Goodeve Medal – Previous Winners

- 2022 - Giusppe Bruno, Manuel Cavola, Antonio Diglio, Gilbert Laporte and Carmela Piccolo
- 2021 - Greg H. Gehret, Jeffery D. Weir, Alan W. Johnson, David R. Jacques
- 2020 - Esra Adiyeke, Semra Agrali and Ethem Canakoglu
- 2019 - Assimizele Brice, Robin Bye, Johannes Royset, Johan Oppen
- 2018 - Agha Iqbal Ali and Guven Ince
- 2017 - Aimée Backiel and Bart Baesens
- 2015 - Sally Brailsford, Dileep De Silva
- 2014 - Sonya Crowe, Peter Bennett, Maren Daraktchiev, Martin Utley
- 2013 - J Bengtsson, D Bredström, P Flisberg, M Rönnqvist
- 2012 - P Kemmer, A Strauss, T Winter
- 2011 - R Johnston, E Shale, S Kapoor, A Sheth, R True
- 2010 - L C Thomas
- 2009 - S Kumar, D A Nottestad, E E Murphy
- 2008 - D Ronen, C A Goodhart
- 2007 - A Medina-Borja , K S Pasupathy, K Triantis
- 2006 - SC Brailsford, P Harper, D Evenden, Dr V Harindra
- 2005 - K Taylor, B Dangerfield
- 2004 - SC Brailsford, V Lattimer, P Tarnaras, J Turnbull
- 2003 - R Hartley, G Lanot
- 2002 - J E Beasley, H Howells, J Sonander
- 2001 - C Eden, S Howick
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- 1999 - J Banasik, J N Crook, L C Thomas
- 1998 - F Duckworth, A J Lewis
- 1997 - D-W Tcha, T-J Choi, Y-S Myung
- 1996 - C M Yates, T Rehman
- 1995 - M Carey, D Lockwood
- 1994 - G M Campbell, C F Davis
- 1993 - D W Bunn, E R Larsen, K Vlahos,
- 1992 - A Bouzaher, S Offutt
- 1991 - D Schrady, D Wadsworth
- 1990 - R Bandyopadhay, S Datta

THE OPERATIONAL RESEARCH SOCIETY

Citations

Citation for Goodeve Medal 2022

Giusppe Bruno, Manuel Cavola, Antonio Diglio, Gilbert Laporte and Carmela Piccolo

Reorganizing postal collection operations in urban areas as a result of declining mail volumes – A case study in Bologna.

The Journal of the Operational Research Society 72 (7), 1591-1606

www.doi.org/10.1080/01605682.2020.1736446

Many OR projects deal with the location of services when expansion is planned. But of course, there are increasing numbers of contraction of services due to technological change. In particular, the impact of technological developments on consumer habits and behaviour is endangering the classical model of postal services. The resulting fall in postal volumes generated by the substitution of traditional letter posts by electronic forms of communication has rendered the collection of postal items highly inefficient.

This project deals with a real problem concerning the reorganization of the collection system of the Italian postal service provider, based on the reduction of the number of postboxes currently located in an urban area. When considering the crucial role of post-boxes as main access points of some users to the postal network, equity is also taken into account.

The authors have produced a very clearly written paper and tested its practical value. The method can be applied to a wide range of other cases of declining but essential services.

From left to right: Giuseppe Bruno, Manuel Cavola, Antonio Diglio, Gilbert Laporte, Carmela Piccolo

Citation for Goodeve Medal 2021

Greg H. Gehret, Jeffery D. Weir, Alan W. Johnson, David R. Jacques

Advancing stock policy on repairable, intermittently-demanded service parts.

