Two Stage Multiobjective Optimization Of Maintenance

Discussion of the Paper Âapplication of Maintenance Optimization ModelsDiscussion of the paper “Application of maintenance optimization models: a review and analysis" written by R. DekkerJoint Optimization of Maintenance and Production PoliciesMaintenance, Modeling and OptimizationModeling and Optimization of Maintenance SystemsFacility-level and System-level Stochastic Optimization of Bridge Maintenance and Replacement Decisions Using History-dependent ModelsIntroduction to Maintenance EngineeringJoint Optimization of Maintenance Policy and Spare Part Inventory Control Using Large Scale Computer SimulationGuidance for Optimizing Nuclear Power Plant Maintenance ProgrammesIntegrated Approach to Optimize Operation and Maintenance Costs for Operrating Nuclear Power PlantsRisk-averse Periodic Preventive Maintenance OptimizationImplementation of Maintenance Management in a Medium Size Industry for Optimization of Maintenance CostReliability and Maintenance in Production ControlProduction and Maintenance Optimization ProblemsMaintenance and Preservation, 2013Proceedings - International Conference on Large High Voltage Electric Systems (CIGRE).Optimizing System-level Bridge Maintenance, Rehabilitation, and Replacement DecisionsHighway Maintenance Operations and Research 1990Optimal Infrastructure System Maintenance and Repair Policies with Random Deterioration Model ParametersSelected Topics on Aging Management, Reliability, Safety, and License Renewal Christophe Gouin Christophe Gouin Nidhal Rezg Mohamed Ben-Daya Xiaoyue Jiang Charles-Antoine Robelin Mohamed Ben-Daya Prasad Kishor Patil International Atomic Energy Agency International Atomic Energy Agency Inderjeet Singh Abhishek Jain Z. Sinuany-Stern Nidhal Rezg International Conference on Large High Voltage Electric Systems Kamal Muhammad Al-Subhi National Research Council (U.S.). Transportation Research Board Sejung Park Vikram N. Shah Discussion of the Paper Âapplication of Maintenance Optimization Models Discussion of the paper “Application of maintenance optimization models: a review and analysis" written by R. Dekker Joint Optimization of Maintenance and Production Policies Maintenance, Modeling and Optimization Modeling and Optimization of Maintenance Systems Facility-level and System-level Stochastic Optimization of Bridge Maintenance and Replacement Decisions

Using History-dependent Models Introduction to Maintenance Engineering Joint Optimization of Maintenance Policy and Spare Part Inventory Control Using Large Scale Computer Simulation Guidance for Optimizing Nuclear Power Plant Maintenance Programmes Integrated Approach to Optimize Operation and Maintenance Costs for Operrating Nuclear Power Plants Risk-averse Periodic Preventive Maintenance Optimization Implementation of Maintenance Management in a Medium Size Industry for Optimization of Maintenance Cost Reliability and Maintenance in Production Control Production and Maintenance Optimization Problems Maintenance and Preservation, 2013 Proceedings - International Conference on Large High Voltage Electric Systems (CIGRE). Optimizing System-level Bridge Maintenance, Rehabilitation, and Replacement Decisions Highway Maintenance Operations and Research 1990 Optimal Infrastructure System Maintenance and Repair Policies with Random Deterioration Model Parameters Selected Topics on Aging Management, Reliability, Safety, and License Renewal Christophe Gouin Christophe Gouin Nidhal Rezg Mohamed Ben-Daya Xiaoyue Jiang Charles-Antoine Robelin Mohamed Ben-Daya Prasad Kishor Patil International Atomic Energy Agency International Atomic Energy Agency Inderjeet Singh Abhishek Jain Z. Sinuany-Stern Nidhal Rezg International Conference on Large High Voltage Electric Systems Kamal Muhammad Al-Subhi National Research Council (U.S.). Transportation Research Board Sejung Park Vikram N. Shah

