

NEWSLETTER

Operational Research Society of New Zealand (Inc.)

Registered at C.P.O., Wellington, as a magazine

June 1991

New Members

A warm welcome to new members since the last newsletter:

Frank Dean	Bank Clerk	Invercargill
Dr. P. Venkateswarlu	Lecturer	Canterbury University

A special welcome to the **Ministry of Defence** as a new **Corporate Member**.

Crown Research Institutes

The Science Task Force, reporting to the Minister of Science, Simon Upton produced an interim report in March. It suggested that DSIR, MAF, FRI and the Meteorological Service be reorganised into 7-8 CRIs. It appears that the Applied Mathematics Group in Auckland and Wellington will go (in one piece) into the CRI for the Manufacturing and Processing sector. This is, however, subject to Government confirmation.

The final report is expected at the end of June.

Editor	Jonathan Lermitt
	↗ Electricorp, P.O. Box 930, Wellington
	☎ (04) 742-370
	Fax (04) 499-1244

Associate Editor	Chris Daké
	↗ Ministry of Agriculture & Fisheries
	P.O. Box 2526, Wellington
	☎ (04) 720-367 x8508
	Fax (04) 730-118

Local and International Events

N.B. The editor has some extra details on all these events if you are in a hurry to get further information.

Workshop on Large-Scale Optimization
Combría, Portugal

29-31 July 1991

14th International Symposium on Mathematical Programming
Amsterdam, The Netherlands

5-9 August 1991

Contact: 14th International Symposium on Mathematical Programming
Paulus Potterstraat 40, 1071 DB Amsterdam, The Netherlands

APORS '91: 2nd Conference of the Association of Asian-Pacific OR Societies
Beijing, China

27-30 August 1991

Theme: OR: Making Decisions for Winning Victory.

The Second Announcement and Registration forms for this conference are available from Hugh Barr, DSIR Physical Sciences, Box 1335, Wellington. Conference registration is \$US320.

Annual NZ Statistical Conference
Victoria University of Wellington

28-30 August 1991

Contact: Dr P J Smith
ISOR, VUW, P.O. Box 600, Wellington

Performance Measurement for Manufacturing Excellence
2nd International Conference of the Belgian Production and Inventory Control Society (**PICS-Belgium**)
Holiday Inn Crowne Plaza, Antwerp, Belgium

29 & 30 August 1991

Contact Vicky Mabin (☎ 04-721000 ext 8095/8084, or fax 04-712200), for further details.

15th IFIP Conference on System Modelling and Optimisation
Zürich, Switzerland

2-6 September 1991

Contact: Dr. K. Frauendorfer, Institute for Operations Research
University of Zürich, Moussonstrasse 15
CH-8044, Zürich, Switzerland

ORSA/TIMS Joint National Meeting
Anaheim, California, USA

3-6 November 1991

Contact: ORSA Business Office, 1314 Guildford Avenue
Baltimore, Maryland 21202, USA

IFIP CAPE '91. Computer Application in Production and Engineering
Bordeaux, France
10-12 September 1991

Contact: CAPE '91 Conference Secretariat, Université de Bordeaux I
Laboratoire GRAI, 351 Cours de la Libération
33405 Talence Cedex, France

INCOM '92

7th IFAC/IFIP/IFORS/IMACS/ISPE Symposium on Information Control
Problems in Manufacturing Technology
Toronto, Canada
25-28 May 1992

Deadline for submission of draft papers: 30 August 1991

Contact: Mrs Nicole Léger, INCOM '92,
National Research Council of Canada
Montreal Road, Ottawa, Ontario, Canada K1A 0R6

International Working Seminar on Production Economics
Innsbruck, Austria

17-21 February 1992

Contact: Janerik Lundquist, Department of Production Economics,
Linköping Institute of Technology, S-581 83 Linköping, Sweden