Journal of the Operational Research Society, Volume 71 (9) 1437-1447

https://doi.org/10.1080/01605682.2019.1610206

Many firms generate revenue by operating systems or fleets, such as rental cars, aircraft, equipment etc. The contribution of service parts to the availability of the system or fleet is well documented. The majority of service parts are intermittently demanded. Research on intermittent demand has primarily focused on forecast accuracy and generally does not distinguish between the stock policies of consumable versus repairable parts, although repair is sometimes more cost-effective. But managing repairable parts is considerably more complex than managing consumable parts.

In this paper, the authors employ a new approach to advance the supply chain manager's ability to determine cost-effective stock. They use a multi-objective approach, covering waiting times and various components of cost. They solve this using different approaches, including seeking a Pareto surface.

They test the new approach via a case study and show the approach to be beneficial for a given firm The approach is generalisable to many sectors, including transport, health and local services. This paper offers a significant development of stock modelling.

From left to right: Jeffery D. Weir, Alan W. Johnson, David R. Jacques, Greg H. Gehret

Citation for Goodeve Medal 2020

Esra Adiyeke, Semra Agrali and Ethem Canakoglu

Risk Averse Investment Strategies for a Private Electricity Generating Company in a Carbon Constrained Environment

Journal of the Operational Research Society, 70 (12), 2056-2068

www.tandfonline.com/10.1080/01605682.2018.1535265

This year's Goodeve medal is awarded to Esra Adiyeke, Semra Agrali and Ethem Canakoglu, who are based in Turkey.

We chose this paper because it is well and clearly written, and it deals with a global and fundamentally important topic, the carbon-and-climate issue. The study looks at a private electricity generating company that plans to enter a partially regulated market that operates under an active cap and trade system. There are different types of thermal and renewable power plants that the company considers to invest in over a predetermined planning horizon. The paper develops a time-consistent multi-stage stochastic optimization model for this investment problem, where the objective is to minimize the conditional value at risk (CV@R) of the net present value of the profit obtained through the planning horizon. The results of a simple case-study show that the developed model is appropriate for determining risk averse investment strategies for a company that operates under carbon restricted market conditions.

Citation for Goodeve Medal 2019

Assimizele Brice, Robin Bye, Johannes Royset, and Johan Oppen

Preventing environmental disasters from grounding accidents: A case study of tugboat positioning along the Norwegian coast.

Journal of the Operational Research Society, 69(11): 1773-1792

This year's Goodeve medal was awarded to Brice Assimzele, Johannes Royset, Robin Bye and Johan Oppen, 3 of whom are based in Norway and one based in the USA. Their paper "Preventing environmental disasters from grounding accidents: A case study of tugboat positioning along the Norwegian coast" is a welcome step towards reducing the environmental impact of oil tankers. Sad to say, oil tankers sometimes run aground and can cause great harm to the marine and coastal environments.

The northern coast of Norway is at risk from such accidents and tugs are stationed along the coast, ready to tow tankers that get into difficulties so as to prevent damage. It is clearly important that the tugs can respond quickly, so their positioning is important. The paper reports a way to method that produces optimum positions for the tugboats. This is based on a non-linear, binary-integer program, integrated in a receding horizon control algorithm that minimises the expected cost of grounding accidents

At the time of writing the paper, the method was being considered for implementation within a decision support system operated by Norwegian Coastal Administration. This embedding of OR methods into routine decision support systems will greatly help reduce environmental damage.

Citation for Goodeve Medal 2018

Agha Iqbal Ali, Isenberg School of Management, MA USA, and Guven Ince, Nature Source Genetics, NY USA

Distress among disaster-affected populations: delay in relief provision

Journal of the Operational Research Society, 68 (5): 533-543

With major disasters seemingly even more common these days, this is a very important piece of work. It looks at the issue from the point of view of those impacted (compared to a number of studies concerned with making relief more efficient overall).

In this paper, the authors characterize two levels of distress, termed criticality and destitution, with respect to the delay provision of relief items. Delay in provision of a relief item will lead to destitution for a tolerable number of days, beyond which it will lead to criticality. They develop a mixed-integer goal program that quantifies these two metrics with respect to the number of days without provision of each of a set of relief items. The model determines the allocation of resources and the distribution of available relief items in a manner that minimizes criticality and destitution in affected population segments.

