



# NEWSLETTER

March 1999

Operational Research Society of New Zealand (Inc.), PO Box 6544, Wellesley St. Auckland, New Zealand  
<http://www.esc.auckland.ac.nz/Organisations/ORSNZ/>

## EDITORIAL

### PROFESSOR HANS G DAELLENBACH

The Operational Research Society of New Zealand has seen a number of people who have made a substantial and long-standing contribution. While not wishing to name them all, I would like to pay tribute to one in particular, who must rank among the most influential in the development of Operations Research in New Zealand.

Hans Daellenbach arrived in New Zealand in 1970, from being Assistant Professor at the University of Washington in Seattle, with an MBA and PhD from the University of California (Berkeley), and a degree from the University of Geneva in Switzerland. Keen to leave the USA, where Richard Nixon was gaining political ascendancy and the Vietnam War was consuming the country, Hans applied to several New Zealand universities for an academic post. Bert Brownlie, seeing the talent, quickly responded and snared him for the Department of Economics at the University of Canterbury, where he has taught through to his retirement this year. It has been my privilege to serve there with him for all but the last year.

A handsome Swiss-German (who does not seem to have aged in 30 years) with decided views, a clear vision for OR, endless energy, enormous and fearless integrity, a little brusqueness at times, and the inability to suffer fools gladly - Hans soon made his presence felt on all parts of the campus and elsewhere. That presence always brought respect, even if his forthright opinions did not always endear people to him or him to them.

## CONTENTS

Editorial	<i>John George</i>	1
From the President	<i>Andy Philpott</i>	3
Maverick Professor Turning to Novels	<i>Canterbury Chronicle</i>	4
Hans: His Influence on the Electricity Sector	<i>Grant Read</i>	5
Reminiscing	<i>John Buchanan</i>	6
'OR Experts' and Professional Ethics	<i>Hans Daellenbach</i>	7
A Positive Linear Discrete-time Systems Model of Capacity Planning	<i>Les Foulds</i>	8
ORSNZ '99 Call For Papers	<i>John Buchanan</i>	9
Massey OR	<i>Catherine Rivers</i>	10
Production & Inventory Management Problems in New Zealand	<i>Don Johnston</i>	11
17 <sup>th</sup> International Conference of System Dynamics & 5 <sup>th</sup> ANZ Conference		14
Auckland Research Wins IPENZ Excellence Award	<i>Andy Philpott</i>	15
Scientific Forecasting Knowledge Website and Project	<i>J Scott Armstrong</i>	15
INFORMS KORNS Seoul 2000 International Meeting	<i>Fred Glover</i>	15
Meetings Calender for 1999 and Beyond		16

Publication dates: March, June, September, December

Deadline for submissions: on the 15<sup>th</sup> of February, May, August, November (for following month's issue)

Deadline for submissions as word attachments by email to Production Manager, [Tricia.Lapham@vuw.ac.nz](mailto:Tricia.Lapham@vuw.ac.nz)



As an academic, Hans had a clear view of how to organise and teach an OR program. He set up the first full degree programs in OR in New Zealand at both the undergraduate and graduate level. They were comprehensive not only in the full range of courses offered, but also in attracting students from science and commerce, as well as graduate students from engineering. Arguably, the Canterbury courses are still the most comprehensive in the country.

Never one to stand still, Hans embraced and championed “Systems Thinking”, the new trend in OR that was coming out of Britain, but entirely consistent with his long-held interest in the philosophy of OR that came from Churchman and Ackoff. Consequently, in recent years Hans decided that introductory OR needed to be rethought. He developed an innovative first year course based on systems and modelling, which pushed the boundaries of OR teaching. Students have a love-hate relationship with this course (the brighter ones love it and the poorer ones hate it) and, as such, was somewhat of a headache for the HOD. Yet it became one of the half-dozen largest courses at Canterbury.

Perhaps the most lasting legacy Hans brought to OR at Canterbury, was his insistence that it be practical. Elegant mathematics did not impress him unless they were of some value in pushing forward the practice of the discipline.

So from the earliest days, two innovations in the teaching were introduced. The first was the use of open-book exams. (What is the use of making students learn formulae that they can, in practice, read from a book?) To this day students have failed to realise that an open-book exam demands more, and not less, on preparation. The second was a team-based practical project for the graduate students. This project has been of outstanding success. It gave most students their first opportunity to go into a real organisation, to be confronted by a real problem (usually still unstructured), to work with client personnel and with a fellow student, and bring in a report by an immovable deadline. Over the years, students and employers alike have praised this part of the course.

At the same time, for departmental research, and as a journal editor and referee, Hans pressed strongly for OR research with both strong methodology and clear practicality. I well remember him rejecting many times the articles sent to NZOR by an overseas academic (and umpteen co-authors) who wrote yet another trivial variation on an already trivial inventory problem. Also, I recall him going through a selection of OR journals pointing out how few articles were of any reader interest and practical value – asking of us “how many articles in this issue did you read even the abstract?”

In the same way, Hans made a major contribution to ORSNZ as editor of NZOR with both his practical bent and fastidious editing making it a local journal of international standing. I well remember the first edition of the journal (not edited by Hans). Within a day or two of its arrival Hans had gone through it with his red pencil (a pencil - or pen - I got to know all too well as his co-author!!) and marked every error and every inconsistency – it was completely covered in red. He then packaged it up and sent it back to the editor. This was hardly the way to act in “gently-does-it” New Zealand!! Not long afterwards, the Society was debating whether Hans should be editor. I don’t rightly remember whether he offered himself or was offered it. I do remember a conversation I had with a Council member, before the final decision was made, saying Hans really was a good guy, not to be upset by his forthrightness, and recommending to them that he would be an excellent editor. The outstanding success of NZOR under Hans’ editorship was testimony to his thoroughness and vision.

