
Operations Management, Quality Management and Supply Chain Management: An Integrated Approach

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Keynote Abstract

Operations management focuses on carefully managing the whole process to produce products or services economically. It utilizes the system view that underlies modern quality management thinking. Another important business philosophy is supply chain management involving efficient movement of materials, money and information. Operations management, quality management, and supply chain management have been proposed as means of improving quality, while simultaneously reducing cost, eliminating waste and improving efficiency. They can be used as complementary elements of an integrated strategy aimed at improving competitiveness. This talk will provide an overview of recent work on the integration of these three management systems.

Keywords

Operations management, quality management, supply chain management, integration

Bio:

Dr. Abdur Rahim is a Professor at the Faculty of Business Administration, University of New Brunswick (UNB), Fredericton, Canada. He joined UNB in 1983 and is a member of the Quantitative Methods area. He received his B.Sc. (Hons.), M.Sc in Statistics from the University of Dhaka, D.S. in Operations Research from the University of Rome, M.Sc. in Systems Theory from the University of Ottawa, and Ph.D. in Industrial Engineering from the University of Windsor. He teaches Management Science, Operations Management and TQM in the BBA and MBA programs. Dr. Rahim is a recognized world expert in Quality Control and Quality Management. He has taught a wide range of courses in Universities in Canada, Bangladesh, Malaysia, and Saudi Arabia. He has served as an Associate Editor of the International Journal of Systems Science, Quality Engineering, and Engineering Optimization. He is a member of the Advisory or Editorial boards for Economic Quality Control, the Journal of Quality in Maintenance Engineering, the Journal of Quality Engineering and Technology, and the International Journal of Production Research. Dr. Rahim received the UNB Merit Award in 1992, 1999, 2000, and 2009 for his excellence performance in research, service, and teaching.

Current Trends in Operations Research

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Keynote Abstract

Operations Research (OR) techniques continue to have significant impact on traditional application areas such as transportation and logistics, production planning and scheduling, inventory control, facility location and layout. In recent years, the scope and significance of OR has extended considerably to various non-traditional areas such as health care, energy, and data mining. In this talk, the speaker will offer some personal perspectives on these recent trends in OR applications, and the research challenges and potential they offer.

Bio:

Dr. Shabbir Ahmed is an Associate Professor in the H. Milton Stewart School of Industrial & Systems Engineering at the Georgia Institute of Technology. He has a Bachelor in Mechanical Engineering from the Bangladesh University of Engineering and Technology, and Masters and PhD in Operations Research from the University of Illinois at Urbana-Champaign. Dr. Ahmed serves as the Chair of the Community of Stochastic Programming (COSP), and was a Vice-chair (Stochastic Programming) of the INFORMS Optimization Society (2006-2008). He is an Associate Editor for Mathematical Programming C and Operations Research Letters, an Area Editor for Surveys in Operations Research and Management Science, a Topical Editor for the Encyclopedia of Operations Research and Management Science and a Department Editor for IIE Transactions (Operations Engineering and Analysis). Dr. Ahmed's honors include the National Science Foundation CAREER award, two IBM Faculty Awards, the Coca-cola Junior Professorship from ISyE, and the INFORMS Dantzig Dissertation award.

Accreditation of Engineering Education: Option or Necessity

Tasneem Pervez

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Keynote Abstract

With world considered as a “global village” the higher education is currently undergoing new and dramatic changes, which has pros and cons for the survival of a society. Furthermore, the technological revolution of 20th century has restricted the liberation of mind of the seeker of knowledge and focused around national and regional prosperity through application of technical knowledge. The increasing demand for higher education worldwide has resulted in mushrooming of offshore campuses, private institutions and franchising arrangements to cater this demand. Concurrently, regional and global trade agreements are encouraging the movement of professional services, capital and individuals across national borders. These new models and practices raise the questions about the responsibility for the quality of education that is delivered. We need a global definition of the quality of education based on some common evaluation criteria. As a result international system of licensure, certification and accreditation are emerging as a powerful tool to ensure quality and mobility. Is there a need for a accreditation of engineering programs in universities around the globe? In our opinion it is a must for survival, to remain competitive, have increased agility and developing niche in focused areas.