The use of the model is illustrated covering for the aftermath of a fictional catastrophic earthquake in a major city. The paper pinpoints the distinguishing characteristic of humanitarian logistics: that the requirements for resources are greatest at the onset of distribution. Strategic planning of disaster relief, beyond the consideration of infrastructure and storage of relief items, must include the establishment of protocols for immediate deployment of transport and manpower capacity.

Agha Iqbal Ali and Guven Ince with OR Society President John Hopes.

Citation for Goodeve Medal 2017

Aimée Backiel, KU Leuven, Belgium; Bart Baesens, University of Southampton, UK & KU Leuven, Belgium; Gerda Claeskens, KU Leuven, Belgium

Predicting time-to-churn of prepaid mobile telephone customers using social network analysis

Journal of the Operational Research Society, (2016) 67 (9), 1135-1145

https://doi.org/10.1057/jors.2016.8

Predicting time-to-churn of prepaid mobile telephone customers using social network analysis Journal of the Operational Research Society 67: 1135-1145 Mobile phone carriers in a saturated market must focus on customer retention (churn) to maintain profitability. This study investigates whether the incorporation of social network information into churn prediction models can lead to improved accuracy, timeliness, and profitability. Records of 1.4 million customers making over 30 million calls per month were analysed for 6 months using Cox proportional hazards models, enabling improved predictions of likelihood of churn for each individual customer to be determined for each future time segment. This paper demonstrates how OR and analytics can improve business performance in a market that is used by almost everyone.

Aimée Backiel and Bart Baesens

Citation for Goodeve Medal 2015

Sally Brailsford, University of Southampton; Dileep De Silva, Ministry of Health, Sri Lanka

How many dentists does Sri Lanka need?

Journal of the Operational Research Society, (2015) 66 (9), 1566–1577

https://doi.org/10.1057/jors.2014.136

Against the background of an over-supply of trained dentists in Sri Lanka, the authors developed two System Dynamics models, one to represent the supply of dentists, through training and in practice until retirement and the other to represent the demand for dentists under various scenarios of population change and economic activity over the coming 15 years. The impact of two key decision variables were examined: first, the annual recruitment rate of admitting new students to university, and second, the creation of new state-funded clinical posts. The fact that one of the authors is a qualified dentist engendered trust and a high response rate from participating dentists, resulting in realistic estimates of transition rates from year to year being obtained. Ministry of health officials participated in runs of the models to examine policy options and have based policy on the results. The outcome is that Sri Lankan dentists now have improved career prospects and more than one million people who previously had no access to care now visit a state dentist at least once a year.

This paper describes an outstanding case study with a powerful impact and stresses the importance of involving all stakeholders so as to ensure the collection of accurate data and to ease implementation.

Dileep De Silva and Sally Brailsford with Ruth Kaufman

Citation for Goodeve Medal 2014

Sonya Crowe (UCL), Peter Bennett (Dept of Health), Maren Daraktchiev (Dept of Health), Martin Utley (UCL)

Use of modelling to inform public health policy: a case study on the blood-borne transmission of variant-CJD

Journal of the Operational Research Society, (2014) 65 (2), 269–277

https://doi.org/10.1057/jors.2013.26

Since the identification of variant Creutzfeldt–Jacob (mad cow) disease in the late 1980s, presented challenging policy questions for Government and blood services in the UK. This study is an excellent example of effective collaboration between operational researchers, expert clinicians and decision makers in predicting the future impact of vCJD infections and to evaluate the likely impact of counter measures to alleviate the spread. The challenge to OR was to develop (relatively simple) models using realistic assumptions to predict future infections from very few observations, when the transmission rate is low and the development of the disease is long term– in fact this study could be labelled 'OR with Small Data'! The model's predictions conformed to the observed data and enabled certain assumed rates of infection to be dismissed as unrealistic. The model was endorsed by the clinicians and the likely future scenarios generated were then used by the decision makers to inform government policy.