Having sorted out NZOR, he turned to the Newsletter. Somehow I think he found that more of a challenge. “There will not be an issue if no one contributes” I remember him saying in frustration one day. Well, Hans, look who is the mug responsible for this editorial!!

Hans is the only person I have met who (genuinely) seconded a motion at a Faculty meeting, and then voted against it. This was not a “device” as some may use, but a genuine change of mind. When asked why he voted against it he replied that only a fool would not change his mind when persuaded he is wrong. This integrity was shown also in his unwillingness to buckle under the “university system”. Whether the edict was from the Staffing Committee, the Registrar, or the Vice Chancellor, it made no difference – if Hans didn’t think it was good decision he would tell them so. As a result, he is responsible for many changes in the way the University operates.

It is less well known in the OR community, that Hans was the original MBA Director at Canterbury. With the same belief in practical theory, he devised and ran the Canterbury MBA for about 6 years.

Hans was an early champion of ensuring women got a fair deal. When writing our text (in the 1970's) he insisted on female managers and having "she" pop up when almost every reader would expect a "he". His social awareness in that respect and many others, including a very active role in Clean Air Society in the 1970's, I found very inspirational. (He convinced me that two children are enough – I still agree with him, despite his having four and the fashion shifting towards larger families.)

I note with some interest that his taste in cars has changed over the years. The long wheel-base Land Rover he brought in his personal baggage in 1970 was always a fraction incongruous in the staff car park alongside Minis and Morris 1100's – although it would not be now!! (Those were the days when importing a new vehicle was difficult and, I presume, what better for a country like New Zealand than a Land Rover to carry his family of six.) Perhaps one of the few signs of his age (the other being that, as an over-sixty, he explained proudly how he got a free bungy jump!!), he more recently sported a little two-seater Fiat sports car. It was not red, but he claims it could corner very fast.

Hans had a vision of not only when to start something, but when to quit. That is a particular gift. After a visit overseas, he convinced the Department of Operations Research that the day for OR departments was over. Hence the dissolution of the Department and the merger that formed the Department of Management. He could see the need to get out of editing NZOR, and even the demise of the journal. He also views his retirement positively, although I suspect his services will be sought by the University for as long as it can.

In his retirement Hans will not be idle. He has developed a skill in writing historical novels. Unfortunately, they will not be published under that famous name. So perhaps the MSCI101 students who are struggling to grasp his text will find themselves unwittingly distracted by one of his novels.

Hans, we have greatly valued your contribution to this Society – to NZOR, the Newsletter, and the Council. Just as much, we value your enormous contribution to OR in New Zealand – your many students are a living tribute to that. Finally, and most importantly, we value your friendship, wisdom, and encouragement. As we will announce below, we look forward to honouring you at the December 99 ORSNZ conference.

Happy retirement!

**JOHN GEORGE, email:jgeorge@phb.co.nz**

## **FROM THE PRESIDENT...**

This month sees the retirement from the academic community of New Zealand's most eminent operations researcher, Hans Daellenbach. During his tenure as Professor of Operations Research at the University of Canterbury, Hans has provided outstanding leadership for OR/MS in New Zealand. His powerful intellect and huge reserves of determination have been key ingredients in the successful growth of OR/MS in New Zealand. This is not to mention his unique and tireless contributions to the ORSNZ, for which we all should be grateful.

Others have written at greater length and in more detail in this newsletter about Hans and his accomplishments. It is worth noting that as a Society we intend to honour Hans formally at the 1999 ORSNZ Conference (on December 10/11 at the University of Waikato), where he will be giving a special invited address to usher New Zealand OR/MS into the next millenium. Attendance at this lecture is compulsory for all ORSNZ members, as well as any others who have any interest in hearing about the future of OR/MS from one who has contributed so much to its recent past.

**ANDY PHILPOTT, Auckland University, email:a.philpott@auckland.ac.nz**

## MAVERICK PROFESSOR TURNING TO NOVELS

It should come as no surprise to learn when Emeritus Professor Hans Daellenbach (Management) retires, his life will take a new turn – to that of an aspiring fiction writer. A self-confessed “fairly unconventional” person, Daellenbach came to Canterbury in 1970 as a senior lecturer. He arrived from the United States, where he had completed an MBA and PhD in business administration at the University of California, Berkeley. He also worked in the private sector, where he earned scholarships to Berkeley, before becoming an acting assistant professor at the University of California and later an associate professor at the University of Washington.

Prior to the States, Professor Daellenbach had completed the equivalent of a BCom(Hons) in business administration at the University of Geneva, Switzerland. He worked in companies in both Paris and Switzerland during a two-year wait for a visa to the States.

Having success in both the business and academic worlds, Professor Daellenbach began to prefer teaching, which offered the chance to basically be his own boss, the opportunity to try new ideas, less stress and the chance to teach students in an exciting subject. However, academic life in America in the late ‘60s also had two circumstances which the Daellenbachs were becoming increasingly unhappy with.

“First, we disagreed with what they were doing in Vietnam, spending billions of dollars basically bombing one country back to the Stone Ages while they had stuff to clean up in their own place. Second, Nixon being elected president – I mean anyone who lived in California knew he was a crook.”

It was 1969 and Professor Daellenbach looked to both Canada and New Zealand, before accepting a senior lecturer’s position at Canterbury. Within a year he had organised the first operations research courses, which by 1977 had split into a subject in its own right. Ten years later, Operations Research became a Department, which Professor Daellenbach headed until it was merged with the Department of Business Administration to form the Department of Management in 1991. He was appointed to a personal chair in 1988.

