of the sound was 16 - 10 db%. In noise audiology the perception of pure tones was common on the level of masking noise and rarely below this level by 13-20 db. In pure tone and in investigation of the temporary shift of the hearing thresholds during a work shift without protection of the ears with headphones most examinees demonstrated signs of fatigue of the auditory analyzer. The results of speech audiology showed the presence of disassociation between tonal and speech hearing. The psychological process in most of the examinees may be localized in hair cells of the spiral organ, in the cochlear partition; in both cases there are apparently functional shifts also in the cortical region of the auditory analyzer. --F. K.

NP73-5C-020

3586. RUMYANTSEV, G. I. and D. A. MEKHUN'SON. (I. M. Sechenov 1st Stavroc, Med. Inst., Moscow, USSR.)--Vishniame rhimo-vibratsionno-temperaturnye faktory v kompleksnoj sudovoj uslovnoj oksitulnym moryvam. [The effect of the noise-vibration factor on workers under complex conditions.] GIG SANIT 35(9): 25-27. 1971. [Engl. summ.].--Vibration noise causes definite shifts in carbohydrate and lipid metabolism, and increases the concentration of sugar and β-lipoproteins in the blood. Introduction of thiamine and nicotinic acid into the daily food ration had a favorable effect. These vitamins should be administered to workers exposed to vibration noise on ships for a long period. --J. L. F.

NP73-5C-021

1 3412. NILLIS, JOHN H. and DAVID J. LILLY. (Cent. Inst. Def., St. Louis, Mo. 63110, USA.)--Temporary threshold shifts produced by pure tones and by noise in the absence of an acoustic reflex. J. ACOUST SOC AM 50(Part 2): 1556-1558. Illus. 1971. [Subjects (6) with an acoustic reflex and 6 subjects without an acoustic reflex were exposed on somatic occasion 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). Temporay 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 amounts of TTS. Low-frequency pure tones produce more TTS than high-frequency bands of noise because of the differential effects of the acoustic reflex in responding to these 2 types of sounds.]

NP73-5C-022

3569. MIYAZAKI, MANABU. (Osaka, City, Osaka, Jap.)--Effect of unsaturated lipid on cerebral circulation was investigated by means of the ultrasonic Doppler apparatus in 10 normal young and elderly males. Increase of the blood flow was conspicuously observed in all the subjects after the onset of the noise. The increasing rate of the blood flow in the internal carotid artery and the vertebral artery was not coincident. The dissocation of the blood flow change in the 2 arteries is discussed. Headache and discomfort due to the noise were observed in all the subjects. Moreover, disturbance of sleep was observed in 2 cases. Severe and repeated noise may induce abnormality of cerebral circulation and various kinds of psychosomatic diseases. --M. F.

NP73-5C-023

1 39811. REASON, J. T. (Dep. Psychol., Univ. Leic., Leicesters, L21 TRN, Engl., UK.)--Some correlates of the loudness function. J. SOUND Vib. 20(3): 303-309. Illus. 1971. Studies correlating the slope of the loudness function and the slope of the function relating spiral after-effect persistence to the duration of prior stimulation with objective motor actions were summarized. Interpretation susceptibility is indicated by a personal history inventory. The slopes of other psychophysical magnitude functions and the slope of the function relating auditory reaction time to sound pressure level are also correlates of the loudness function. Consistent individual differences in "receptivity" or the characteristic way of the human transducer stimulus energy explains the results.

NP73-5C-024

1 39812. HOCKEY, G. R. J. (Dep. Psychol., Univ. Dur, Dur, Dur, England, UK.)--Effects of noise on human efficiency and some individual differences. J. SOUND Vib. 20(3): 299-304. Illus. 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. Extroverted 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.

NP73-5C-025


NP73-5C-026

1 46504. NICHOLS, ALAN C. (San Diego State Coll., San Diego, Calif. 92115, USA.)--Effects of noise on articulation scoring: A methodological study. J. COMMUN DISORD. 4(3): 199-207. Illus. 1971 [read 1978].--A video-tape of children's responses to an articulation test was played once in the ambient quiet of a television studio, and once while electronically mixed with 5 conditions of broadband noise. 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 quiet but not scored as errors in quiet, were maximized when the broadband noise was between 80 and 85 db. The noise affected the listeners' judgments of the apparent detectiveness of the articulations they heard in complex and contrasting ways. Control of noise in experimental studies of articulation and in articulation testing is needed.