**8th International Conference on CAD/CAM,
Robotics and factories of the future**
Metz, France

17 - 19 August 1992

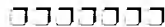
Contact: Dr J.-M. Proth, Technopôle Metz 2000
4, rue Marconi, 57070 Metz, France
Fax: (33) 87 76 39 77 ☎ (33) 87 20 35 00

VI CLAIO - 6th Latin-Ibero American Congress on Operations Research
México City, México

7- 11 October 1992

Deadline for abstracts: 31 January 1992

Contact: Javier Márquez, Departamento de Administración, ITAM
Rio Hondo N° 1, Tizapán San Angel
México, D.F., México. C.P. 01000 Fax: +52 - 5 -500-7637



Call for papers - European Journal of Operational Research

This journal is planning a special issue devoted to 'Lotsizing Models for Production Planning'. Deadline for submission of papers is 1 March 1992.

Contact: Dr Marc Solomon
Erasmus University, Rotterdam School of Management
P.O. Box 1738, 3000 DR Rotterdam
The Netherlands ☎ +31 - 10 - 4082021

“The purpose of computing is insight, not numbers.”

A.S. Householder

Decisions under Uncertainty

In fields as diverse as marketing, forecasting, medical diagnosis, and hazard or environmental planning, decisions are usually reached on the basis of combining known information with vague or qualitative data. Now for the first time a commercial software tool, SIMUNC, is available which addresses this type of decision making process. SIMUNC allows the integration of statistical, logical and soft information and the derivation of the logical closure over the whole knowledge. This functionality, usually known as probabilistic logic, is based on a combination of methods derived from classical logic and OR. Its main difference to previous approaches is that it does not introduce additional assumptions into the knowledge.

SIMUNC stands for SIMulation of UNCertainty, and was originally developed as part of a research project in Germany. Now it is available as a professionally programmed PC system for £333. Development versions (C-Library) are also available for both MS-DOS and UNIX machines. For a brochure or more information write to C³-Software, Campbell House, Campbell St, Cambridge CB1 3NE, England or ☎ +44 223 412965. (from ORS newsletter (UK), Feb 91).

(sounds interesting, but couldn't they think of a nicer sounding acronym? *Ed.*)



Dash Associates Ltd have provided a copy of their newsletter. This covers improvements to their mathematical programming package XPRESS-MP. Topics include the new mainframe version, algorithmic developments, nonlinear programming, future developments, and training. Improvements include much faster solution of mixed integer problems, and a modelling language which interfaces with Lotus 1-2-3. Your editor has a copy, or write to Dash at Blisworth House, Church Lane, Blisworth, Northants NN7 3BX, England. ☎ +44 604 858993, fax +44 604 858147.

We are pleased to advertise local software products (or other OR related services) in the newsletter. Contact one of the editors (addresses on the front page).

Annual Conference Preview

**Operations Research and Operations Management:
Helping Business to Thrive and Survive in the 90s.**

**26-28 August 1991
Victoria University of Wellington**

The organisation for this conference is going very well, (although as one of the organisers, I can't help noting what a lot of work is involved!) On the Monday 26 and Tuesday 27 August, we will have the papers, and there will also be trade stands. Wednesday 28 August brings four site visits to local manufacturers, Mitsubishi, Pilkingtons, Formway Furniture and ICI paints. Also on the Wednesday there will be a workshop for teachers of Operations Management and Operations Research.

This conference is a special event organised jointly by the Wellington Branches of the New Zealand Production & Inventory Control Society (NZPICS) and ORSNZ. NZPICS is a professional group of people who practice the art and science of Production and Inventory Management. Its aims are to foster high standards in the profession by mutual exchange of problems and ideas and the provision of further education and qualifications. The overlap with NZPICS has been demonstrated in the past with very popular joint meetings at Auckland and Wellington branches. This is the first time a joint conference has been held, although some of you may remember the ORSNZ conference in Auckland in 1984 which was organised in association with NZPICS. We look forward to support from all ORSNZ members. It will be a worthwhile and enjoyable three days with excellent speakers, site visits and a social programme.