In 1983, still pushing the limits and trying new ideas, he organised Canterbury's MBA programme and was programme director from 1984-87 and again from 1990-91. The unique programme became highly sought-after, attracting ambitious, top-of-the-range students who have since gone on to high positions in the business community. Professor Daellenbach put a lot of that down to the emphasis placed on interpersonal skills (leadership, delegation and presentation).

"Teaching students to think widens their horizons and that is basically what they need to become managers. Our graduates are very successful."

Seeing students develop into successful managers remains a highlight for Professor Daellenbach, as does being in the "privileged" position of working at Canterbury where he could always try new ideas. One of these has been to change the teaching style to one where students are taught one subject from one instructor alone each week, making the courses much more intensive and interactive. Others were introducing internal assessment back in 1971, a year later puzzling examiners by holding "open book" examinations and encouraging graduate students to be on a first-name basis with their teachers.

"The open book exam was greeted with great alarm but I am fairly unconventional; always pushing the systems to its limits".

During his academic career, Professor Daellenbach has written four texts and about 50 research publications. He has also been the editor of an operations research journal for eight years and been on the editorial board of three journals.

It is the writing part of his career which Professor Daellenbach plans to continue when he retires on 31 January but he aims to leap from fact to fiction. Initially, he plans to revise his text *Systems and Decision Making (A Management Science Approach)*, but then fiction beckons. Professor Daellenbach said he had been "dabbling" in writing novels, including one involving Internet fraud and a country defaulting on all its foreign debts, but with an unexpected twist.

**Article: Courtesy University of Canterbury Chronicle**

## **HANS: HIS INFLUENCE ON THE ELECTRICITY SECTOR**

Given the prominence which electricity sector applications have, from time to time, been accorded in the life of the Society, it may be worth recalling Hans's role in fostering this activity. I guess Jonathon Lermitt, and John Boshier, among others, played a pioneering role here, too, but my own introduction to the area was largely due to Hans.

In those days it was possible for a Maths honours graduate, with no undergrad OR papers (well there weren't really too many in existence then), to register "Studies in Economics and /or Operations Research" as a PhD topic, attend some graduate papers, and get going on a research topic. Having shifted from Mathematics because it seemed to offer limited real world relevance, it did not take me too long to realise that, in those distant days before "the revolution", economics offered little more than pipe dreams of little relevance to the realities of an economy run by Government departments. OR on the other hand, offered the prospect of applying those same mathematical and economic concepts to the real world.

In particular, Hans had just returned from a study tour, armed with the latest information on reservoir management methods in the US, Norway, and France. It was the latter work which captured my imagination, as Hans translated internal working papers from Electricite´ de France, describing a model in which reservoirs were to be coordinated via a decomposition model which treated them as if they were operated by independent managers interacting via a market. This approach was necessitated by the limited capabilities of NLP software in those pre-MINOS days. But it was a radical idea, whose long term ramifications we could only dimly see at the time. I'm not sure if Hans has ever really come to accept those implications, destructive as they may be to the culture of Corporate OR and "Systems Thinking" at some organisational levels. But like it or not, it was Hans who first brought the concepts here, and Hans who supervised much of the early work in that area, not only by myself, but by several others, including Greg Manning, Ian Dempster and Bill Baker.

It has been said that “those who can, do.. those who can’t, teach”. I don’t believe this to be true of Hans, but perhaps a teacher’s greatest reward and legacy is not so much in what he or she “achieves”, but in what his or her students achieve. Over the years, a steady stream of Canterbury graduates have found satisfying careers in the electricity sector, and I believe they have made a positive contribution to society, both here and overseas. We all owe a debt of gratitude to Hans. Ironically, quite a few of those graduates are now consulting in Europe... taking back with them the fruition of those same radical ideas whose seeds Hans first brought to us. I’m sure they would all join me in wishing him well in his retirement.

**GRANT READ, University of Canterbury, email:g.read@mang.canterbury.ac.nz**

## **REMINISCING (on the subject of HGD) 1975-1999**

My first introduction to Hans Daellenbach – as students, our pronunciation of his name was “Hands Something” – was in a stage one economics course, right at the end, where we were introduced to Operations Research. In only two weeks! By the end of my first year of study (at the University of Canterbury) I had irrevocably decided not to be an accountant so, in the process of taking a number of courses in mathematics, I also took an economics course that was essentially an introduction to OR. I think it was called ECON205 and it was sufficiently interesting for me to take three part three OR courses the following year. It took until the third year for us students to get to know Hans better. I well recall a section in one course on Dynamic Programming, which was one of Hans’ strengths. However, judging from the average grade for the Dynamic Programming test of 29, it was not a strength of ours. Hans required us to re-sit the test: his conclusion was that standards were too low; ours was that they were too high. I have learned many things from Hans (thank you again, Hans) but I’m afraid that Dynamic Programming was not one of them.

After graduating with a BCom, taking a year off overseas, I returned for a Masters Degree in OR. As a graduate student, relations with academic staff became a little more familiar. What a year! I have never worked so hard; I have never learned so much. Aside from the many really useful things that I learned (and have subsequently used), my enduring memory of that year was Hans’ chocolate mousse. Absolutely superb! Looking back, I credit Hans and the other staff in OR for the well-rounded quality of that programme.

Then, after another break, I returned for a PhD, with Hans as supervisor. He said, “What do you want to do?” I said, “I don’t know – how about a simulation model of the Meat Industry?” Thankfully, that came to nought and Hans’ then present interest in multiple criteria decision making set me on a path from which I have not looked back. As a supervisor, Hans was both distant and close. Distant in the sense that if I did not go and see him, I did not see him at all. Close in the sense that if I did go to see him, he gave me fully of his time, reading whatever I gave him. The arrangement worked well and I was grateful for his support.