scientific essay from the year 2011 in the subject business economics business management corporate governance grade 19 5 20 university of rennes 1 language english abstract maintenance management and optimization of maintenance is getting more and more important for a large number of companies the use of automated machines and equip ment in order to produce goods is very common today hence companies have to rely on reliable machines which are available and working 100 of the time in order to attain a flawless working factory maintenance management is crucial however companies cannot hope that the decisions they make concerning maintenance management are optimal and they start therefore to use decision support systems based on optimization methods also maintenance management is very complex and a lot of different decisions have to be made like defining maintenance intervals personal planning when to buy spare parts when to replace equipment etc it is easier for companies to base their decisions on a mathematical program and therefore the use of maintenance management optimization models arises optimization models proved to be very advantageous in other sectors so it was just a matter of time before optimization methods where ported to maintenance man agement problematic in the case of maintenance optimization are the very specific

maintenance problems resulting in a large number of different maintenance optimization models it is consequently very difficult to get a good overview about the different models and their application r dekker who has worked a lot on maintenance optimization and on operations research in maintenance management wrote a paper about maintenance optimization methods and their application application of maintenance optimization models a review and analysis it summarizes maintenance management in general gives a brief history of maintenance management describes different optimization methods their practical a

scientific essay from the year 2011 in the subject business economics business management corporate governance grade 19 5 20 university of rennes 1 language english abstract maintenance management and optimization of maintenance is getting more and more important for a large number of companies the use of automated machines and equip ment in order to produce goods is very common today hence companies have to rely on reliable machines which are available and working 100 of the time in order to attain a flawless working factory maintenance management is crucial however companies cannot hope that the decisions they make concerning maintenance management are optimal and they start therefore to use decision support systems based on optimization methods also maintenance management is very complex and a lot of different decisions have to be made like defining maintenance intervals personal planning when to buy spare parts when to replace equipment etc it is easier for companies to base their decisions on a mathematical program and therefore the use of maintenance management optimization models arises optimization models proved to be very advantageous in other sectors so it was just a matter of time before optimization methods where ported to maintenance man agement problematic in the case of maintenance optimization are the very specific maintenance problems resulting in a large number of different maintenance optimization models it is consequently very difficult to get a good overview about the different models and their application r dekker who has worked a lot on maintenance optimization and on operations research in maintenance management wrote a paper about maintenance optimization methods and their application application of maintenance optimization models a review and analysis it summarizes maintenance management in general gives a brief history of maintenance management describes different optimization methods their practical application problems which can occur by applying the models etc in this paper i will discuss the work of r dekker first of all there will be a description of the paper explaining what it is about and giving a resume of important aspects in the second section the paper will be compared to other papers concerning maintenance opti mization different

and identical aspects will be explained furthermore some information will be added in order to simplify the comprehension of maintenance optimization mod els finally i will comment the paper and give my opinion about the aspects that i liked and what i would describe differently

this book presents the recent work regarding the different approaches developed in the framework of the joint optimization of intelligent maintenance and production strategies the originality of these strategies is that they take various constraints into account including production management subcontracting environmental degradation inspection and product quality

production costs are being reduced by automation robotics computer integrated manufacturing cost reduction studies and more these new technologies are expensive to buy repair and maintain hence the demand on maintenance is growing and its costs are escalating this new environment is compelling industrial maintenance organizations to make the transition from fixing broken machines to higher level business units for securing production capacity on the academic front research in the area of maintenance management and engineering is receiving tremendous interest from researchers many papers have appeared in the literature dealing with the modeling and solution of maintenance problems using operations research or and management science ms techniques this area represents an opportunity for making significant contributions by the or and ms communities maintenance modeling and optimization provides in one volume the latest developments in the area of maintenance modeling prominent scholars have contributed chapters covering a wide range of topics we hope that this initial contribution will serve as a useful informative introduction to this field that may permit additional developments and useful directions for more research in this fast growing area the book is divided into six parts and contains seventeen chapters each chapter has been subject to review by at least two experts in the area of maintenance modeling and optimization the first chapter provides an introduction to major maintenance modeling areas illustrated with some basic models part ii contains five chapters dealing with maintenance planning and scheduling part iii deals with preventive maintenance in six chapters part iv focuses on condition based maintenance and contains two chapters part v deals with integrated production and maintenance models and contains two chapters part vi addresses issues related to maintenance and new technologies and also deals with just in time jit and maintenance