ABET, an internationally accepted accreditation body, is a title to assure quality of engineering programs in USA and abroad. The system is matured and is serving well the needs of global society. The new criteria of outcomes assessment allow the institutions to upgrade its goal and find ways and means to achieve the set goals as a continuous process. This brings competitive culture in engineering education automatically assuring quality and cross-border recognition. The objective of this presentation is not only to establish the need for quality assurance through accreditation but also to highlight various accreditation bodies established around the globe. In addition, the rationale for the need of a Regional Accreditation Body will be put for discussion considering the regional character.

Bio:

Dr. Tasneem Pervez is an Associate Professor in the Mechanical and Industrial Engineering Department, College of Engineering at Sultan Qaboos University (SQU). He has received his Bachelor’s degree from NED University of Engineering & Technology, Karachi, Pakistan, and MS and Ph.D. degrees, all in Mechanical Engineering, from University of Minnesota, USA. He has been actively engaged in research and consulting work with various national and international organizations. His research interests are in CAE, FEM, Composite Materials and Solid Expandable Tubulars. He has served as an Associate Editor / member of editorial board for The Journal of Engineering, Research, Journal of Solids and Structures, IJMD, NED University Journal of Engineering and Disaster Journal. He has given invited talk on Solid Expandable Tubulars in many conference and technical forums. He has received Outstanding Faculty Award, Best paper awards and Best Researcher award in 1999, 2004, 2005 and 2008. A part from teaching, research and consultancy, he has actively participated in developing new engineering programs and accreditation process. He was instrumental in accreditation of engineering programs in both IIUM and SQU specially focusing on Continuous Quality Improvement Process. He has presented various papers related to accreditation in various conferences and conducted 2-5 days workshops on accreditation to 8 different universities in Middle East countries.

Abstracts

ID: 101

Interpretive Structural Modelling for Understanding the Inhibitors of a Telecom Service Supply Chain

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Abstract

ISM is a well-proven strategy for analyzing the synergic influences of various attributes to the overall system under study. The unique feature of ISM is that it analyzes the attributes based on their driving power and dependence. In the current study, the ISM has been developed for a leading telecom service provider operating in various global regions having their head quarters in India. The hierarchy of various inhibitors was established based on the outcomes of the final reachability metrics. Finally MICMAC analysis was carried out to categorize the inhibitors into four clusters.

ID: 102

Optimal Fuzzy Inventory Policies via Fuzzy Geometric Programming

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Abstract

In this paper, we establish and analyze two economic order quantities (EOQ) that in this model, some parameters are fuzzy variables. This note is based on inventory models under total cost minimization and profit maximization that have solved via fuzzy geometric programming (FGP) techniques. Through FGP and by Zadeh's extension principle, two main programs are transformed to a pair of two-level of mathematical programs. The upper bound and lower bound of the objective value are obtained by solving the pair of geometric programs.

ID: 103

Determinants of Supply Management Performance within the Garment Industry in Bangladesh

Mohammad Asif Salam, University of the Fraser Valley, British Columbia, Canada

Abstract

This research examines the relationship between strategic supply management skills, supplier integration, the perceived status of the supply management function, and supply management performance. A conceptual model has been developed based on the literature on strategic supply management skills, supplier integration, the perceived status of supply management, and supply management performance. To test the model a survey interview was conducted to obtain primary data from the purchasing managers or equivalent within the highly competitive garment industry in Bangladesh. Finally, the model was tested using Structural Equation Modeling. The findings

from this study indicate that there is significant evidence to support the hypothesized model in which strategic supply management skills, supplier integration and the perceived status of supply management have a direct impact on supply management performance. This implies that firms can improve their supply management performance through an increased emphasis on strategic supply management skills, supplier integration and improving the perceived status of supply management.