Finally, in my time as a University teacher, Hans was a colleague and sort of mentor. He never let me off lightly. When I asked for comment on something I had written, he did so, usually critically and challenged my thinking. Again, these were further instances of how Hans took things seriously and how he was unwilling to provide superficial responses. In my view as I look back, Hans modelled a very nice balance between hard-core, practical OR and eclecticism. Perhaps that is a simple consequence of a systems view. Hans significantly influenced my personal development and thinking - positively. I will miss him and his contributions; however, I suspect that retirement will still allow for some involvement with the OR community. I sincerely hope so.

**JOHN BUCHANAN, Waikato University, email:jtb@mngt.waikato.ac.nz**

## **‘OR EXPERTS’ AND PROFESSIONAL ETHICS**

The dictionary defines an expert as ‘a person who has extensive knowledge, mastery, or skills in a particular field, derived from training or experience’. Most of us would hardly quarrel with describing OR as the use of analytic and quantitative methods, tools, and techniques for modelling real-life problem situations in view of improving their effectiveness and efficiency. Hence, operations researchers are experts in analytic and quantitative modelling. What distinguishes OR from other applied scientific fields of knowledge is that OR has no subject domain, like electrical engineering, chemistry, etc. We share this with a few other subjects, such as Applied Mathematics, Systems Theory, etc. We are experts in a certain type of methodology and process for studying and analyzing all sorts of systems and operations in other subject domains.

Given this absence of subject domain, our expertise is of a rather elusive and abstract nature. When Grant Read studies the operation of electric power systems, he does so not as an expert in the physical operation of such systems, but as an expert in modelling of any system that has certain mathematical structures. He has little or no power systems operation domain expertise. Similarly, when Andrew Philpott develops optimization strategies for sailing Team New Zealand at the next America’s Cup, he contributes his expertise in mathematical modelling and not as an expert racing yachtsman. In other words, both are outside experts, applying their expertise on certain aspects in another subject domain. They must, in turn, rely to a large extent on the subject domain knowledge of ‘experts’ in that particular field.

Both will also readily admit (in a moment of weakness) that the fact that they used the ‘best method of analysis’ is no guarantee that the recommendations or strategies derived are the best from a prescriptive point of view for the real-life situation studied. Why are they right in this respect? There are a number of points or ‘truths’ that any expert worth her salt should periodically remind himself of (awful this political correctness of being gender neutral!).

Modelling, no matter how comprehensive, cannot deal with all aspects of a situation. The very definition of a model implies this. A model is an abstraction of some entity, expressing certain aspects at the exclusion of others. In OR it is usually a mathematical analogy, with all its simplifications and assumptions. So modelling has its limitations. Some are in the nature of built-in assumptions of the model, others relate to explicit assumptions and simplifications made by the modeller, and how well both of these are capable of capturing reality. Still others stem from how appropriate and relevant the model is for its intended use. Can it answer the right questions? And then there is also the question of how competently it is applied (but we have little doubt that both Grant and Andrew would pass that aspect with flying colours!). Werner Ulrich, the prime proponent of Critical Systems Thinking, states “Ceasing to be self-critical, with the consequent risk of claiming too much, is unfortunately very easy” (“If Systems Thinking is the Answer, What is the Question?”).<sup>1</sup> I would add that it is also very tempting, particularly if you desire to strengthen the publication chances of a piece of academic research or try to sell a piece of consultancy.

Full disclosure (in a language the user or client can readily understand) of the limitations of a modelling exercise, in terms of the explicit assumptions made by the modeller and the implicit assumption of the model itself, should be part of the professional ethics of any operations researcher. But there is more! The modeller should also state what questions the model can answer and what questions it cannot answer. I have no illusions that this may not always be easy, but it is here where the expert proves her competence in the proper use of a model.

If most experts worth their salt are aware of the limitations of their models, some fail to recognize another, more subtle and elusive layer of implicit assumptions in their methodology. Methodologies and models are not ‘value-free’. The form of the objective function, its components and how they are measured, imply a given ‘Weltanschauung’ or world view. The world view and hence the ‘values’ reflected in the model are usually the ones of the sponsor, owner, or decision maker of the problem situation. Furthermore, alternative means to reach given ends may have different implications and consequences for different stakeholders of the problem situation which are not considered in the model, except maybe through policy constraints or the choice of certain input parameters. Maximum emission standards of pollutants is an example of the former, the choice of discount rate used for a mining project or a nuclear power station project an example of the latter. A high discount rate puts a negligible value to the decommissioning costs and other long-term irreversible effects shouldered by future generations. The choice of discount rate has thus serious intergeneration distribution effects.

The very nature of OR experts' reliance on quantitative models may blind them to non-quantitative and intangible costs and benefits that are less obvious. Sometimes the social costs explicitly or implicitly ignored may extract a terrible price on other stakeholders.

My experience tells me that most operations researchers choose an objective function that is solely based on economic considerations. It is the default option, used more or less automatically. The question of whether this is a relevant or appropriate choice rarely gives rise to deliberate considerations and discussion. (Maybe those of us who are teaching OR inadvertently contribute to this failure. Question yourself: 'How much class time do you devote to that aspect of modelling?') Any OR model implies certain prevailing 'values'. It does not—in fact, it usually cannot—reflect the often conflicting 'values' of all stakeholders. However, we should make it clear and justify whose 'values' we use, and whose we ignore, and the consequences of this. (Another reason for extensive sensitivity analysis?) Again, I consider this an integral part of the professional ethics of an operations researcher.