Sonya Crowe, Peter Bennett, Maren Daraktchiev and Martin Utley with Stewart Robinson

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Citation for Goodeve Medal 2013

Jens Bengtsson, David Bredström, Patrik Flisberg and Mikael Rönnqvist

Robust planning of blending activities at refineries

Journal of the Operational Research Society, (2013) 64 (6), 848–863

https://doi.org/10.1057/jors.2012.86

Refinery operation planning is a complex task since refinery processes and inventories are tightly interconnected and ships arriving with crude oil for processing have uncertain arrival times. Whilst optimising oil refinery operations has been a standard application of OR techniques for decades, this is the first successful attempt to combine the uncertainty of tanker arrivals into a robust optimisation approach. The authors use a simulation case study to demonstrate that this methodological innovation out-performs conventional deterministic approaches and will be of great interest to both researchers and practitioners.

Citation for Goodeve Medal 2012

Philipp Kemmer, Arne Strauss and Thomas Winter

Dynamic simultaneous fare proration for large-scale network revenue management

Journal of the Operational Research Society, (2012) 63 (10), 1336–1350

https://doi.org/10.1057/jors.2011.143

Network revenue management is a critical activity in the airline industry and in this paper the authors develop a new method using dynamic programming which outperforms the standard benchmarks used by the industry. The novelty here is to decompose the network problem into a number of single resource problems that are easier to solve, resulting in higher expected revenues and reduced computing time. The new approach has been tested and proved on real data from Lufthansa and consequently also demonstrates the potential rewards from academic collaboration with industry.

Arne Strauss, Philipp Kemmer, and Thomas Winter with Geoff Royston

Citation for Goodeve Medal 2011

R Johnston, E Shale, S Kapoor, A Sheth and R True

Breadth of range and depth of stock: forecasting and inventory management at Euro Car Parts Ltd.

Journal of the Operational Research Society, (2011) 62 (3), 433-441

https://doi.org/10.1057/jors.2010.189

This case study paper describes how the management of the stock held by a large UK wholesale car parts company, at regional hubs and local stock holding branches, was improved. A critical and innovative feature in the approach was the linking of both the range of stock and the amount of stock to hold at hubs and branches so as to optimise the investment in inventory. Improved parts demand forecasts were also developed to enable better management of inventory. The new approach was implemented and has led to significant increases in stock turn and sales value with only a marginal increase in inventory held.

The judges described the paper as an excellent case study which had a real and sustained impact on the client company. The work demonstrated that theoretical developments can lead to significant benefits in the real world so long as researchers and managers collaborate closely so as to address the practicalities.

Citation for Goodeve Medal 2010

Professor Lyn Thomas, University of Southampton

Consumer finance: challenges for operational research

Journal of the Operational Research Society, (2010) 61 (1), 41–52

https://doi.org/10.1057/jors.2009.104

Consumer finance has become one of the most important areas of banking, both because of the amount of money being lent and the impact of such credit on the global economy and the realisation that the credit crunch of 2008 was partly due to incorrect modelling of the risks in such lending. This paper, written by a key expert in the field, lucidly reviews the history and development of credit scoring (the way of assessing risk in consumer finance) and what is meant by a credit score. It then outlines 10 challenges for operational researchers in better supporting modelling in consumer finance. Some of these challenges involve developing more robust risk assessment systems, whereas others expand the use of such modelling to deal with the current objectives of lenders and the new decisions they have to make in consumer finance. This paper is likely to have a major impact on research and practice in evaluating risk in consumer finance.

