



SPRING CONFERENCE 1981

UNIVERSITY OF NEWCASTLE UPON TYNE

ACOUSTICS '81

**Structural Dynamics
Industrial Noise
Speech and Hearing
Musical Acoustics**

INSTITUTE OF ACOUSTICS

Institute of Acoustics

SPRING CONFERENCE 1981

"ACOUSTICS 81"

University of Newcastle upon Tyne

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Exhibitors

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"Acoustics 81"
Outline Programme

Tuesday 21 April

- 4.00-8.00 Registration
8.00 Exhibitors' Reception

Wednesday 22 April

- 8.45 OPENING OF THE CONFERENCE
by Professor D.H. Whiffen, Pro-Vice Chancellor of the
University of Newcastle-upon-Tyne
- 9.00 Technical sessions commence
- 11.45 1980 RAYLEIGH MEDAL LECTURE
by Professor Uno Ingard, Massachusetts Institute of
Technology
- 1.00 Lunch
- 2.00 Technical sessions resume
- 4.45 1981 TYNDALL MEDAL LECTURE
by Dr. R.K. Mackenzie, Heriot-Watt University
- 7.00 Civic Reception at the Mansion House, Jesmond Dene

Thursday 23 April

- 9.00 Technical sessions resume
- 11.45 INVITED LECTURE
by Dr. Jürgen Meyer, PTB Braunschweig
- 1.00 Lunch
- 2.00 Poster session and technical visits
- 5.00 INSTITUTE ANNUAL GENERAL MEETING
- 5.30 PRESIDENTIAL ADDRESS
- 7.00 Reception and Conference Dinner

Friday 24 April

- 9.00 Technical sessions resume
- 11.45 INVITED LECTURE
by Professor E.J. Richards, Institute of Sound and
Vibration Research, Southampton
- 1.00 Lunch
- 1.30 Close of Conference

TECHNICAL PROGRAMME BY SUBJECT AREAS

STRUCTURAL DYNAMICS I

Organiser: B.L. Clarkson,
Institute of Sound and Vibration Research

<u>Wednesday a.m.</u>			Page
9.00	SOME ASPECTS OF THE PARAMETRIC AND NONLINEAR VIBRATION OF STRUCTURES	1A1	21
	ALLAN D.S. BARR University of Dundee		
9.30	NON-LINEAR INTERACTIONS IN COUPLED BEAM SYSTEMS	2A1	25
	J.W. ROBERTS and S.L. BUX University of Edinburgh		
10.00	DYNAMIC PLASTIC BUCKLING OF STIFFENED CYLINDRICAL SHELLS	3A1	29
	NORMAN JONES University of Liverpool		
10.30	PARAMETER SENSITIVITY CALCULATIONS IN DYNAMIC DESIGN	4A1	33
	D.L. TAYLOR Cornell University, U.S.A.		
11.00	FREQUENCY RESPONSE TESTING A NON-LINEAR STRUCTURE IN A NOISY ENVIRONMENT WITH A DISTORTING SHAKER	5A1	37
	H.G.D. GOYDER Atomic Energy Research Establishment, Harwell		
<u>Wednesday p.m.</u>			
2.00	ON THE INFLUENCE OF STIFFNESS AND LOCATION OF SHEAR CENTRE IN THE DYNAMICS OF A CONTAINERSHIP	6A2	41
	R.E.D. BISHOP, W.G. PRICE and P. TEMAREL University College, London		
2.30	MODAL RESPONSES OF FLEXIBLE UNSYMMETRIC PRISMATIC BODIES IN STILL WATER	7A2	45
	R.E.D. BISHOP, C. CONCEICAO and W.G. PRICE University College, London		
3.00	FATIGUE AND DYNAMIC ANALYSIS OF OFFSHORE STRUCTURES	8A2	49
	L.R. WOOTTON Atkins Research and Development Ltd.		
3.30	TECHNICAL SYSTEMS USED IN THE ATTEMPTED SALVAGE OF THE ALEXANDER L. KIELLAND	9A2	51
	S. WALKER and C. PETTITE Structural Dynamics Ltd.		