<sup>1</sup> Working paper No. 22, 1998, Centre for Systems Research, Lincoln School of Management, University of Lincolnshire and Humberside

**HANS G. DAELLENBACH, University of Canterbury**  
**e-mail:h.daellenbach@mang.canterbury.ac.nz**

## **A POSITIVE LINEAR DISCRETE-TIME SYSTEMS MODEL OF CAPACITY PLANNING**

**CURRENT RESEARCH - Work with Professor L Caccetta and Dr V Rumchev of the Curtin University of Technology**

We present a model of the establishment of an aggregate production plan for a manufacturing plant. The basic issue, given a set of production demands stated in some common unit, is what levels of resources should be provided and what level of inventory should be held in each period? There has been a long history of academic research on aggregate planning, resulting in many mathematical programming models and in a variety of heuristics. However, as firms attempt to implement manufacturing planning and control systems, they find serious deficiencies in these models and heuristics. We attempt to overcome some of these drawbacks with a new approach. We discuss a new model of the issue, which is a positive linear discrete-time system (PLDS). Applying recent results concerning PLDS's we are able to analyze the model and provide a number of interesting new insights into capacity planning concerning the reachability of the system. We believe that this paper will prove to be a useful addition to the capacity planner's toolkit.

**LES FOULDS, Waikato University, email:l.foulds@waikato.ac.nz**

OR in the New Millenium

# ORSNZ 99

## CALL FOR PAPERS

The 34<sup>th</sup> Annual Conference of the Operational Research Society of New Zealand

Friday 10<sup>th</sup> and Saturday 11<sup>th</sup> December 1999

Hamilton, New Zealand

[www.mngt.waikato.ac.nz/orsnz99/](http://www.mngt.waikato.ac.nz/orsnz99/)

### VENUE AND CONCEPT

The conference will be held in the spacious, garden campus of the University of Waikato, Hamilton, New Zealand. We are using the “work-end” concept, for busy people to conference Friday and part of Saturday, allowing get-away time for a pre-Christmas break.

ORSNZ 99 also dovetails neatly with the MODSIM (Modelling and Simulation) conference (<http://www.mngt.waikato.ac.nz/depts/econ/modsim99.html>) which ends on Thursday, 9<sup>th</sup> December 1999.

### THEME: OR in the New Millenium

Well, we guess that was pretty predictable but given our discipline’s consciousness for its form and future, we would like to make future directions a conscious theme. At least one of our key speakers will address this issue, a forum on the theme will be organised. Further we will encourage each paper to have a small comment on future directions be it just for their work, perhaps their subject area or, better still, for OR in general.

### INVITED KEYNOTES

Professor Michael Rothkopf  
Rutgers University  
New Jersey, USA  
Title: “The Evolution of Operational Research”

Professor John Taplin  
The University of Western Australia  
Perth, Australia  
Title: “Simulation Models of Traffic Flow”

### STUDENTS

Full-time students who are speaking at the conference are eligible for travel grants in aid if travelling within New Zealand from outside Hamilton. Applicants for these travel grants are asked to note this information on their abstract submission.

### PAPERS

The conference welcomes submissions of paper abstracts (of up to 300 words) from interested participants. Submissions in plain text, Microsoft Word or LaTeX may be emailed to [orsnz99@waikato.ac.nz](mailto:orsnz99@waikato.ac.nz) or mailed to the following address:

ORSNZ 99  
Department of Management Systems  
University of Waikato  
Private Bag 3105, Hamilton, New Zealand

The closing date for acceptance of abstracts is 16 August 1999. Authors of papers will be notified regarding acceptance of their papers by 27 September 1999. Authors of accepted papers will be required to submit a full-length paper (up to 10 single-space typed pages) for publication in the Conference Proceedings which is issued to all participants and to all ORSNZ members. Authors are also encouraged to submit postscript (.ps) or Adobe Acrobat (.pdf) versions of their papers for inclusion in the conference archive. The deadline for submission of full papers is 25<sup>th</sup> October 1999. Guidelines for style and format of the full paper will be sent at the time of acceptance. Speakers will have about 20 minutes to present their paper at the Conference, plus five minutes for questions from the audience.

## CONTACT

All enquiries to either: ORSNZ 99  
or: Email : [orsnz99@waikato.ac.nz](mailto:orsnz99@waikato.ac.nz)  
Web site: [www.mngt.waikato.ac.nz/orsnz99](http://www.mngt.waikato.ac.nz/orsnz99)

## ORGANISING COMMITTEE

Dr John Buchanan Professor Les R Foulds  
Dr Chuda Basnet Dr Jim L Corner  
Dr John L Scott Dr Andrew Philpott

## IMPORTANT DATES

Abstract : 16 August 1999  
Full-paper submission: 27 October 1999

## REGISTRATION

Print registration form from the web, or send us a note and we will mail one to you.

## MASSEY OR

Operations Research at Massey University is undergoing a few changes along with the rest of the university. John Giffin (now known as the "Subject Leader of OR") is moving to the Institute of Information Sciences and Technology from his current position in the Institute of Fundamental Sciences. This will not involve a physical move at present. He will join the stochastic OR folk: Mark Bebbington, CD Lai, Graham Wood and Raj Govinduraju. Graham Wood is Professor of Statistics interested in global optimisation.

Mahyar Amouzegar has left us to work for the Rand Corporation in sunny California. I'll bet he misses the famous Massey weather.