NP73-5C-027

1 46316. OKADA, AKIRA (Sapporo Med. Coll., Dep. Pub. Health, Sapporo, Jap.), HIROTSUGU YAMAMURA and KOTARO MIYAKE. (Inst. Ind. Hyg., Occup. Dis., Acad. Med. Sci., USSR, Moscow, USSR.)--Physiological shifts in weavers working on looms with different noise intensities. GIG SANIT 37(4): 29-32. Illus. 1972. Five male students (15-20 year-old) with normal hearing were exposed to steady-state noise, vibration, and noise and vibration at the same time. A control experiment of the subject sat beside the moving vibrator with ear plugs and earmuffs. Temporary threshold shift (TTS) occurred after both 20 and 60 min of exposure to the vibration of acceleration 500 cm/sec² and frequency 5 Hz, which is regarded as a resonance frequency of human body. The TTS by a steady-state
synchronism showed the highest loudness. The influence of the 95 dB had a perceived 
tory function. This leads to the formation of a stable effect of external
Levels of infrasound in moving vehicles can produce symptome
analyzer. Relative isolation and hypokinesia tangibly influence the
hypokinesia depends primarily on the state of the sections of the
[Engl. Adapt. model. of measures for protecting adolescents' health at enterprises of the
textile industry suggested. -- J. F. L.

NP73-5C-030

S1062. SIEPELON, O. P. (Vladivost. Med. Inst., Miniat. Health RSFSR, Vladivostok, USSR.) Kompleksnoe obosobnenie usloviy truda i sostoianija zdorovja rabochih sudorodnnykh priznakhlanosti. [Complex evaluation of working conditions and the health of workers in the ship repairing industry.] GIG SANIT 36(9): 114-116, 1971 (recd. 1972).--The effect of industrial factors on 1769 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 branches.--N. G.

NP73-5C-031

52024. KRYLOV, Y. V. and M. V. NEFEDOVA. Osobennosti sluchkowych adaptatsiy pri komplikovannom vozdejstvi na cheholovek srednieh intensivnosti v uslovijakh operativnoi iskljutel'nii i gipokinesii. [Peculiarities of auditory adaptation of humans in response to a complex action of noises of medium intensity under conditions of isolated isolation and hypokinesia.] T 2V AKAD RASSSSR SSR BIOL 4: 629-630, 1971. [Engl. summ.]--Auditory adaptation under conditions of isolation and hypokinesia depends primarily on the state of the sections of the auditory analyzer. Relative isolation and hypokinesia strongly influence the audi-
tory function. This leads to the formation of a stable effect of external
hindering causing a considerable change of the auditory adaptation,
--J. A. L.

NP73-5C-032

57824. OGLING, A. (Callier Hear, Speech Cent, 1538 Imperial Rd, Denver, CO, 80220, USA.) Medical aspects of noise control. TAPF (Scot ASSOC Pulb Pap End) 35(1): 89-94, Illus. 1972.--Noise produces a significant hearing loss for speech when the exposure is above 90 dB (decel). A detailed case history is presented of an 8-year-old boy whose hearing loss was not a secondary
Thesearcher will prevent that loss but noise control at the source is the
 eventual solution. The nonauditory health effects of noise exposure are now better understood. It is also clear that noise control is a practical
enough to be feasible for many businesses. The methods are discussed.

NP73-5C-033

edoverya traktoristov v protsesse polzovania raboeto. [Eletroencephalo-
graphic investigation of tractor operators working during field work.] CIG SANIT 37(5): 106-107, Illus. 1971. EEG data are given for 12 trac-
tor 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. B.