<u>Wednesday p.m. (continued)</u>			Page
4.00	VIBRATION OF THIN-WALLED LIQUID-FILLED PIPES <i>D.H. WILKINSON</i> <i>Central Electricity Generating Board, Marchwood</i>	10A2	55
 <u>Thursday a.m.</u>			
9.00	WAVE PROPAGATION IN FLUID-FILLED PIPES <i>F.J. FAHY and C.R. FULLER</i> <i>Institute of Sound and Vibration Research,</i> <i>University of Southampton</i>	11A3	59
9.30	WAVE TRANSMISSION AND REFLECTION IN BEAMS WITH DISCONTINUITIES <i>B.R. MACE</i> <i>University College, Cardiff</i>	12A3	63
10.00	TRANSMISSION OF LONGITUDINAL WAVES IN COMPOSITE SYSTEMS <i>S.O. OYADIJI and G.R. TOMLINSON</i> <i>University of Manchester</i>	13A3	67
10.30	SEPARATION OF STRUCTURAL WAVE COMPONENTS <i>G. PAVIC</i> <i>Electrotechnical Institute, Zagreb, Yugoslavia</i>	14A3	71
11.00	MEASUREMENT OF THE LONGITUDINAL WAVE PROPAGATION PROPERTIES OF REINFORCED FLEXIBLE HOSE <i>D.K. LONGMORE, C.W. STAMMERS and B. TUC</i> <i>University of Bath</i>	15A3	75
 <u>Friday, a.m.</u>			
9.00	A NOTE ON THE DYNAMICS OF A VLASOV BEAM <i>R.E.D. BISHOP, W.G. PRICE and ZHANG,</i> <i>XI-CHENG</i> <i>University College, London</i>	16A4	7
9.30	RESPONSE OF A SINGLY CURVED, ORTHOGONALLY STIFFENED PANEL TO A RANDOM PRESSURE FIELD <i>A.Y. ABDEL-RAHMAN, S.P. LIM and M. PETYT</i> <i>Institute of Sound and Vibration Research,</i> <i>University of Southampton</i>	17A4	8
10.00	THE RESPONSE OF VEHICLES ON ROUGH GROUND <i>R.F. HARRISON and J.K. HAMMOND</i> <i>Institute of Sound and Vibration Research,</i> <i>University of Southampton</i>	18A4	8
10.30	A TWO-WAVE TYPE MODEL FOR ESTIMATING THE DYNAMICAL RESPONSE OF FRAME STRUCTURES <i>L.A. WALKER and M.J. GREENWOOD</i> <i>University of Leeds</i>	19A4	8
11.00	FREE VIBRATION CHARACTERISTICS OF ELLIPTICAL CYLINDRICAL SHELLS <i>C.B. SHARMA</i> <i>University of Manchester Institute of</i> <i>Science and Technology</i>	20A4	9

STRUCTURAL DYNAMICS II

Organiser: B.L. Clarkson
Institute of Sound and Vibration Research

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9.30	METHODS FOR MEASURING POWER INPUT TO A STRUCTURE <i>R.J. PINNINGTON</i> <i>Institute of Sound and Vibration Research, University of Southampton</i>	2B1 99
10.00	ESTIMATION OF VIBRATION LEVELS AT LAUNCH ON EQUIPMENT MOUNTED IN SATELLITES <i>R.J. POPE and B.L. CLARKSON</i> <i>Institute of Sound and Vibration Research, University of Southampton</i>	3B1 103
10.30	VIBRATIONAL ENERGY DISTRIBUTION AND PROPAGATION MEASUREMENTS IN HONEYCOMB AND CORRUGATED SPACECRAFT COMPONENTS <i>M.J. RANKY</i> <i>Institute of Sound and Vibration Research, University of Southampton and Hungarian Academy of Sciences, Budapest</i>	4B1 109
11.00	AUTOMATIC SPECTRUM ANALYSIS FOR THE FIELD <i>G.J. HILTON</i> <i>Spectral Dynamics Ltd.</i>	5B1 111
<u>Wednesday p.m.</u>		
2.00	THE APPLICATION OF STATISTICAL ENERGY ANALYSIS TO SOUND TRANSMISSION THROUGH BUILDINGS <i>R.J.M. CRAIK</i> <i>Heriot-Watt University, Edinburgh</i>	6B2 115
2.30	SPACECRAFT STRUCTURAL ACOUSTICS <i>D.C.G. EATON</i> <i>European Space Agency</i>	7B2 119
3.00	APPLICATIONS OF STATISTICAL ENERGY ANALYSIS TO HIGH FREQUENCY SHIP VIBRATION <i>G.T. WILLSHARE, D. CATLEY and A. CREXIS</i> <i>British Ship Research Association</i>	8B2 123
3.30	THE INFLUENCE OF SUPPORTING STRUCTURE ON THE DYNAMIC BEHAVIOUR OF LARGE INDUSTRIAL FANS <i>R.R. WILSON, M.H. SMITH and I. WATSON</i> <i>James Howden & Company Ltd., Glasgow</i>	9B2 127

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4.00	NEW MEANS OF REDUCING PROPELLER INDUCED CABIN NOISE E.H. WATERMAN Fokker BV	10B2	131
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Thursday, a.m.