We were very pleased with the response to the Call for Papers, and now have a full timetable with a good balance between OR and PIC papers, theoretical and applied. We have three keynote speakers, David Jack from UEB in Auckland, Peter Stanley from Miele Australia, and Geoff Pitt, from ANZ Banking Group.

So mark these dates in your diaries now. A registration brochure is included with this newsletter. For more copies, contact Vicky Mabin (☎ 04-721000 ext 8095/8084, or fax 04-712200). Make sure your company has at least one person there to get the latest information.

See you there!

"Operational Research" - what's in a name?

The term "Operational Research" is widely misunderstood by the public at large. No doubt to many people it means finding a better way to have your appendix out.

Recently, particularly in Government circles, the term has acquired a far wider meaning than the application of various techniques to decision problems. It has come to mean research into almost any problem involving any operation. It has now become part of the Wellington jargon. Correspondence from several of our learned members has been dispatched to the offending departments.

The question is, do we fight or switch? Should we try to stamp out this practice, or, alternatively perhaps change the name of the society?

Do members have strong views on the subject? If so, please let the editor have them for the next newsletter.

Letter to the Editor - the student paper prize

From *Dr Julie Falkner*

Dear Editor,

I would like to contribute my two cent's worth on the Student Paper Competition issue, as someone who has been involved both as a student entrant and as a project supervisor. Clearly the new rules have both advantages and disadvantages. I agree that communication skills are essential in our field and that students should be encouraged to present papers at Conference. However, many of the best students seek employment or graduate studies overseas after completing their degrees. (More than once in recent years the winner of the prize has been unable to attend Conference.) By effectively excluding such students from the competition we are choosing to ignore some excellent project work. Is this really what we want? I think not, and therefore join Grant and David in calling for TWO competitions.

Julie Falkner
Department of Combinatorics and Optimization
University of Waterloo
Waterloo, Ontario
Canada N2L 3G1
(formerly University of Auckland)

The Resource Management Bill

Are there any opportunities for the OR Profession?

Introduction

The sustainable management of natural and physical resources will, in the future, be enforced through legislation to be enacted by 4 July 1991. The legislation, known as the Resource Management Bill, will ensure that the management of natural and physical resources meets the needs of present and future generations: safeguards air, water, soil, and ecosystems; and seeks to mitigate any adverse impacts of development on the environment.

The Resource Management Bill will be implemented by Regional Councils and Territorial Authorities (District Councils), by means of policy statements and management plans. These bodies will determine regulatory and economic instruments required to enforce the Bill.

It appears that the OR profession has had little or no involvement in the debate that preceded and followed the drafting of the Bill. The purpose of this article is, therefore, to initiate debate with regard to the future involvement of the OR profession in the implementation of the Resource Management Bill, and in the general area of sustainable resource management.

Professional societies/practitioners may contribute to the implementation of the Bill, both at the national and local levels. At the national and regional levels, they may assist authorities set standards, and recommend instruments for the sustainable management of resources. At the regional and district levels, they may be involved in the development and implementation of district plans.

Background

In December 1988, a discussion paper, "People, Environment and Decision Making", sought public opinion on the inclusion of environmental and ecological criteria in the management of natural and physical resources in New Zealand. As a result of the consultation, the previous Government decided to enforce the sustainable management of resources through legislation; A draft bill, the Resource Management Bill, was introduced to the New Zealand parliament for debate in December 1989.

Federation of Scientific and Technological Societies Established

Extracts from a letter from DR Jim Salinger, chairperson of FOSTS:

INTRODUCING FOSTS

FOSTS, The Federation of Scientific and Technological Societies has now been established with a council representative of affiliated bodies, and has been accommodated within the present Royal Society structure. FOSTS was formed from a meeting of scientific societies affiliated to the Royal Society in October 1990, in response to a need to reform the Royal Society and allow the scientific community to be much more effective in expressing a collective viewpoint on matters of common interest. FOSTS was later endorsed at the annual meeting of the Royal Society Member Bodies' Committee in November.