NP73-5C-034

yushchikhsya i rabotayushchikh v pryamom kontakt s noiskom. [The state of health of adolescents working in spinning-weaving shops.
The first results of a research on workers in conditions of continuous, high intensity, noise on the human sleep cycle. PSYCHOPHYSIOLOGY (Baltimore) 10(2): 227-232, Illus. 1972.--Eight male college students slept for 8 consecutive nights under conditions of 33 ± 2 dB white 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 < .01, 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 de-
pitation 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-035

57968. SCOTT, D. THOMAS D. (Nat. Sci. Lab, Univ. Calif., Santa Cruz, Calif, 95060, USA.) The effects of continuous, high intensity, white noise on the human sleep cycle. PSYCHOPHYSIOLOGY (Baltimore) 10(2): 227-232, Illus. 1972.--Eight male college students slept for 8 consecutive nights under conditions of 33 ± 2 dB white 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 < .01, 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 de-
pitation 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

speeds were measured down to the octave centered on 2 Hz. The ef-
teffects of infrasonic on balance and psychological awareness studied.
Levels of infrasound in moving vehicles can produce symptoms of
balance disturbance, including vertical nystagmus, and have deep
effects on psychological awareness, in normal humans. Possible
mechanisms for these effects are discussed.--J. B. P.
5077. KRUGLOV, N. P., V. A. LUTOV, A. L. PINCHUK and G. G. SOROCHINSKII. (Dep. Gen. Hyg., Vitebsk Med. Inst., Vitebsk, USSR.) Voprosy gigieny truda v shchinen proizvodstva. [Industrial hygiene problems in the sewing industry.] GIG SANT 37(3): 22-23. Illus. 1971. [Engl. summ.] A study of industrial conditions prevailing at a sewing factory proved that the technologic process was accompanied by certain noxious environmental factors. The main factors are the unsatisfactory microclimate in the sewing shops, significant levels of high-frequency noise and a considerable strain of attention, vision, and neuro-motor apparatus in fulfillment of monotonous production line operations. All this has a considerable effect on the physiological reactions, the state of health and the work productivity. --- E. S.

NP73-5C-038

69028. SCHNEIDER, BRUCE A. (Columbia Univ., New York, N.Y. 10027, USA.), ALLEN J. NEURINGER and DOUGLAS RAMSEY. Magnitude estimation of loudness with a minimum 24-hr interstimulus interval. PSYCHOLOGICAL SCI SECT HUM EXP PSYCHOL 27(4): 243-245. Illus. 1972. --- Magnitude estimates of the loudness of white noise were obtained in 2 conditions: in the 1st, the time between consecutive stimulus presentations was at least 24 hr; in the 2nd, the time was less than 2 min. In both conditions, the relationship between the reports of the subjects (Ss) and the intensities of the stimuli was best described by a power function. The exponent of the function was lower and the variance was slightly greater in the 24-hr interstimulus condition.

NP73-5C-039

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 human and rodent, hearing impairments, and the relationship between coronary ailments and mental disorders and noise are stressed. --- S. G. B.

NP73-5C-040

69262. TARASENKO, N. Yu., A. A. KASPAROV, E. M. SMIRNOVA and B. V. ANAN'EV. (I. M. Sechenov Ist Med. Inst., Moscow, USSR.) O kombinovannom deistvii faktorov vneshnei sredy na proizvodstve i ikh normirovani. [Joint action of environmental factors in industry and their standardization.] GIG SANT 36(7): 27-32. Illus. 1971. [Engl. summ.] In the chemical industry, the action of toxic substances prevailed 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 VER MEULEN. 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...
NP73-5C-042
Temporary threshold shift and recovery patterns from two types of rock and roll music pronunciation. Hintzmann WF, et al. J Acoust Soc Am 51:1205-6, Apr 72

NP73-5C-043

NP73-5C-044

NP73-5C-045
Environmental noise is growing-Is damaging our hearing? Lipscomb DM. Clin Pediatr (Phila) 11:374-5, Jul 72

NP73-5C-046

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NP73-5C-048

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NP73-5C-050
Are hearing tests necessary during continued work in a noisy environment? Schwartz P. Roentgenblatt Laryngol Otol 100:304-92, 1972 (Eng. Abstr.) (Ger)