In 2000, OR becomes Decision Sciences, possibly with a DS major in the BBS degree. Perhaps this will encourage the library to stock a few OR journals. In the meantime, post-graduate students will have to continue to haunt the libraries of other universities. At least this can't be said to take them away from their desks at Massey since only one of the five PhD students actually has a desk. Facilities are minimal here. Fortunately, we are all well-adjusted, optimistic, hard-working... Hello, is anyone out there?

**CATHERINE RIVERS, Massey University, email: [crivers@clear.net.nz](mailto:crivers@clear.net.nz)**

# **PRODUCTION AND INVENTORY MANAGEMENT PROBLEMS IN NEW ZEALAND**

## **THE PROBLEMS**

Because of the geographical isolation and small population of New Zealand, certain types of production and inventory management problems are widespread in this country. Those which are discussed here fall into the categories of

1. the need to cope with uncertainty and
2. the effects of production bottlenecks

If a company is only selling into the N.Z. market then the small size of that market results in the random fluctuations in the demands for products being large in percentage terms. Lead times from overseas suppliers are usually long. For these reasons, many New Zealand importers and manufacturers need to hold substantial stocks in order to be able to provide acceptable customer service. The resulting inventory carrying costs are frequently of considerable importance to the companies concerned. Many companies also find themselves with considerable dead stock problems.

Where possible, steps should be taken to reduce uncertainty and/or to develop contingency plans for averting imminent shortages. However, the need to hold substantial stock to cope with uncertainty is the norm, rather than the exception, in New Zealand. Optimisation when uncertainty is involved requires statistical modelling. The statistical models are peculiar to individual companies. Consequently, no generic software package can be expected to cope adequately with the problems of uncertainty, even if the package is industry specific.

## **RELEVANCE OF ERP SOFTWARE**

Enterprise Resource Planning (ERP) software packages are becoming popular. Some of them contain optimisation algorithms for use in supply chain management and production planning. Because of the large number of features in such packages, many people assume that such a package will solve all of their optimisation problems. However, for the reasons mentioned above, such packages will not cope adequately with the problems of uncertainty. Any company which is concerned about inventory levels should not look to an ERP package alone as the means of dealing with its problems. Such a package might still be of considerable assistance, including the collection of a wide range of useful data and optimisation of some aspects of the company's operations. It will, however, be necessary to deal with the problems of uncertainty as a separate exercise.

## **FORECASTING OF DEMANDS**

If lead times from suppliers are long, then it is important to ensure that the technique used for forecasting demands will perform well in the user's environment. If people are involved in forecasting, then it is important to ensure that they have feedback (preferably graphical) concerning their forecasting performance. If an automatic forecasting technique is used, then it should be chosen on the basis of the types of demand patterns which tend to occur. There is no such thing as a good general purpose forecasting technique. One which is designed or chosen appropriately on the basis of the environment in which it is to be used can be expected to produce much better results than a generic one. When long lead times are involved, the forecasting algorithm should be less sensitive than might be appropriate for short lead times. If focus forecasting is used then it is important to ensure that the amount of time over which the constituent forecasting techniques are compared is very long in comparison with the lead time.

## **UNCERTAINTY IN RELATION TO DISTRIBUTION**

Most New Zealand companies which import and distribute products need to carry substantial safety stocks. All appropriate methods of reducing the required investment in safety stock should be used including

1. ensuring that the technique used to forecast demands is appropriate
2. ensuring that the effective lead times are as short as they can be made without incurring excessive costs as a result
3. having contingency plans for dealing with shortages and
4. taking economic considerations into account in the setting of safety stocks for individual items.

For a more complete list, send email to editor@inventory.co.nz with "Distribution" as the subject.

## **UNCERTAINTY IN RELATION TO MANUFACTURING**

Many New Zealand manufacturers find it necessary to hold substantial stocks of raw materials and/or finished products in order to be able to provide acceptable customer service. The methods mentioned above for dealing with uncertainty in relation to distribution also apply here. Manufacturers have some additional methods of reducing the required inventory levels. These are concerned with machine selection, staff training, production planning and work in progress (w.i.p.) stock.

Many New Zealand manufacturers have only one machine of each type. Consequently, it is common for one machine to be a continual bottleneck. Although this situation is not desirable, it does provide a substantial benefit, viz. that it simplifies production planning. Most of the production planning can be concentrated on coping with the bottleneck. The existence of the bottleneck creates considerable flexibility in the rest of the production capacity planning. This is particularly true if the company has a multi-skilled workforce. The problems caused by the bottleneck can be alleviated by means of having buffer stocks before and after it. The existence of this w.i.p. stock reduces the required stock of raw materials and of finished products. It also helps to alleviate the effects of uncertainty and to further increase the flexibility of production planning.

If one of the production processes produces a number of different items with some of the input items in common then overall stock levels can be reduced by holding stock just before that production stage. Painting and packaging are examples of such production processes. If the process concerned is the last one then, if that process can be carried out on a just in time basis, the need for stock of finished products is replaced with a need for a considerably smaller amount of w.i.p. stock.

## **A LOW COST SOLUTION FOR SMALL COMPANIES**

Many New Zealand companies are small enough to enable them to use spreadsheets for the purpose of inventory management and/or production planning and many of them do so. However, most such spreadsheets are very basic and their usefulness could be improved greatly. Companies for which this approach is often appropriate are

1. those which distribute a small number of products and
2. manufacturers of a small number of products and for which one of the production processes is a continual bottleneck.

In such situations, the forecasting of demands for finished products is usually done by people and the forecasts are included in the spreadsheet. If the actual sales (or demands) are entered as well then it is a simple matter to compare the two graphically.