ID: 104

Design of a Direct Gain Passive Solar Heating System

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Abstract

The solar energy that falls naturally on a building can be used to heat the building without special devices to capture or collect sunlight. Passive solar heating makes use of large sunfacing windows (south-facing in the Northern Hemisphere) and building materials such as brick and tile that absorb and slowly release solar heat. A designer plans the building so that the longest walls run from east to west, providing lengthy southern exposures that allow solar heat to enter the home in the winter. A well-insulated building with such construction features can trap the sun's energy and reduce heating bills as much as 50 percent. Passive solar designs also include natural ventilation for cooling. Shading and window overhangs also reduce summer heat while permitting winter sun. In this paper, the heat energy obtained from solar energy is stored by thermal mass floor which is used to maintain higher temperature inside the room in day time as well as in the night. The thermal mass floor was made of stone chips of thickness 4 inch. The overhang was also designed and constructed in order to reduce over heating during summer.

Keywords: Passive Solar System, Direct Gain, Determinants of Design

ID: 105

Quality Costing: An Efficient Tool for Quality Improvement Measurement

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Abstract

Sound economy and assured profitability of an organization entirely depend upon effective control of non quality costs generated in the organization. Through simple economic model with parato and cause effect analysis of different elements of quality costs, e.g Prevention, Appraisal costs conformance costs and internal and External failure costs – non conformance costs, total quality costs can be controlled resulting considerable savings. This paper discusses how quality has an impact on the costs of goods and services in an organization and “Return on Investment (ROI)” is linked with “Return on Quality (ROQ)”. In the interest of customers and minimizing national loss due to proof quality of products and services, it should be obligatory for organizations to correctly report “Quality costs” in their annual reports like Balance Sheets and Profit and Loss Accounts.

ID: 106

Contemporary Model for Project Selection in Changing World

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Abstract

The proper choice of investment in projects is crucial to the long-run survival of all companies especially now when the financial crisis is going worst by every single day. The project selection primarily focuses on identification of most profitable, feasible and least risky business areas by incorporating predefined process for the selection of project in order to align it with the organizational strategy and objectives. If projects are not selected by due diligence, it is for sure that the effort required to get out of the contract will be more than to acquire it. In today's changing world, the process of selection of project has totally altered with the change in today's strategic, financial and political systems. To make a project almost certain to be a profitable and by looking into the issues of today's project, a project filtration model is conceived which inherits the properties of water filtration process with an outcome of filtered water ready to use meaning by, a most feasible and profitable project ready to bid. The "Project Filtration Model" uses a layered approach for the selection by analyzing the project strategically, technically, financially and politically. The model advocates the organization wide consent on the project to be undertaken with the involvement of top management at strategical layer, domain experts at technical layer, CFO at financial layer and BOD/domain expert at political layer along with project in-charge acting as facilitator and advisor in all levels. It gives a comprehensive "what to do" checklist for all the layers and their qualifying criteria. The proposed model supports that the project undertaken after due diligence in changing world, fruits more and remain more predictable throughout the project life cycle.

ID: 107

Performance Comparison of Domestic Refrigerator using HFC134a and HFC134a/HC Refrigerant Mixture

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Abstract

An experimental performance comparison study on domestic refrigerator system was conducted and compared with HFC134a and M09 (HFC134a and HC blend (containing 55.2%HC600a and 44.8%HC290 by weight)) mixture refrigerant. The domestic refrigerator system was initially designed to operate with HFC134a. Experimental results showed that the refrigeration capacity of the refrigerant M09 mixture system had 20.6% higher than R134a system at 32°C atmosphere condition. It was observed that the M09 showed a faster cooling rate than R134a. The COP of M09 mixture system was 7.2% to 9.16% higher than R134a system. A reduction in pull down time percentage in the refrigerator Freezer, chiller, Food, Crisper was observed to be about 24.34%, 11.11%, 1.91%, and 7.90% for M09 system. In per day energy consumption of M09 system was 2.1% lesser than HFC134a system. The temperature variation along the evaporator coil was less than 2.7 °C. The M09 mixtures cool the system 6 minutes earlier than the HFC134a due to its higher heat transfer characteristics. The overall performance has proved that the above M09 refrigerant mixture could be the best long term alternative to phase out R134a.