FOSTS hopes to provide an independent voice on relevant issues to both the Government and the public on behalf of the scientific community. Therefore, public awareness and communication in science is high on our agenda. Often advice is sought on scientific and technical matters, and we aim to provide advice by facilitating opinions to and from the affiliated bodies. We will form working groups from the societies when necessary of the best people able to provide advice, especially on specific subject areas.

By this means FOSTS will raise the public awareness of science, and involve affiliated bodies in providing advice on science policy development. FOSTS will use these and other methods to raise the image of science.

It is my belief that the formation of FOSTS is a very positive step taken so that scientists and affiliated bodies are able to achieve several objectives, such as influencing public science policy. As we see ourselves as facilitators, this will involve FOSTS working closely with you.

You can contact FOSTS through Mr Brian Balshaw, Executive Secretary, Royal Society, P.O. Box 598, Wellington.

Summary of the ORSNZ submission to the Ministerial Science Task Group on Crown Research Institutes

We wish to comment on the place and role of Operational Research in CRI's and their relationship with the tertiary education sector and industry.

Operational Research (OR) has been successfully used in NZ, in industry and government, and we would like to see OR fostered in the new CRI's.

Our recommendations are:

1. There needs to be a national OR group:

There needs to be a national OR group to undertake the long-term research in OR methods and applications. Currently there is one such group, and we wish this to be retained and strengthened.

2. It needs excellent communication and collaboration with sector groups:

OR is multi-disciplinary; hence it is important that a national OR group needs excellent communications and collaboration with sector groups, as well as with tertiary education institutes. It should not be dispersed amongst sectoral CRI's, but be a fairly autonomous unit, with a wide brief to liaise and work with all sector groups, and all industries.

3. Smaller OR groups are needed elsewhere in government:

Smaller OR groups are needed elsewhere in government, to enhance technology transfer and communication of industry or sector needs back to the national OR group.



Deadline for copy for the June Issue - 15th June 1991

The Bill will replace existing laws concerned with:

- land management and subdivision;
- water and soil;
- minerals;
- energy resources;
- coastal management;
- air and pollution control; and
- noise control.

Due primarily to the size and complexity of the issues contained in the draft Bill, the Labour Government was unable to enact the necessary legislation before their term of office ended.

On taking office, the National Government decided to review the Bill to ensure its workability and the certainty of its effect. The following areas were addressed by the review team:

- (a) purpose and principles clauses of the Bill;
- (b) setting of minimum environmental standards;
- (c) process of consultation during the formulation of statements of Government policy;
- (d) use of best practical option concept in achieving environmental outcomes;
- (e) balance between the Crown's rights for access to information on minerals, and the rights of private individuals to undisturbed possession of minerals;
- (f) the process the Minister of Conservation may use in coastal management; and
- (g) use of economic instruments for the allocation and management of resources.

The recommendations of the Review Group have largely been accepted, and are contained in a Supplementary Order Paper which has been considered by a Select Committee.

What is Sustainable Management?

Attaining sustainable management is undoubtedly the main purpose of the Resource Management Bill. The use and definition of sustainable management have generated considerable debate. Proposals were put forward recommending the use of the term 'sustainable development'. This view was rejected since this concept might not be wide enough to embrace other socio-economic considerations.

In the Bill, the Government has accepted that sustainable resource management means:

- "managing the use, development and protection of natural and physical resources in a way, or rate, which ensures that, in providing for the social, economic, and cultural wellbeing of people and their communities, and their health and safety, -
 - (a) the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations is sustained;
 - (b) the life-supporting capacity of air, water, soil, and ecosystems are safeguarded; and
 - (c) any adverse effects of activities on the environment are avoided, remedied, or mitigated."