The spreadsheet should include calculation of the stocks at all locations at which buffer stocks are planned. In a supply chain, the buffer stocks concerned are at the various stocking locations. In a manufacturing operation, the most relevant buffer stocks are of raw materials, finished products and the three types of w.i.p. buffer stocks mentioned above.

All of the important relevant variable costs should be included. These should include the inventory carrying costs.

Spreadsheets have very versatile "What if" analysis capabilities. Use of such capabilities to experiment with buffer stocks is a useful exercise.

If there are weather dependent seasonal demands then the "What if" analyses should include, not only changes in the magnitudes of the seasonal peaks and troughs but, just as importantly, the timing of the seasonal peaks.

"What if" analysis is not an optimisation technique but it is a start. Replacing forecasts with historical data can yield greater insights. There are serious shortcomings in the use of this approach in the setting of near-optimal buffer stocks. In order to achieve better results, statistical modelling is essential. It is then possible to make the spreadsheet take uncertainties into account with the aid of an add-on called "@RISK" which was developed by the Palisade Corporation. It is then possible to experiment with buffer stocks to achieve near-optimal results. Use of "RISKOptimizer", which incorporates @RISK and was developed by the same company, can be used to carry out the optimisation. However, it will not reduce the need for statistical modelling.

Capacity planning should not be restricted to processes which are continual bottlenecks. However, the existence of a bottleneck and of the five types of buffer stocks mentioned above will enable many small New Zealand companies to carry out reasonably good production planning using fairly unsophisticated techniques.

## **CONCLUSION**

Good inventory management and production planning can often be achieved in N.Z. companies with the use of reasonably simple techniques and a small expenditure on appropriate consultancy services. Such an approach will frequently yield a much better result at a much lower cost than implementation of an ERP package. ERP packages do have their uses and, if used appropriately and in the right environments, they can provide considerable benefits. They must not, however, be looked upon as a complete solution for a company's problems, particularly in the N.Z. environment. When uncertainty is involved, implementation of software alone is insufficient.

There is no such thing as a panacea for all inventory and production management problems. What is important is that the main sources of potential improvement are identified and dealt with. Only after that has been done should any effort be devoted to trying to optimise the handling of individual sources of improvement.

*This article was adapted from an article in the "E-Journal of Distribution Inventory Management" which is distributed free of charge by email. To subscribe, send email to [editor@inventory.co.nz](mailto:editor@inventory.co.nz) with "Subscribe" as the subject.*

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# 17th INTERNATIONAL CONFERENCE OF THE SYSTEM DYNAMICS SOCIETY & 5th AUSTRALIAN NEW ZEALAND SYSTEMS CONFERENCE

\*\*\*\*\*SYSTEMS THINKING FOR THE NEXT MILLENNIUM\*\*\*\*\*

July 20-23, 1999 - Wellington, New Zealand

## CONFERENCE INFORMATION

**SYSTEM DYNAMICS & SYSTEMS THINKING** - This conference is expected to attract more than 200 experts and practitioners from around the world, specialising in system dynamics, systems thinking and other systemic methodologies.

**PROGRAMME** - The main theme of the conference is "Systems Thinking for the Next Millennium." Sub-themes will examine the applications, contributions of and the linkages between systems thinking, scenario planning and strategic simulation. This theme may be addressed through the perspectives of:

- System dynamics
- Hard, soft and critical systems
- Adaptive and strategic planning
- Organisational learning and research
- Chaos and complexity
- Philosophy of systems thinking
- Action learning and research
- Community systems research
- Community and soft OR
- Management science methodologies
- Cognitive processes in systems thinking and learning
- Systems methodologies

In other areas of interest, parallel sessions and some plenary sessions will cover the range of work being done by systems thinking and system dynamics practitioners worldwide.

Over 250 abstracts for paper presentations, workshops and tutorials sessions have been received. Abstracts are currently being peer reviewed, and acceptances will be communicated the beginning of March 1999. The draft programme will be available in March. Please visit the website for updates.

Information on travel, the partners program, speakers, the conference schedule and the programme design will be updated on the conference website.

## CONTACTS

### Conference chair

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**FOR MORE INFORMATION AND UPDATES PLEASE VISIT THE WEBSITE AT:**

<http://www.vuw.ac.nz/gsbgm/isdc99>

## **AUCKLAND RESEARCH WINS IPENZ EXCELLENCE AWARD**

Professor David Ryan of Auckland University and his team of collaborators at Air New Zealand have been awarded the Institute of Professional Engineers (IPENZ) Excellence Award for Information Technology and Networks Engineering. The award was made at the IPENZ Congress in Wellington on February 6. Professor Ryan's project, which has been running for 14 years and involved many postgraduate and undergraduate contributors, uses state-of-the-art optimisation techniques to construct tours of duty and rosters for air crew and cabin crew on Air New Zealand flights. The techniques developed have allowed the solution of previously intractable problems and have made huge savings for Air New Zealand. A profile of Professor Ryan and his research is to appear in the next Newsletter.

**ANDY PHILPOTT, University of Auckland**

## **SCIENTIFIC FORECASTING KNOWLEDGE WEBSITE AND PROJECT**

Scott Armstrong is working (along with 45 others) on a project summarize existing knowledge about in all areas of forecasting, with a heavy emphasis on forecasting in the management sciences. This knowledge is being formulated as principles that can be used by practitioners and researchers. Information about this project can be found at <http://hops.wharton.upenn.edu/forecast>.

