Fertilizer industry plays an important role in developing economies. Outgoing quality of fertilizer is required to be as per minimum nutritional statutory constraints. Silos are generally used for storage and recovery to balance production and distribution. A decision support system is developed to determine silo size and mixing strategy so as to achieve uniform outgoing quality and eliminate off-spec reprocessing completely, resulting in a recurring direct saving of over Rupees five crores per year. (NC)

FA9.2 Decision Analysis in Some Practical Problems in China, *D. Yong/Chinese Academy of Sciences, Grad. Sch., 19 Yu quan Rd., 100039 Beijing, China*

This paper is the result of some applications of OR methods in the design of a large scale opencut coal mine and the studies of a national award system. It presents some new concepts, methods and techniques. The results obtained are rewarding in the sense of social and economic benefits for China. (NC)

FA9.3 A Linear Programming Model for Distribution of Electrical Energy in a Steel Plant, *G. Datta/Northwestern University, Dept. IE/MS, Evanston, IL 60208 USA; G.P. Sinha/ Tata Iron & Steel Co. Ltd., N. Mitter, P.N. Roy*

This paper refers to the development and implementation of mathematical programming model for optimal distribution of electrical energy in an integrated steel plant. The model considers all the technoeconomic constraints not only to decide which processor to run, but also optimal product mix at each level of energy availability. (C)

FA9.4 A Decision Support System for the Dairy Industry – Procurement Fore- casting, Production Planning and Operations, *V.P. Gulati/Institute of Rural Management, Anand 388 001., B.M. Vyas/Gujarat Cooperative Milk Mktg. Fed.*

A DSS was developed for dairy federations in 1986 and implemented in the Gujarat Cooperative Milk Marketing Federation (GCMMF) in 1987. Subsequently, the Federation used the DSS in solving several of its planning and operational problems and could also take long term decision on capacity expansion based on the information supplied by the DSS. This paper documents such experiences of the Federation. Several additions to the DSS and improvements in the software have been made subsequent to its implementation. These were made based on the specific needs of the users, to improve its support to the managers and make it more powerful. Due to the recent developments in the industry and changing information needs, the paper explores the possibility of different kinds of support that a DSS might have to provide. (C)

Friday 9:00am – 10:30am

Investments

FA10   *Contributed Session/Patamar SB/Loja/Ritz*

Chairman: *Tara K.N. Baidya/Pontificia Universidade Catolica, Rua Marques de Sao Vicente, 225, Gavea - CEP, 22453 Rio de Janeiro, Chile*

FA10.1 Robustness as a Decision Criterion in Capital Investment Analysis, *R. Berry/University of East Anglia, SYS/UEA, Norwich, NR4 7TJ UK; D. Trigueiros, G. Ergodan*

We show that Quinlan's ID3 algorithm (1979) originally intended for extracting rules from sequential data, is very effective in interpreting complex decision trees like those used in Investment Appraisal. Namely, we show that a new way of assessing the robustness of decisions is obtained. We present a real-world example. (C)

FA10.2 Decision Factor Analysis of R&D Investment: A Case of Major Industries in Japan, *T. Sumita/The Japan Development Bank, 1-9-1 Ohtemachi Chiyoda-ku, Tokyo 100, Japan; S. Kigawa/Toyo University, T. Ueno/Wako University*

The purpose of this study is to determine the decision factor of R&D investment by enterprise in major industries in Japan. They are the electric, precision, chemical and medical supplies industries. Based on our analyses, we found the important factors which effect the level of R&D investment by each enterprise. (C)

FA10.3 Empirical Verification of the Option Pricing Model of Black and Scholes in the Financial Markets of Brazil, *T.K. Baidya/Universidade Catolica do Rio de Janeiro, Rua Marques de Sao Vicente, 225, Gavea - CEP, 22 453, Rio de Janeiro, Brazil*

The main problem in testing the option Pricing Model is the inability to make good forecasts of the variance of the underlying stock. Past observations demonstrate that the variance is not constant. Methods used to forecast the variance are described. These methods have been applied to the Brazilian Option Market Data and interesting results have been obtained. (C)

Friday 9:00am – 10:30am

Strategic Management - I

FA11   *Invited Session/D. Henrique/Ritz*

Chairman: *Seiichiro Yahagi/Yahagi Consultants, Inc. 3-130-13 Hanakoganei, Kodaira-shi, Tokyo-to 187, Japan*

FA11.1 Quadruplet of Corporate Strategy Simulations and their Applications, *S. Yahagi/3-130 13 Hanakoganei, Kodaira-shi, Tokyo-to 187, Japan*

An integral group of corporate strategies have been developed. They are Corporate Structure Innovation Strategy, Resource Allocation Strategy, Management Efficiency Improvement Strategy and Management Resource Input/Output Strategy. These strategies are composed of strategy concepts, procedures and computer simulation programs. The applications coverage for these strategies has now reached about 20 of the 27 major Japanese industries. (I)

FA11.2 Interactive Consulting: Guiding Clients to the Optimal Strategic Plan, *T. Koi/Yahagi Consultants, 2515 New Otani Business Crt., 4-1. Kioi-cho, Chiyoda-ku, Tokyo 102, Japan*

The value-oriented '90s require that planning consultants give more than just outside solutions. Unlike a black-box approach, "Interactive Consulting" utilizes the existing expertise of the client's staff and teaches them the strategic concepts, procedures and tools necessary to formulate effective strategic planning on an on-going basis. (I)

FA11.3 The Strategic Traffic Management Systems, *J. Shibata/Sumitomo Electric Industries, Ltd., 4-5-33, Kitahama, Chuo-ku, Osaka 541, Japan*

The dynamic navigation system is one of the most advanced strategic traffic management systems and is considered to improve the existing driver information systems. Sumitomo Electric Industries, Ltd. had developed a commercially based navigation system with map-matching technology. (I)

Friday 9:00am – 10:30am

Search Theory and Applications

FA12   *Invited Session/Obidos A/Meridien*

Chairman: *Lawrence D. Stone/Metron Inc., 11911 Freedom Dr., Ste. 800, Reston, VA 22090-5603 USA*

FA12.1 Search for the SS Central America: Mathematical Treasure Hunting, *L.D. Stone/Metron, Inc., 11911 Freedom Dr., Ste. 800, Reston, VA 22090-5603 USA*

In 1857, the SS Central America sank, taking gold bars and coins worth $400 million dollars to the ocean bottom almost 8000 feet below. The author developed a probability distribution for the location of the Central America. This distribution was used for constructing the search plan that found the wreck. (I)

FA12.2 Filtering for Static and Dynamic Information, *T.L. Corwin/Metron, Inc., 11911 Freedom Dr., Ste. 800, Reston, VA 22090-5603 USA*

We explore the adaptation of a nonlinear filter to processing dynamic and static information. The conditional distribution of state, given both types of information, is derived. Two representations are presented, one based upon a factorization of the posterior