As defined, the concept of sustainable management emphasises the need to control and ameliorate any detrimental environmental effects caused by resource use.

Framework for Developing Regulatory and Economic Instruments

Previous discussions of the Bill have favoured the use of regulatory measures as the mechanisms for implementing sustainable management of resources. Regulatory measures act essentially as binding constraints on production, and thus represent a production cost. Associated with each constraint is a shadow price which indicates the increase or diminution in the value of the outcome if the constraint is relaxed.

Economic instruments may, in some cases, be used to achieve the desired outcomes of sustainable management. These instruments, which are in general pricing mechanisms, may take the form of taxes, e.g. a carbon tax on emissions, levies, charges to cover administrative cost, and bonding. Even though the Review Group was asked to look at the use of economic instruments, their recommendation was limited to requesting that provision be made in the Bill, for both central Government and local bodies, to develop frameworks to evaluate and compare the effectiveness of regulatory and economic instruments.

Implementation Process

A hierarchical structure, involving Central Government, Regional Councils, and Territorial Authorities, will be used as the main structure for implementing the requirements of the Bill. The role of Central Government will be to

issue, after public enquiry, national policy statements on specific aspects of managing a resource. The policy statement will also be used to establish environmental standards for the development of specific resources.

Local authorities will be required to take into account any national policy statement when developing regional and district policies and plans. Any decisions on regulatory or economic instruments that are proposed for achieving desired outcomes, may be subject to public debate, and when implemented will have the effect of law.

Role of the Operations Researcher

The operations researchers, because of their wide training in quantitative skills, are best placed to assist the Government and local bodies in determining the best combination of regulatory and economic instruments that may be used to achieve desired outcomes. OR techniques may be used to assist the Government in setting standards at the national level. However, their services would appear to be valuable in assisting regional councils and territorial authorities in developing necessary instruments to implement national policies.

It is envisaged these services could be provided in the form of mathematical/simulation modelling of candidate regulatory instruments as constraints or goals to be attained. Candidate economic instruments may also be built directly into the models.

References

- 1 Ministry for the Environment, "People, Environment, and Decision Making: The Government's Proposal for Resource Management Law Reform", Wellington, December 1988.
- 2 "Report of the Review Group on the Resource Management Bill", appointed by the Minister for the Environment, Wellington, 11 February 1991.

Chris Daké and Hugh Barr

This Bill is likely to have a significant effect, not only on our professional work, but also on the wider community. There are profound ethical issues involved in appropriate resource use. Should the Society be taking a stand? Readers are invited to send in their comments for the next issue. Ed.

I.F.O.R.S.

INTERNATIONAL FEDERATION OF OPERATIONAL RESEARCH SOCIETIES

letter from the president

A MODEST PROPOSAL

Operations Research is roughly 50 years old at this point and there is much from which those of us who teach and do Operations Research can take satisfaction. Having begun as an activity in which scientists from other disciplines such as physics, chemistry and mathematics applied their minds and skills to the urgent operational problems of defense, Operational Research in the decade of the 1950s found its way into academic institutions and the problems of business and industry. Most of the pioneers went back to their original disciplines and new professionals were drawn into the field because it was exciting; its realm was that of organizations rather than physical science or mathematics. John Kemeny wrote, "the individual sciences are distinguished, not by their models or methods, but by the portion of nature they explain". It is asserted here that Operational Research is distinguished from other disciplines because it focuses on the affairs and efficiency of man and his organizations.

Having said the above, the origins of OR did not include the development of theory or algorithms for frequently encountered problems in organisations. This was the work of others in the decades after World War II; techniques for dealing with optimisation, networks, inventories, all manner of stochastic processes, and many more. These developments were largely created by academicians in university settings.