9.00	OPTIMUM ABSORBER PARAMETERS FOR MINIMIZING VIBRATION RESPONSE G.B. WARBURTON University of Nottingham	11B3	135
9.30	FRICTIONAL DAMPING IN STRUCTURES - SOME ASPECTS OF MEASUREMENT AND MODELLING L.J. WILKINS and S.W.E. EARLES City University and Kings College, University of London	12B3	139
10.00	THE INCREASE OF STRUCTURAL DAMPING BY CONTROLLED SLIP IN JOINTS C.F. BEARDS Imperial College, University of London	13B3	143
10.30	MEASUREMENT OF LOSS FACTOR IN FLOORS M.F. WHITE and K.H. LIASJØ Acoustics Laboratory/ELAB, Trondheim, Norway	14B3	147
11.00	THE INFLUENCE OF EMBEDMENT IN DRY SAND ON THE DYNAMIC CHARACTERISTICS OF MODEL PILES D.M. LILLEY, R.D. ADAMS and W.J. LARNACH University of Bristol	15B3	151

Friday, a.m.

9.00	VIBRATION RESPONSE TO WIND OF TWO IN-LINE CIRCULAR CYLINDERS FOR VARIOUS WIND APPROACH ANGLES AND SPEEDS D.J. JOHNS and R.H. MASTERS Loughborough University of Technology	16B4	155
9.30	THE STRUCTURAL DYNAMICS OF WIND TURBINES A.J. PRETLOVE University of Reading	17B4	159
10.00	SOUND RADIATION FROM WALLS AND WINDOWS Y. SHEN and D.J. OLDHAM University of Sheffield	18B4	163
10.30	THE MODELLING OF RAILWAY VEHICLES USING LUMPED PARAMETER TECHNIQUES J.L. WEARING, C. PATTERSON and G.A. JEFFREY University of Sheffield and British Railways Board, Derby	19B4	167
11.00	STRUCTURAL RESPONSE OF A RAILWAY WAGON TRAVERSING A DIPPED RAIL JOINT R.J.M. DODD and E.M. STROVER British Railways Board, Derby	20B4	171

INDUSTRIAL NOISE

Organiser: Brian Oakes
Newcastle upon Tyne Polytechnic

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9.00	MEASUREMENT BY VENDORS: FARRAGOES, FALLACIES AND FACTS <i>S.G. TAME and D.A. RICHARDSON</i> <i>Davy McKee (Oil and Chemicals) Ltd.</i>	1C1	175
9.30	ACOUSTIC DESIGN OF LARGE PROCESS PLANT <i>J.B. ERKSINE</i> <i>I.C.I. Ltd.</i>	2C1	179
10.30	NOISE ANALYSIS OF IMPACT HAMMERS - FULL SIZE AND WORKING SCALED MODEL COMPARISON <i>G.J. McNULTY, N. DEAN</i> <i>Sheffield Polytechnic and W.H. Davis & Sons Ltd.</i>	4C1	191
11.00	RESEARCH INTO DROP HAMMER NOISE I <i>M.F. WESTCOTT</i> <i>Institute of Sound and Vibration Research,</i> <i>University of Southampton</i>	5C1	195
	RESEARCH INTO DROP HAMMER NOISE II <i>M.E. WESTCOTT and I.E. CARR</i> <i>Institute of Sound and Vibration Research,</i> <i>University of Southampton</i>	5C1	199
<u>Wednesday p.m.</u>			
2.00	NOISE REDUCTION DURING ROCK DRILLING <i>G. STIMPSON and E.J. RICHARDS</i> <i>Institute of Sound and Vibration Research,</i> <i>University of Southampton</i>	6C2	203
2.30	RESONANCE SPECTROSCOPY - A NEW METHOD OF QUALITY CONTROL IN MASS PRODUCTION <i>ECKHARD ROEDER</i> <i>Kletec, West Germany</i>	7C2	207
3.00	DIGITAL NOISE CORRECTION <i>M. LONG, H.W. HARDENBERGH and D. MARSH</i>	8C2	209
3.30	HEARING LOSS, HAZARD ASSESSMENT - DO WE HAVE IT RIGHT? <i>R.M. HOWIE</i> <i>Institute of Occupational Medicine</i>	9C2	213
4.00	NOISE DOSIMETRY - ADVANCED CONCEPTS AND INSTRUMENTATION <i>J. EARSHEN</i> <i>Metronics Inc., New York, U.S.A.</i>	10C2	217