NP73-5C-051

NP73-5C-052
Temporary threshold shifts produced by pure tones and by noise in the absence of an acoustic reflex. J. H. Mills and D. J. 1514-8 pt 2 17 '71

NP73-5C-053

NP73-5C-054
[Threshold audiometric studies on hearing disorders in military ground personnel] Grosskrut E. Med Welt 32:818-20, 27 May 72 (Ger)

NP73-5C-055

NP73-5C-056

NP73-5C-057
Temporary threshold shifts produced by pure tones and by noise in the absence of an acoustic reflex. J. H. Mills and D. J. 1514-8 pt 2 17 '71

NP73-5C-058

NP73-5C-059
[Temporary threshold shifts produced by pure tones and by noise in the absence of an acoustic reflex] Neubert J. Z Gerontol Myo 18:186-90, Mar 72 (Ger)

NP73-5C-060

NP73-5C-061


Temporary threshold shift in hearing from exposure to different noise spectra at equal dBA level. A. Cohen and others. Bibl 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. Straesser H. Pfluegers Arch 332:Suppl 332:R52, 1972

125
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 dB(A) for more than 5 min or for 20% of the duration of the preceding noise burst. Interruption levels below 60 dB(A) 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 exposure and associated damage risk to hearing. See Citation No. 73-1TE-00005 p. 140. [1972?].

Abs. only, from AA.


Intermittent noise exposure is an occupational hazard that is difficult to identify and monitor. Depending on job or machine 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 ongoing industrial 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.


A longitudinal study of noise and hearing loss was undertaken in the du Pont Company 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-yr 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.


An equation 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 effects of age and noise are not simply additive as is often assumed.

L'importance de la protection acoustique. See Citation No. 73-1GE-00017. 1 page. [1971?].

In French; no abs., no refs., from Text.

Noise reduction : Public health : Physiological and psychological effects.

The effects of noise pollution are surveyed, considering the resulting physiological and psychological fatigue. 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 insure 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 cause and extent. It clearly appears that the risks of hearing troubles are
necessarily of variable importance in the various enterprises. As regards the average decrease of the hearing capacity, the noise characteristic registered in every working place seems to be extremely important. All experiences gained support and facilitate the application of personal and technical audioprotective measures in the various enterprises. Moreover, the investigation of which percentage of professional diseases ought to be indemnified (relative deafness caused by excessive noise) is discussed.

NP73-5C-076
72-STE-0149
Large, John B. 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.
Measurement and assessment of the impact of noise are discussed. Noise affects society in two ways: it produces damage to the hearing mechanisms if the intensity of the noise is too high or if the human is subjected to excessive periods of noise; and secondly, at lower intensities, it produces a state of mental disturbance. Problems and solutions for aircraft noise and sonic booms, traffic noise, and industrial and domestic noise are discussed.

NP73-5C-077
72-STE-0154
Walker, J. G. Univ. of Southampton, Inst. of Sound and Vibration Research, Operational Acoustics and Audiology Group, Eng.
Hearing conservation.
See Citation No. 72-STE-0148. 12 pages. 1972.
No abs., 2 appendices. 6 refs. from Text & SS.
NOISE CONTROL: HEARING LOSS: EAR DAMAGE.
The biological effects of noise can 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
72-STE-0158
Grether, W. F. (all) Aerospace Medical Research Lab., Wright Patterson Air Force Base, OH.
Harris, C. S.
Obbaum, M.
Sampson, P. A.
Guignard, J. C.
Wright State Univ., Dayton, OH.
Further study of combined heat, noise and vibration stress.
Abs., 5 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
72-STE-0160
Sommer, Henry C. (both) Aerospace Medical Research Lab., Wright-Patterson Air Force Base, OH.
Harris, C. Stanley
Combined effects of noise and vibration on mental performance as a function of time of day.
Abs., 4 figs. 3 refs., from AA.
Presented at: Aerospace Medical Ass'n, Meeting (Held in Houston, Tex., April 26, 1971).
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 z, 110 dB noise) at 6:00 a.m., no stress (no vibration-65 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.
5C HEALTH AND PERFORMANCE
(See Also)

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