It is transparently obvious, I think, that the analyst working in internal or external consultancy, is indebted to those whose endeavours have provided ideas, techniques and algorithms which the analyst is using. It is perhaps equally obvious that encounters with the world of the organizations would not be a bad thing for the academician. There is nothing quite so thrilling and satisfying for anyone who considers him/herself to be an OR analyst than actually making an impact on the way an organization does its business. After more than a decade of being an administrator within my academic institution, I have rediscovered the satisfaction of teaching and getting back to research. Very recently my research has made a significant impact on the way an organization does its business. The research was not esoteric; it involved certain processes and incorporating the models and the data they require in a computer-based support system. The system provides

them with data they require to predict things which they had previously only been able to track. With prediction came the ability to plan actions in consonance with the predicted future.

If indeed someone is reading this, you must be wondering about the proposal. It involves the faculties who teach OR. The suggestion is that all faculty members be expected to touch base with the focus of their discipline. If you buy the assertion that organizations are the setting in which OR is done, the suggestion is that all faculty take an "experience tour" to business, industry, or governmental organizations every five years or so. Further it should be clear that the objective of the faculty member on his/her experience tour is not simply to gain some background and gather some data for classroom examples, but rather the objective must be to make an impact on the organization through understanding their operations and problems, good analysis, and good communication and presentation skills. Most degree programs in OR, no matter the country in which this education takes place, put primary emphasis on mathematical and computer skills. Were faculty not pushed out to work with client organizations, but rather challenged and inspired to periodically "go out and make an impact", the role of non-mathematical skills in OR education might be expanded.

How practical this suggestion is depends to some extent on the country. However for much of the world as defined by the countries whose national OR societies comprise the membership of IFORS, it is conceivable that paying client organizations can be found. Academic institutions, and indeed most fundamentally the national professional societies, must have made it clear that the laboratory of the OR faculty member is not his/her office but is an organization where his/her skills can be applied. Faculty who are actively engaged in off-campus consulting activities may be considered to be meeting the spirit of this proposal.

I thrill at the prospect of the excitement and inspiration which "practicing" faculty in numbers would impart to their students, and that Operational Research will thus continue to be a discipline seen as relevant to the important affairs of man and society and thus continue to attract its share of the best and brightest students.

David Schrady, IFORS Honorary Treasurer
Department of Operations Research
Naval Postgraduate School
Monterey, California.

MASSEY UNIVERSITY
Department of Mathematics and Statistics

Lectureship in Operations Research

Applications are invited for a Lectureship in Operations Research in the Department of Mathematics and Statistics within the School of Mathematical and Information Sciences. (A lectureship in a New Zealand University is equivalent to tenure-track Assistant Professorship in the US system; tenure is normally granted after three years). Current involvement in research, a good research record, a PhD degree or equivalent experience in an OR related discipline and commitment to quality graduate and undergraduate teaching are required of the appointee. Preference may be given to applicants with experience in mathematical programming, but those with experience in discrete optimisation, simulation or stochastic modelling are encouraged to apply.

The Department has two autonomous units (Mathematics and Statistics) and the OR programme is drawn from both. OR is available as a major within Science, Technology and Social Sciences. Relevant research strengths in the Department include discrete mathematics, differential equations and modelling, stochastic processes and applied statistics. The Department has the largest number of PhD students in the Mathematical Sciences in NZ. Enquiries of an academic nature can be directed to the Head of Department, Professor Graeme Wake (e-mail G.Wake@massey.ac.nz).

Closing Date: 15 July 1991.

Further details of the above position together with Conditions of Appointment are obtainable from Mrs V B Bretherton, Personnel Section, to whom applications, including a full curriculum vitae and the names and addresses of three referees with facsimile numbers if possible should be sent before the closing date specified.

B R H Monks
Registrar.

ORSNZ registers for GST

The Society is now registered for GST, which will be included in future on all subscriptions and conference fees. It will make little difference in practice, as it can be claimed back on expenses.