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9.00	A METHOD TO PREDICT SOUND PRESSURE LEVELS RADIATED BY MACHINES, AT THEIR DESIGN STAGE <i>R.K. JEYAPALAN and N.A. HALLIWELL</i> <i>Institute of Sound and Vibration Research,</i> <i>University of Southampton</i>	11C3	219
9.30	MEASUREMENT OF THE SOUND ABSORPTION COEFFICIENT OF A FACTORY ROOF AT VARIOUS ANGLES OF INCIDENCE <i>R.J. ORLOWSKI</i> <i>University of Cambridge</i>	12C3	223
10.00	A METHOD OF PREDICTING SOUND LEVEL AS A FUNCTION OF DISTANCE FROM AN INCOHERENT, RECTANGULAR, PLANE SOURCE <i>Rupert Taylor</i>	13C3	227
10.30	PREDICTION OF NOISE SOURCES IN FORGING MACHINES <i>D.C. HODGSON and M.M. SADEK</i> <i>University of Birmingham</i>	14C3	231
11.00	SOUND PROPAGATION IN FACTORIES <i>MURRAY HODGSON</i> <i>University of Cambridge</i>	15C3	235

Friday a.m.

9.00	RECENT LABORATORY MEASUREMENTS ON THERMAL/ ACOUSTIC LAGGING <i>B. BERGER, J.M. REA and R.A. IREDALE</i> <i>NEI Parsons Ltd. and Central Electricity</i> <i>Generating Board</i>	16C4	239
9.30	MAMMOTH ACOUSTIC ENCLOSURES CONTAIN "ROLLING ROAD" NOISE AT LEYLAND VEHICLES LTD., TRUCK AND BUS WORKS, PRESTON <i>D.F. PERCY</i> <i>Industrial Acoustics Company Ltd.</i>	17C4	243
10.00	ATTENUATION OF HIGH AMPLITUDE ACOUSTIC WAVES IN PERFORATED STRUCTURES <i>ALAN CUMMINGS</i> <i>University of Missouri, U.S.A.</i>	18C4	245
10.30	A PRACTICAL APPROACH TO NOISE SUPPRESSION OF HIGH PRESSURE VENTS <i>J.F. BRANT</i> <i>Burgess Industrial Silencing</i>	19C4	249
11.00	A PORTABLE SILENCER FOR TEMPORARY VENTING OPERATIONS <i>T. SMITH</i> <i>British Gas Engineering Research Station</i>	20C4	251

SPEECH AND HEARING

Organiser: Ron Beresford
Newcastle upon Tyne University

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	<i>M. HAGGARD</i> <i>Medical Research Council Institute of Hearing</i>		
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	<i>W.A. AINSWORTH</i> <i>University of Keele</i>		
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 <u>Wednesday p.m.</u>			
2.00	MYRTILLE II: A UNIFIED APPROACH TO PSEUDO- LANGUAGE UNDERSTANDING	6D2	265
	<i>J-P. HATON</i> <i>Universite de Nancy, France</i>		
2.30	DYNAMIC PROGRAMMING VARIATIONS IN AUTOMATIC SPEECH RECOGNITION	7D2	269
	<i>R.K. MOORE</i> <i>Royal Signals and Radar Establishment, Malvern</i>		
3.30	ACOUSTICAL TRANSMISSION LOSSES IN TELEPHONE CONNECTIONS	9D2	273
	<i>D.L. RICHARDS and R.W. WHORWOOD</i> <i>University of Aston in Birmingham</i>		
4.00	SPEECH DEREVERBERATION: PERFORMANCE OF SIGNAL PROCESSING ALGORITHMS AND THEIR EFFECTS ON INTELLIGIBILITY	10D2	277
	<i>P. JEFFREY BLOOM and G.D. CAIN</i> <i>Polytechnic of Central London</i>		
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9.00	VIDEO SPEECH SYNTHESIS: A FLEXIBLE, INTEGRATED SYSTEM FOR ANALYSING AND SYNTHESISING SPEECH PRODUCTION IN THE VISUAL DOMAIN	11D3	281
	<i>N. MICHAEL BROOKE</i> <i>University of Lancaster</i>		
9.30	DETAILS OF FORMANT TRANSITIONS IN THE TIME DOMAIN	12D3	285
	<i>G.G.R. GREEN and R.M.C. GREGSON</i> <i>University of Oxford</i>		
10.30	DETECTION OF PERIODIC PITCH IN SPEECH SIGNALS	14D3	287
	<i>W. MILLAR and R. LINGGARD</i> <i>Queens University, Belfast</i>		