this thesis focuses on modeling and optimization of maintenance systems

although the terminology we use is within the domain of manufacturing industry we can identify its potentials in it sections such as software reliability engineering and communication network management to name a few the basic problem we are attacking is how to arrange preventive replacement optimally based on the available information about the system s health condition instead of emphasizing the concrete models which are extremely rich and diverse we focus on the fundamental methodologies to grasp the essence of this subject in chapters 2 to 6 we propose five models which can be roughly classified into two categories age based models chapters 2 3 and 4 and condition based models chapters 5 and 6 while each of the models is of its own practice interest it serves also as the vehicle to convey the methodologies we integrated from the literature or developed in this thesis we solve these models in a fairly unified manner the unified methodology is further summarized in chapter 7 in terms of a common modeling framework and the associated optimization procedure we expect that this framework will be valuable for a wide range of applications

this introductory textbook links theory with practice using real illustrative cases involving products plants and infrastructures and exposes the student to the evolutionary trends in maintenance provides an interdisciplinary approach which links engineering science technology mathematical modelling data collection and analysis economics and management blends theory with practice illustrated through examples relating to products plants and infrastructures focuses on concepts tools and techniques identifies the special management requirements of various engineered objects products plants and infrastructures

machine maintenance policy consists of two important activities preventive maintenance to avoid potential breakdowns and the decision once a breakdown has actually occurred either to repair or replace failed machine component present study has focused later case and formulates the joint problem of 1 carrying an optimal number of spare part inventory 2 deciding breakdown maintenance actions to be taken by management a simulation approach is used to formulate a model which can solve joint problem with the objective of minimization of maintenance cost and production loss abstract

the objective of the project on optimization of nuclear power plant overall performance within the iaea s subprogramme of nuclear power planning implementation and performance is to systematically improve the overall performance and compeititiveness of nuclear power plants npps with due regard to safety through the application of technological and engineering best practices including quality assurance quality management and the

utilization of relevant databases as an integrated part of this project the technical working group on life management of npps deals with the managerial and engineering aspects of npp maintenance its optimization process with special regard to the importance of condition monitoring in maintenance strategies and the contribution of maintenance to managing the lifetime of operating npps this publication was developed in the above framework with the objective to collect and analyse proven maintenance optimization methods and techniques engineering and organizational in member states

the increasingly competitive environment of the electricity sector has significant implications for nuclear power plant npp operations management objectives must be focused on efficient operation as the key to profitability the business and financial success of operating npps must be given greater consideration through an integrated approach which also ensures the successful achievement of safety and reliability objectives in developing strategic and operational goals nuclear plant managers will be required to embrace and articulate clear and measurable business objectives and goals which not only ensure safety and reliability but also eliminate unnecessary costs and identify investment opportunities this publication looks at the optimization of costs as an integrated part of the management process with a focus on planning strategic and tactical and on controlling control system corrective actions and pay reward functions

we consider a class of periodic preventive maintenance pm optimization problems for a single piece of equipment that deteriorates with time or use and can be repaired upon failure through corrective maintenance cm we develop analytical and simulation based optimization models that seek an optimal periodic pm policy which minimizes the sum of the expected total cost of pms and the risk averse cost of cms over a finite planning horizon in the simulation based models we assume that both types of maintenance actions are imperfect whereas our analytical models consider imperfect pms with minimal cms the effectiveness of maintenance actions is modeled using age reduction factors for a repairable unit of equipment its virtual age and not its calendar age determines the associated failure rate therefore two sets of parameters one describing the effectiveness of maintenance actions and the other that defines the underlying failure rate of a piece of equipment are critical to our models under a given maintenance policy the two sets of parameters and a virtual age based age reduction model completely define the failure process of a piece of equipment in practice the true failure rate and exact quality of the maintenance actions cannot be determined and are often estimated from the equipment failure history we use a bayesian