Lyn Thomas with Richard Eglese

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Citation for Goodeve Medal 2009

S Kumar, D A Nottestad and E E Murphy

Effects of product postponement on the distribution network: a case study

Journal of the Operational Research Society, (2009) 60 (4), 471–480

https://doi.org/10.1057/palgrave.jors.2602572

In this case study paper a simulation model is described which enabled a large multi-national manufacturing company (3M) to evaluate the introduction of a product postponement policy that had become feasible. Product postponement involves the timing of products in the various parts of the distribution chain and also whether it is cost-effective to delay some manufacturing processes, e.g. assembly, until a customer order is received. The use of the WITNESS-based discrete-event model enabled distribution planners to evaluate trade-offs between stock holding costs and delivery performance to customers. The judges were impressed with the way that customer ordering behaviour had been modelled in a realistic way and by the development of a decision support tool that enabled the planners to tune the system for best performance and also to investigate what-if scenarios. The model is scalable to include more customers, branches, stock holding units and products and the company now intends to apply the tools to a wider range of products.

S Kumar, D A Nottestad and E E Murphy

Citation for Goodeve Medal 2008

D Ronen and CA Goodhart

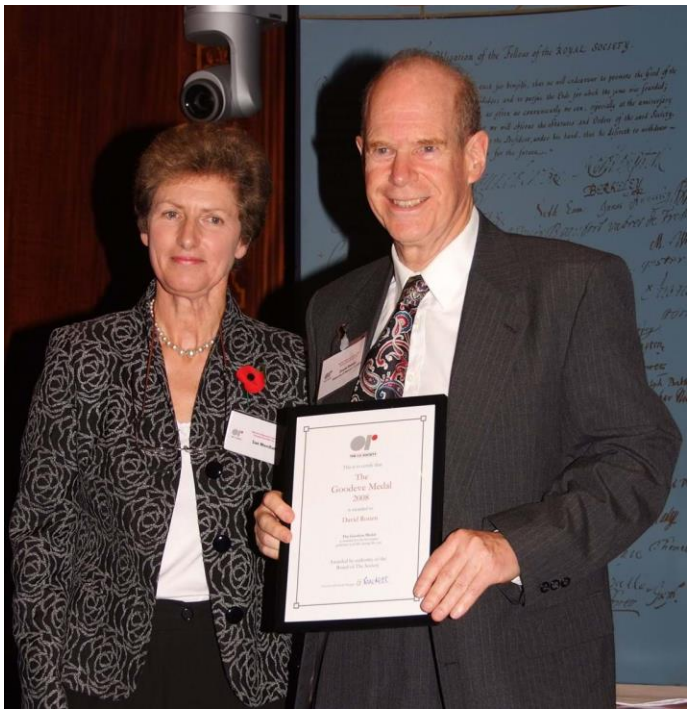
Tactical Store Delivery Planning

Journal of the Operational Research Society, (2008) 59 (8), 1047-54

https://doi.org/10.1057/palgrave.jors.2602449

This paper describes a system for the tactical planning of store deliveries that was developed and implemented for a major US retailer which operates several distribution centres and over one thousand stores. The system is used to plan the weekly truck routes from distribution centre to store, whilst taking account of many practical constraints. The system has been shown to reduce delivery costs by 1 – 5%, equating to several million dollars annually, and to reduce the planning process from weeks to hours.

The problem is known as the Period Vehicle Routing Problem and the developers made innovative use of existing solutions so as to take account of the specific circumstances of this retailer. This study is an excellent example of the application of OR both to improve a planning process and also to secure substantial annual cost savings. The approach is also applicable to other major retailers.