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<u>Friday a.m.</u>			
9.00	A RULE LEARNING SYSTEM AND ITS APPLICATION TO MACHINE SPEECH <i>S. OAKLEY and R.C. CAWTHORN</i> <i>Teesside Polytechnic</i>	16D4	295
9.30	ACOUSTIC MEASURES IN VOICE DISORDER <i>G.G.R. GREEN, R.M.C. GREGSON and</i> <i>E. McGUIRK</i> <i>University of Oxford, Radcliffe Infirmary,</i> <i>Oxford</i>	17D4	299
10.30	INCREMENTAL MODEL OF THE BASILAR MEMBRANE <i>R. LINGGARD and P. McCULLAGH</i> <i>Queens University, Belfast</i>	19D4	301
11.00	ARTICULATION TESTS WITH A SIMULATED SUB- BAND CODER <i>M.A. SCOTT and L.S. MOYE</i> <i>Standard Telecommunication Laboratories Ltd.</i>	20D4	305

MUSICAL ACOUSTICS

Organiser: Joyn Bowsher
University of Surrey

Wednesday a.m.

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9.30	ANALYSIS OF TROMBONE BELL VIBRATIONS <i>P.S. WATKINSON</i> <i>University of Southampton</i>	2E1 313
10.30	MATERIAL VIBRATION AND ITS INFLUENCE ON PERFORMANCE OF WIND INSTRUMENTS <i>R.A. SMITH</i> <i>Boosey & Hawkes (M.I.) Ltd.</i>	4E1 317
11.00	RESONANCE STUDIES OF THE GUITAR <i>B.F. RICHARDSON and C.A. TAYLOR</i> <i>University College, Cardiff</i>	5E1 321

Wednesday p.m.

2.00	IMPULSE METHODS IN BRASS INSTRUMENT MEASUREMENT <i>J. GOODWIN,</i> <i>University of Surrey</i>	6E2 325
2.30	VIBRATIONS OF PIANO STRINGS AND COUPLING TO THE SOUND BOARD <i>A.R. BAXANDALL, I.S. BROWN and C.E. GOUGH</i> <i>University of Birmingham</i>	7E2 331
3.00	APERIODICITY IN BOWED STRING MOTION <i>M.E. McINTYRE, R.T. SCHUMACHER and J. WOODHOUSE</i> <i>University of Cambridge, Carnegie-Mellon</i> <i>University and Topexpress Ltd., Cambridge</i>	8E2 335
3.30	MUSICAL ACOUSTIC RESONANCE SPECTROSCOPY OF STRINGED INSTRUMENTS <i>C.E. GOUGH,</i> <i>University of Birmingham</i>	9E2 339
4.00	TIME ERROR IN PERCEPTION OF SOUND BRIGHTNESS <i>J. SMURZYNSKI and T. LETOWSKI</i> <i>Warsaw Academy of Music</i>	10E2 343

Thursday a.m.

9.00	TONAL SEQUENCES, MELODY AND MUSIC <i>A.J. WATKINS</i> <i>University of Reading</i>	11E3 347
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10.30	THE THEORY AND PRACTICE OF SOUND POWER MEASUREMENT (THE POWER OF MUSICAL INSTRUMENTS) <i>J. ANGSTER</i> <i>Hungarian Academy of Sciences, Budapest</i>	14E3 355

Friday a.m.

9.00	THE SOUND INSULATION OF SMALL STUDIOS <i>D.B. FLEMING</i> <i>Bickerdike, Allen & Partners, London</i>	16E4 359
9.30	MUSIC AND MUSIC ROOMS. <i>Discussion Form introduced by C.L.S. GILFORD,</i> <i>Consultant</i>	17E4 -

HOURLY TIMETABLE

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	MYRTILLE II: A UNIFIED APPROACH TO PSEUDO-LANGUAGE UNDERSTANDING	6D2	265
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