Keywords: Mixture, Refrigerant, R134a, Hydrocarbon

ID: 108

A Decision Making Optimization Model for Implementing Biomass Gasification Plant in Tamil Nadu

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Global warming has been the watchword today for the whole world, which is mainly caused due to the usage of non renewable and conventional fuel sources. This phenomenon can be reduced at large by the usage of renewable resources, especially biomass. Biomass generally refers to plant matter grown to generate electricity or produce bio fuel. In India the realization for the potential use of Biomass Gasification has increased tremendously since it is greener and also generates a higher return on investment than geothermal, solar & wind combined generation of electricity. In this paper an optimization model has been developed to maximize the profit of an industry implementing a biomass gasification plant by determining the best within some broader boundaries like the alternative sources of biomass and technology under the given circumstances for a location, taking into account the effects that are typical for the biomass like the Seasonal fluctuations in supply and demand of biomass, Losses of water due to drying, losses of dry matter due to heating and the technological constraints. Using this model the optimal campaign to maximize the profit was determined on a real life case: a sugar industry which has recently installed the cogeneration facility.

Keywords: Renewable resource, Biomass, Biomass Gasification, Optimization model, Cogeneration, Sugar industry.

ID: 109

Biomedical Signal Processing and Applications

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Abstract

In biomedical signal processing, the aim is to extract clinically, biochemically or pharmaceutically relevant information in order to enable an improved medical diagnosis. All living things, from cells to organism, deliver signals of biological origin. Such signals can be electric, mechanical, or chemical. All such signals can be of interest for diagnosis, for patient monitoring and biomedical research. The main task of processing biomedical signals is to filter the signal of interest out of from the noisy background and to reduce the redundant data stream to only a few, but relevant parameters. This paper will cover biomedical signal processing as used in diagnostic instrumentation. A number of current research projects will also be outlined with emphasis on intelligent medical diagnosis system.

ID: 110

Using Linear Programming with Education Cost for Enhancing the Level of Human Resource Efficiency

Aboozar Mehrmanesh, Alireza Hajisotoudeh, and Mohammad Ali Bavar, Tehran University, Iran

Abstract

One of the most important points in managing construction projects is the procurement of qualified human resource needed for the project. Define a correct strategy in the human resource management can make a better time and cost management, and thus increase the quality of the project. The human resource education and recruitment is the main subject in this paper. We have compared the cost made by the absence of the employed staff for being educated, with the cost that will occur if we employ a new staff and wait for him to adapt the working condition. We will present a model to make this comparison and then we will try to solve it using linear programming.

ID: 111

A Case Study on Implementation of New MINOMI Type Material Handling System Concept as an Element of Global Manufacturing in a Reputed Automotive Manufacturing Plant

Timir Gandhi, and S. M. Bhatt, Mechanical Engineering Department, L. D. College of Engineering, Ahmedabad, India

Abstract

As per today's scenario the automotive production / Manufacturing plant has marvellous development. One critical element of the car making process, which significantly effects quality, is the Body Shop that is used for BIW (Body In White) Manufacturing. Before manufacturing and production of a BIW sedan car vehicle several significant factors need to focus for New Body Shop readiness. As per as Definition of MINOMI is concern it is "Nut without a shell" = "Part without container" means Minimal or no operator interaction with container. There are several types of MINOMI Concept based material handling devices but based on Production volume and necessity of automation it is clearly describe in this paper that which type of devices should be implement. Also in this Paper it is described that how Material is delivered to the point of use and presented to the operator for a single point pick without a container. The objectives of this invented methodology are to implement a new material handling system Concepts and to meet global manufacturing requirements. In this paper it is clearly shown and described the activity done during implementation for new material handling concept development, its design and methodology used for its implementation in a new automobile Body Shop manufacturing plant with comparatively difference between previous system and lately material handling concept. As well as in this paper evidently mention the crucial issues faced during Conceptual design phase, manufacturing phase and tryout phase of this new material handling concept. The end goal is to arrive at a common platform that can be utilized by global Body Shop manufacturing plant.