David Ronen with Sue Merchant (President of The OR Society)

Citation for Goodeve Medal 2007

Medina-Borja A, Pasupathy K S and Triantis K

Large-scale data envelopment analysis (DEA) implementation: a strategic performance management approach

Journal of the Operational Research Society, (2007) 58 (8), 1084-1098

https://doi.org/10.1057/palgrave.jors.2602200

This paper describes the development and implementation of a data envelopment analysis (DEA)-based performance management system for a major US charity. The system evaluates more than 1000 field unit operations devoted to disaster relief, emergency communications, and life-saving skills training. The work entailed developing an advanced conceptual model for measuring performance in the nonprofit sector. The novel DEA formulation had to account for differences in the operational environment of the field units, and included service quality and effectiveness measures alongside traditional efficiency measures. Finally, the project involved creating a data collection system and report generation tools necessary for the deployment of evaluation results to the field in a user-friendly format for managers. The new system has been running for 3 years and has enabled better benchmarking throughout the organisation, the identification of relative inefficiencies and better allocation of resources so as to achieve strategic goals.

There are many theoretical papers on the use of DEA but this is one of very few large scale implementations that have been incorporated into a real life decision-making process. This should provide a stimulus for more work in this field. While the suitability of DEA for real-life performance measurement is demonstrated, the challenges of a DEA implementation are also discussed. The approach has applications to other charitable organisations.

Alexandra Medina-Borja with Sue Merchant (President of The OR Society)

Citation for Goodeve Medal 2006

SC Brailsford, P Harper and D Evenden

Improving the cost-effectiveness of chlamydia screening with targeted screening strategies

Journal of the Operational Research Society, (2006) 57 (12), 1400-1412

https://doi.org/10.1057/palgrave.jors.2602134

Chlamydia is the most common sexually transmitted infection in the UK and constitutes a major public health problem. The UK Department of Health is phasing in a national chlamydia screening programme but there is concern that blanket screening of the entire at risk population will simply add extra burden to the already overstretched health economy. This paper demonstrates that certain high-risk sub-groups within the general population are critical in the infection dynamics. Improved targeting of these high-risk populations will achieve greater cost-effectiveness.

Statistical risk-group clustering techniques have been used to identify indicators that are strong predictors in determining high-risk status. Geomapping techniques visually display prevalence geographically across the Portsmouth region, thus identifying high prevalence postcode clusters. This informs public health planners where to target intervention and screening strategies. A system dynamics simulation model has been used to capture the infection dynamics and measure the cost-effectiveness of the intervention strategies. The model incorporates risk-group behaviour, as identified by the above geomapping and statistical analysis components of the research. The judges were impressed with the combined use of computer simulation, statistical analysis and geomapping methodologies to provide a unique holistic view of the problem.

The work has enabled staff in a health region to plan a more cost-effective screening programme and the approach is applicable to other areas and to other infectious diseases (such as HIV/AIDS) as data becomes available.

Paul Harper and Sally Brailsford with Jeff Griffiths (President of The OR Society)

Citation for Goodeve Medal 2005

K Taylor and B Dangerfield

Modelling the feedback effects of reconfiguring health services

Journal of the Operational Research Society, (2005) 56 (6), 659-675

https://doi.org/10.1057/palgrave.jors.2601862

The paper looks at the impact of decisions to offer health care services closer to the patient and the unintended consequences that might result. System dynamics models of two different health care providers were built. These were then used to evaluate alternative policy decisions that were being considered. A key result from the study was the recognition that improving health care services can actually stimulate demand for those services. The discussion at the end of the paper includes the following statements "Increasing capacity is not the most effective way of improving access" and "Patient pressure represents challenges to the delivery of health care which cannot be ignored in a realistic model". Overall the paper argues for stricter clinical guidelines in delivering healthcare and ensuring that the criteria for measuring the performance of clinical units are appropriate.

Citation for Goodeve Medal 2004

SC Brailsford, V Lattimer, P Tarnaras and J Turnbull

Emergency and on-demand health care: modelling a large complex system

Journal of the Operational Research Society, (2004) 55 (1), 34-42

https://doi.org/10.1057/palgrave.jors.2601667

The paper describes the process for modelling health care provision in Nottingham. A range of modelling techniques are used in the paper and this process could be easily applied to similar scenarios. The engagement of different stakeholders in the project is particularly noteworthy. This paper has been written in a way to make it easily accessible to a wide cross disciplinary readership.