approach to parameter estimation under which a random walk based gibbs sampler provides posterior estimates for the parameters of interest our posterior estimates for a few datasets from the literature are consistent with published results furthermore our computational results successfully demonstrate that our gibbs sampler is arguably the obvious choice over a general rejection sampling based parameter estimation method for this class of problems we present a general simulation based periodic pm optimization model which uses the posterior estimates to simulate the number of operational equipment failures under a given periodic pm policy optimal periodic pm policies under the classical maximum likelihood ml and bayesian estimates are obtained for a few datasets limitations of the ml approach are revealed for a dataset from the literature in which the use of ml estimates of the parameters in the maintenance optimization model fails to capture a trivial optimal pm policy finally we introduce a single stage and a two stage formulation of the risk averse periodic pm optimization model with imperfect pms and minimal cms such models apply to a class of complex equipment with many parts operational failures of which are addressed by replacing or repairing a few parts thereby not affecting the failure rate of the equipment under consideration for general values of pm age reduction factors we provide sufficient conditions to establish the convexity of the first and second moments of the number of failures and the risk averse expected total maintenance cost over a finite planning horizon for increasing weibull rates and a general class of increasing and convex failure rates we show that these convexity results are independent of the pm age reduction factors in general the optimal periodic pm policy under the single stage model is no better than the optimal two stage policy but if pms are assumed perfect then we establish that the single stage and the two stage optimization models are equivalent

maintenance in indian small and medium enterprises smes is regarded as a capital extensive approach rather than profit making approach the position of management is held by the owner himself in most of the indian organizations and management always thinks to optimize the overall expenditure on equipment maintenance in smes in this paper the authors introduce a new concept of total productive maintenance tpm as maintenance management mm for optimizing recurring maintenance costs by using interpretive structural modeling ism approach the effective maintenance strategies in the manufacturing organization can help to save a huge amount of time money and other useful resources generally owners are worried about low production and its product quality but do not try to find the causes behind this problem in smes the authors in this study identify many difficulties and suggest an action plan for the same after finding the causes of these problems the authors observe a drastic change in the

targeted organization after adoption of mm

this book focuses on industrial constraints such as subcontracting warranty and quality in manufacturing and logistic fields and gives new integrated maintenance strategies it presents new production and maintenance control policies compared to the hedging point theory strategy and different integrated strategies of maintenance are developed under industrial constraints in order to propose a robustness production and maintenance plan

trb s transportation research record journal of the transportation research board no 2360 contains 10 papers that study holistic approaches to maintenance and preservation of transportation infrastructure guidelines for thermographic inspection of concrete bridge components in shaded conditions bridge preservation by action type fatigue testing and structural health monitoring of retrofitted web stiffeners on steel highway bridges and vulnerability of bridges exposed to scour this issue also examines performance measures for bridge preservation risk modeling of advanced deterioration in bridge management systems modeling hurricane hazards and damage on florida bridges developing bridge management components that facilitate decision making and a method to assess bonding characteristics of membrane layers in wearing course on orthotropic steel bridge decks pub online blurb

accurate facility deterioration models are important inputs for the selection of infrastructure maintenance repair and reconstruction mr r policies deterioration models are developed based on expert judgment or empirical observations these resources however might not be sufficient to accurately represent the performance of infrastructure facilities incorrect deterioration models may lead to wrong predictions of infrastructure performance and selection of inappropriate mr r policies this results in higher lifecycle costs existing infrastructure mr r decisionmaking models assume that deterioration models represent the real deterioration process of infrastructure facilities this assumption ignores the uncertainty in empirically derived facility deterioration models this dissertation presents a methodology for selecting mr r policies for systems of infrastructure facilities under uncertainty in the deterioration model parameters it is assumed that inspections reveal the true conditions of facilities based on the inspection results the deterioration model parameters can be updated to express the deterioration process more accurately it is expected that more appropriate maintenance policies will be selected as a result in the first part of this dissertation it is assumed that facility inspections are performed at the

beginning of every year the model parameters are updated and mr r policies are selected every year using the updated deterioration models in the second part the assumption is relaxed and alternate inspection frequencies are considered in this case the updates of the model parameters and the selection of optimal mr r policies are executed only after an inspection the results of the parametric analyses demonstrate that updating the deterioration models reduces the expected system costs the results also show that relaxing the facility inspection frequency can reduce the total costs further

annotation the role of aging and risk management in safe operation and life extension of nuclear power plants and petrochemical plants is explored in these papers from an august 2002 conference structural mechanical heat transfer thermal hydraulic fatigue fracture and creep problems are addressed papers topics include generic aging management programs for license renewal of pwr reactor coolant system components high cycle analytical thermal fatigue test of pipe structures managing aging of coatings for nuclear plant license renewal and signal processing for lifetime management subjects examined in the category of reliability and safety include a logic model approach to conceptual design of scientific industrial complexes and risk based maintenance there is no subject index annotation c book news inc portland or booknews com

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