ID: 112

Development and Optimization Methodology for Implementation of New Body Shop Area in Car Manufacturing Plant -A Case Study

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Abstract

As per today's scenario the automotive production / Manufacturing plant has marvelous development. One critical element of the car making process, which significantly effects quality, is the Body Shop that is used for BIW (Body In White) Manufacturing. Before manufacturing and production of a BIW sedan car vehicle several significant factors need to focus for New Body Shop readiness. This paper considers a case study which provides an example of lately development of new Body Shop area implementation to meet global manufacturing facilities requirements in a reputed automobile company. In this paper it is shown and described the activity done during implementation for new Body Shop manufacturing area.

- Study and optimization of Body Shop Layout based on Jobs per Hour Production requirements and future upcoming new vehicle models.
- Beam-Column Structural Design - development and its analysis.
- New material handling concept implementation to meet Global Manufacturing system facilities requirements with comparatively difference between previous system and lately material handling concept.
- Optimization in Facilities readiness for BIW Manufacturing.
- Cost reduction in various machines and tooling through technical study and analysis.
- Crucial Issues faced and resolved during New Body Shop Facilities readiness, manufacturing, and tryout phase.
- Various tests performed for Body Shop welding Fixtures, tooling and machines Validation.
- Ergonomic factors consideration- issue tracking and resolved during tryout phase.

The end goal is to arrive at a common platform that can be utilized by global Body Shop manufacturing plant. After some strenuous work and continuous issue tracking our effort lead to the successfully implementation of New Body Shop area in one of the reputed Indian automobile manufacturing company (OEM) based on global manufacturing requirements. Also this is worthy as a reference for future Automotive manufacturing sector.

ID: 113

Understanding Project Complexity from the Perspective of a Project Manager

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Abstract

In today's complex development environments, the ability to integrate the different components of a project is quite dependent on the cognitive capabilities (skill) of the project managers. The word 'complexity' is used in day to day life by project managers and practitioners in the area of project management to express some characteristic of a project. However there seems to be no universally accepted definition of the term project complexity in the construction industry. The purpose of this paper is to develop an understanding of the term complexity in relation to construction projects and measure it in terms of the cognitive capabilities of the involved human resources. The findings based on interviews with project managers suggest that the project complexity is also dependent on the skill of the involved human resources beyond simply having a large number of interacting parts. The quantification of complexity highlights the role of the skill of involved human resources at its conceptual level which otherwise is in a fluid state. Secondly it allows identifying potential factors responsible for initiating complexity in a project known as complexity generating factors. Finally it may provide a basis for project managers for selecting workers that will help in checking overruns of time and cost.

Keywords: Complexity, Human Resources, Complexity Generating Factors, Skill

ID: 114

A Case Study of Evaluation the Effectiveness of Implementing Quality Management System (ISO 9001:2000) in Gas Processing Plants of National Iranian Gas Company (NIGC) using Balanced Scorecard (BSC) Methodology

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Mona Mirhadi, Industrial Consultant Engineer, Gas Dispatching Directorate of National Iranian Gas Company, Tehran, Iran

Abstract

The purpose of this study was to evaluate the gas treating companies of National Iranian Gas Company and measure their quality management performance (ISO 9001:2000) by "Balanced Scorecard" approach which is a useful technique in this subject. The Balanced Scorecard approach suggests a framework for each organization to look at itself from four different perspectives to provide a more extensive view of organizational performance: the financial perspective, the customer perspective, the process perspective, the innovation and learning perspectives. The case study is done in five gas treating companies with different ages of quality

systems registration. The results indicate the following important points: The first, the Balanced Scorecard successfully used to measure the performance of quality systems in studied companies. Second, the productivity of the internal process is increased as well after establishing this quality system; and the third, the innovation and learning perspective in somehow is neglected in these companies. Meanwhile it can be concluded that investments in quality systems increase organizational performance.