Citation for Goodeve Medal 2003

Hartley and G. Lanot

On the design of lottery games

Journal of the Operational Research Society, (2003) 54, pp. 89-100.

State lotteries are widely used to generate tax income and to raise funds for causes such as sport, the arts and education. The total revenue is affected by the tax rate and the level of participation, which in turn is affected by the design of the lottery and, in particular, the probability of winning a jackpot prize. Hartley and Lanot, the authors of this paper, have developed a model for these effects and have used it to judge whether the current design and tax rate for the UK National Lottery are optimal, in terms of generating income for good causes. They show that revenue could be increased by increasing the probability of winning the jackpot and/or reducing the rate of taxation.

The model is a dynamic model of individual behaviour and takes into account features such as the consumer's attitude to risk and his/her "fun function" – the direct consumption value of money spent on the lottery as compared with other potential purchases. The fun function can also depend on whether it is a rollover draw and whether that individual has ever won anything on the lottery before. The probability of participation is increased not only by the size of the jackpot, but also by the 'fun' a person has in purchasing a ticket.

The authors use some elegant mathematics to construct a stochastic dynamic optimisation model of the consumer's decision of how many tickets to buy, and then to solve it by a first-order approximation as a static, deterministic, non-linear programming model. Investigation of the properties of the (unique) optimal solution shows that the solution is plausible for a realistic set of assumptions about the various model parameters and functions. The model is then applied to the UK National Lottery, assuming the current operating costs and jackpot proportion. A set of simulation experiments showed that increasing the probability of winning the jackpot (currently 1 in 14 million) and decreasing the tax rate both lead to an increase in expected tax revenue. Increasing the jackpot probability reduces the number of rollovers, but this is offset by the increased participation due to the higher chance of winning. Decreasing the tax rate also increases participation sufficiently to offset the reduction in tax revenue. The authors have carried out a detailed sensitivity analysis using different functional forms and parameter values and the recommendations remain unchanged.

The paper is clearly written despite its mathematical complexity and demonstrates how operational research can make an impact in a practical problem of national importance. The authors are to be congratulated on their work and for winning the Goodeve Medal.

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Citation for Goodeve Medal 2000

K Korporaal, A Ridder, P Kloprogge and R Dekker

An Analytical Model for Capacity Planning of Prisons in the Netherlands

Journal of the Operational Research Society, (2000) 51 (11), 1228-1237

https://doi.org/10.1057/palgrave.jors.2601021

This paper describes a decision support system developed to help in assessing the need for various types of prison cells in the Netherlands. The DSS takes into consideration the inflow pattern of prisoners and their sentences and a required performance of the penitentiary system. Such performance is measured in terms of the number of prisoners sent home, the waiting time of prisoners for transfer and the cell occupancy rate.

The authors developed two models for the penitentiary system: a simulation model Cellsim and an analytical model Cellnet, with the former model used to evaluate the latter. It was found that Cellsim has the usual features of simulation, that is being flexible but time consuming for development and running. The analytical model Cellnet was developed as a queuing network with blocking. The prisoners are the customers of the network and the cells are the servers. In the Cellnet model all prisoners are aggregated into one class and averaged over all possible routes and service times. A generalized semi-Markov process (GSMP) is selected to model the system using the assumptions of Poisson arrivals and exponential service time based on the Poisson-exponential model of criminality (Avi-Itzhak and Sinnar). To solve the model the authors developed an approximation algorithm based on decomposing the network into simple queues for networks with the previously unreported blocking type observed in this study. The approximation used by Cellnet for the actual process produced reasonable outcomes within relatively short development and computation times.

One of the anonymous paper referees commented "I found this paper to be one of the best applications of queuing theory. This is certainly a great application for this theoretical framework...it is well written and applies to a very important problem for our society".

The awards subcommittee agrees with the referee's comments which in our opinion fully justify the award of Goodeve medal to this paper.