The site also contains everything needed to use forecasting principles, such as sources of data, guides to the research literature, sources of forecasts, and relevant organizations. This project will lead to a book to be published in late 1999. If you would like to review any of the papers (described on the website) or if you have done research that might be relevant to forecasting principles, contact Scott (<mailto:armstrong@wharton.upenn.edu>) Finally, the site tries to provide all you need to know to use forecasting principles. It is not there yet. Suggestions?

website: <http://www-marketing.wharton.upenn.edu/faculty/armstrng.html>  
website on forecasting: <http://www-marketing.wharton.upenn.edu/forecast>  
website on advertising: <http://www-marketing.wharton.upenn.edu/~esap>

**J. SCOTT ARMSTRONG, University of Pennsylvania**  
**email:armstrong@wharton.upenn.edu**

## **INFORMS-KORMS SEOUL 2000 INTERNATIONAL MEETING**

Friends and Colleagues,

I would like to invite you to organize a session of 3 to 5 speakers in the "Tabu Search" cluster, at the forthcoming INFORMS-KORMS Seoul 2000 International Meeting, in Seoul, Korea, June 19-21, 2000.

If you can accept, please let me know at your earliest convenience, and I'll send you additional information, including deadlines and submission forms.

**FRED GLOVER, email:fred.glover@colorado.edu**

## MEETINGS CALENDAR FOR 1999 AND BEYOND

Western Decision Sciences Institute, 28th Annual Meeting: 6 - 10 April 1999, Puerto Vallarta, Mexico  
Email: [mnicholls@swin.edu.au](mailto:mnicholls@swin.edu.au) or <http://faculty.mckenna.edu/wdsi>

INFORMS Cincinnati Spring 1999 Meeting: 2 - 5 May 1999  
Chair: David F. Rogers, University of Cincinnati, Ohio, 45221-0210, USA  
Email: [David.rogers@uc.edu](mailto:David.rogers@uc.edu)

3rd International ICSC Symposia on Intelligent Industrial Automation: 1- 4 June 1999, Genova, Italy  
Conference Organiser: [operating@icsc.ab.ca](mailto:operating@icsc.ab.ca)

5th International Conference of the Decision Sciences Institute: 4 - 7 July 1999, Athens, Greece  
Contact: <http://www.dsi99.athens.aueb.gr>

ASOR National Conference: 4-7 July 1999, Gold Coast, Queensland, Australia  
Email: [asor@fsc.qut.edu.au](mailto:asor@fsc.qut.edu.au) or <http://www.math.fsc.qut.edu.au/asor>

New Zealand Statistical Association 50th Anniversary Conference: 5 - 7 July 1999, Victoria University, Wellington New Zealand  
Contact: Conference Secretary, PO Box 1731, Wellington, New Zealand  
E mail: [NZSA99@mcs.vuw.ac.nz](mailto:NZSA99@mcs.vuw.ac.nz) Web page: <http://www.mcs.vuw.ac.nz/>

6th International Conference of the United Kingdom Systems Society, 5 - 9 July 1999, Lincoln Campus, University of Lincolnshire and Humberside United Kingdom  
Contact: Doreen Gibbs, Lincoln School of Management, Lincolnshire and Humberside University, Brayford Pool, Lincoln LN6 7TS, United Kingdom  
Tel: 01522 886 202 Facsimile: 01522 886 032 email: [ukss99@lincoln.ac.uk](mailto:ukss99@lincoln.ac.uk) Web page: <http://www.lincoln.ac.uk/lsm/ukss99/>

17th Conference of the International System Dynamics Society and 5th Australia New Zealand Systems Conference: 20 - 23 July 1999, Wellington, New Zealand.  
Deadline for papers 1 May 1999  
Conference Manager: Margaret Stevenson-Wright, Graduate School of Business and Government Management, Victoria University of Wellington  
Tel: 64 4 496 5452 Facsimile 64 4 496 5459 email: [Margaret.Stevenson-Wright@vuw.ac.nz](mailto:Margaret.Stevenson-Wright@vuw.ac.nz)

IFORS '99 Beijing: 16 - 20 August 1999, Friendship Hotel, Beijing, China  
Contact: Ms Loretta Peregrina, IFORS Secretariat, Richard Ivey School of Business, University of Western Ontario, London, Canada N6A 2K7  
[IFORS@Ivey.uwo.ca](mailto:IFORS@Ivey.uwo.ca)  
IFORS OR in development prize: contact Dr Elise Del Rosario, [elisear@sanmiguel.com.ph](mailto:elisear@sanmiguel.com.ph)

10th Mini Euro Conference, HCP'99, 20 - 24 September 1999, Brest, France  
Contact: Ghislaine Le Gall, Departement IASC, ENST Bretagne, BP 832, 29285, Brest cedex-France.  
Tel 33 2 9800 1425 Facsimile: 33 2 9800 1030 e mail: [Ghislaine.LeGall@enst-bretagne.fr](mailto:Ghislaine.LeGall@enst-bretagne.fr) or <http://www.iasc.enst-bretagne.fr/hcp99/>

26th International Conference on Computers and Industrial Engineering, 8 - 10 December 1999, Melbourne, Australia  
Contact: Paul Lochert, Monash University, PO Box 197, Caulfield East, Vic 3145, Australia  
Tel: 61 3 9903 2647 Facsimile: 61 3 9903 2227 e mail: [p.lochert@sci.monash.edu.au](mailto:p.lochert@sci.monash.edu.au)

34<sup>th</sup> Annual Conference of the Operational Research Society of New Zealand. 10-11<sup>th</sup> December 1999, Waikato University, Hamilton, New Zealand  
Closing dates for abstracts is 16 August 1999 and full paper submissions 27 October 1999.  
Contact: John Scott, email: [jls@waikato.ac.nz](mailto:jls@waikato.ac.nz) or email: [orsnz99@waikato.ac.nz](mailto:orsnz99@waikato.ac.nz)