ID: 115

Queuing based Analysis of Inventory Control in a Multi-Level Supply Chain

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Abstract

The network supplier of an end-product manufacturer company who receives customer orders and organizes his production and supply policy so as to minimize the sum of his average stock-out cost is analyzed from the viewpoint of queuing models in two categories, first same costs for suppliers and then different costs. For each main component to be ordered, we consider the producer has two possible suppliers. The arrivals of customers' orders are random and delivery times from suppliers are also supposed random. This supply system is represented as a queuing network where the producer uses a base-stock inventory control policy that keeps constant the inventory position level (current inventory level & pending replenishment orders). The decision variables are the reference inventory position level and the percentages of orders sent to the different suppliers. In the queuing network model, the percentages of orders are implemented as Bernoulli branching parameters. In first step we find an exact solution with assumption of same costs for supplier's costs. Solving the optimization problem in next step leads us to have an approximate result. The quality of the approximate solution is evaluated by comparison to the solution of first phase, which can be computed numerically in some simple cases, in particular in the two-supplier case. Numerical applications show the important economic advantage for the producer of sending orders to several suppliers rather than to a single one.

Keywords: Inventory Control; Supply Chain; Stochastic Models; Queuing

ID: 116

Development of an Integrated Method for Analyzing Ergonomic Compliance of a Workstation

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Abstract

Ergonomics, as an applied science, has a significant role to play in improving working conditions and productivity in Industrially Developing Countries (IDCs). Ergonomists practicing in IDCs frequently identify suboptimal working environments that place the operator at high risk. There is a need for input from trained personnel in improving many IDC working environments where poor work practice and low productivity are commonplace. Manual Materials Handling (MMH) tasks continue to predominate in IDCs and universally these have long been recognized as a major contributor to the occurrence of health complaints. Heavy physical demands place the human operator under undue physical stress and increase the likelihood of the onset of work-related musculoskeletal disorders (WMSDs). This in turn results in an increase in suffering of the operator, and cost to the company concerned. There exists an urgent need to investigate the incompatibility between the human operator and the physically demanding tasks so many workers in developing areas are required to do. The focus of the present paper was specifically on manual activities of workers in the engineering industry. The development of integrative method more focuses on MMH and the workplace compliance in an industry. During ergonomical audit of a workstation, checklist used to evaluate the workplace, while the developed tool (software) used to evaluate manual ongoing activity at that workstation.

Keywords: Ergonomics, NIOSH, EN 1005-2, ISO 11228-1, ISO 11228-2, OCRA Index.

ID: 117

Industrialization and its Impact on Agriculture: A Case Study on Savar Upozilla, Dhaka, Bangladesh

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Abstract

The words industry industrializations are highly comply with developed country indeed. However industrialization could be a blessing for a country where the land area is limited and population is too high. Bangladesh is mainly an agriculture based country with high population and slow economic growth rate. However, increasing population along with many other natural calamities are the causes of continuous decrease to cultivable land over the years. The history of reckless industrializations in Bangladesh is not too long. But by this time it has already created

serious impact on general environment and livelihoods at nearby area. This paper is based on the findings and observations of the study of industrialization and its impact on agriculture: A case study of savar Upozilla, Dhaka. The methodologies used for this research are GIS and GPS along with qualitative research techniques; that is Focus group discussion (FGD), semi structured and in-depth interview. There are 200 industries (indifferent types i.e. chemical, leather, dying, textile, garments, iron, pharmaceuticals and food processing) excluding a large export processing zone (EPZ), which are discharging its waste directly to the open water and wet lands, resulting a huge amount of productive agricultural land toxic, water of the river and beel (a large wet land area, full of water in monsoon but come under paddy cultivation in dry season) seriously polluted. Therefore indigenous spices and available fish have been decreased over the year though industries have ability to create and open up with many of the new and alternative opportunities. However current trend of industrialization is the evident of serious affect of traditional and occupational livelihoods i.e. farmer and fisher folk. While creating the general environmental disturbances it also exposed with serious health hazards for locals. Some suggestions have been given to overcome these problems.

ID: 118

Assessing the Impact of Multi-loop Kanban Systems in a High Volume Fabrication System

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Abstract

At present, competition has led manufacturers to invest in state-of-the-art technologies to cope with customer requirements. This has driven manufacturers to focus on maximizing throughput and prioritizing efficiency of their resources. They follow push strategies in production to maximize the use of their resources. They allow continuous processing of materials to ensure that there are enough buffers to respond to customer needs immediately. However, this produces large amounts of work-in-process (WIP) which incurs inventory costs within the system. In order to regulate the amount of WIP, the use of kanban systems is necessary because it promotes synchronized flow of materials. In recent years, studies in multi-stage pull production systems have focused on determining the number of kanbans and container sizes. Although these are important considerations, a more critical aspect of kanban systems is identifying locations of kanban control points and the spans of stages controlled by kanbans. This creates multiple loops of kanbans which controls production within the system. This study developed a simulation model of a high volume fabrication system to assess the impact of a multi-loop kanban system in the throughput, cycle time and the amount of WIP within the system.

ID: 120

Prospects of Remanufacturing, Bangladesh Perspective

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Abstract

Environmental concern of waste materials and product disposals has encouraged some companies to operate their businesses more efficiently while minimizing waste. One of the ways to achieve this purpose is by taking back end-of-life products for remanufacture for life extension. Since the quantity of returned product is uncertain and its quality is not always good, so the companies still need to produce new products to fulfill their customer demand. Hence, they need to put both manufacturing and remanufacturing together in one system. This research will address the possibilities and scope of remanufacturing in Bangladesh. This research has investigated and analyzed the industry sectors, the scope of products to be remanufactured and how the world is getting benefits from remanufacturing. Also this research is going to discuss the existing practices of Remanufacturing worldwide especially USA and how Bangladesh can be benefited from this comparing to other countries. The outcome of this research will encourage companies to undertake sustainable manufacturing strategies in their manufacturing system.

ID: 121

A Meta-Heuristic Algorithm for Solving Economic Lot Scheduling Problem (ELSP)

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Abstract

Economic lot scheduling problem has been an important topic in production planning and scheduling research for more than four decades. The problem is known to be NP-hard due to its combinatorial nature. In this paper, a meta-heuristics algorithm based on Simulated Annealing (SA) - is proposed. Besides on explaining how to use SA, the effects of changing in production frequency on sequence and also on production lot are also considered. The result shows the reduction of cost.

ID: 122

Selection of Industrial Robots using Compromise Ranking Method

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Abstract

Selection of an industrial robot for a specific engineering application is one of the most challenging problems in real time manufacturing environment. This has become more and more complicated due to increasing complexity, advanced features and facilities that are continuously being incorporated into the robots by different manufacturers. The decision maker needs to select the most suitable industrial robot in order to achieve the desired output with minimum cost and specific application ability. This paper mainly focuses on solving the robot selection problem using VIKOR (Vise Kriterijumska Optimizacija Kompromisno Resenje) method, which has already become a quite popular multi-criteria decision-making (MCDM) tool. One real time example is cited in order to demonstrate and validate the effectiveness and applicability of VIKOR method.

Keywords: Robot selection, Multi-criteria decision-making, VIKOR

ID: 123

Facility Location Selection using PROMETHEE II Method

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Abstract

Selecting a location for a new organization or expansion of an existing facility is of vital importance to a decision maker. The cost associated with acquiring the land and facility construction makes the facility location a long-term investment decision. The best location is that which results in higher economic benefits through increased productivity and good distribution network. Selecting the proper facility location from a given set of alternatives is a difficult task, as many potential qualitative and quantitative criteria are to be considered. This paper solves a real time facility location selection problem using PROMETHEE II (preference ranking organization method for enrichment evaluation) method which is an effective multi-criteria decision-making (MCDM) tool often applied to deal with complex problems in the manufacturing environment.

Keywords: Facility location, Multi-criteria decision-making, PROMETHEE

ID: 124

A TOPSIS Method-based Approach to Machine Tool Selection

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Abstract

Due to highly competitive global market, the organizations are now forced to focus more on increasing productivity while decreasing cost by right selection of machine tools. Proper selection of machine tool justifies labor saving, improved product quality and increased production rate with enhanced overall productivity. Evaluation and selection of a machine tool is a complex decision-making problem involving multiple conflicting criteria. This paper presents a logical procedure to evaluate the CNC machines in terms of system specifications and cost by using TOPSIS method. The results derived while solving the CNC machine selection problem highly corroborate with those as obtained by the past researchers.

ID: 125

A Group Decision Making Method for Determining the Importance of Customer Needs Based on Customer- Oriented Approach

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Mahdi Bashiri, Department of Industrial Engineering, Shahed University, Iran

Abstract

Nowadays one of the effective techniques for total quality management is Quality Function Deployment that pays attention to recognition of customer's needs and analysis process in all the planning and production stages. This paper presents a Group Decision Model to determine importance amount of customers' needs for product of one organization. In this model, all assessments are stated using linguistic variables. Firstly, on the basis of presented approach and after collection of customers' needs, raw weight of each customer's need is accounted. In the next stage, implementation of each demand in organization product and its competitors is determined, and relative weight of each customer's need is calculated with respect to organization plan. Finally presented model is illustrated for an applied case and final findings are analyzed.

ID: 126

Design of Two Switch Mechanism Concepts for a Surgical Shears Device

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Abstract

Since the widespread introduction of laparoscopic cholecystectomy in late 1989, the minimally invasive surgery (MIS) has been under rapid development and had been applied to many classes of traditional surgeries. Minimally invasive surgery (MIS) challenges the surgeon's skills due to his separation from the operation area which can be reached with long instruments only. Along with the germination of the first surgical robot in 1985, it was not until April 1991 that the first robotically assisted MIS was clinically applied to patients in a minimally invasive prostate surgery. Safety, Precision, Reliability over multiple and long procedures and ease of use for physicians are the most vital factors in a surgery. Robotics and Automation facilitates above factors de-creasing surgery time and recovery time of the patient. This paper addresses improved design of two switch mechanism concepts from existing handle mechanism increasing safety by locking jaw movements at open and close positions, ease of usability and assisting surgery automation i.e., performing the required assignment with just two switch movement & this proposal could come into practical existence when Computer Assisted Surgery (CAS) replaces manual methods. The Objective is to design a mechanism to evade partial holding and to seize accurately by locking the jaw movements. The paper presents different mechanism concepts for the function of two switches controlling jaw movements individually and locking the jaw movements at open and closed position. Paper also briefs the methodology used in concept development and concept selection according to specific criteria.

Keywords: Minimally invasive surgery, Laparoscopy, Safety, Automation, Concept development, Concept selection, Concept Scoring Matrix

ID: 127

Application of ISO – 9001: 2008 in Academic Institutions

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Abstract

ISO is the “International Organization For Standardization” As for manufacturing and service industries, ISO – 9001: 2008 certifications is also needed for an Academic Institution. Basically University, College or School all can be considered as service organizations serving society. These Institutions follow Process Approach of transforming inputs as students into matured human resources being capable of taking proper decision to help in improving and growth process of the society and nation. This transformation is done through teaching – learning process. To ensure effective and efficient functioning of educational organization, one important aspect is to determine and manage various linked activities in the teaching – learning process. These linked activities are to be properly managed through promoting and adopting of a process

approach to develop, implement and improve the effectiveness of a quality management system, to enhance satisfaction of the society and nation as customers by properly meeting their requirements. ISO – 9001: 2008 including Guidelines for application of ISO – 9001: 2000 in education acts as a helping tool to fulfill those requirements. Towards improvement of performance of any academic institution, the following management principles are identified.

1. Customer Focus.
2. Leadership.
3. Involvement of teaching and non- teaching staff.
4. Process Approach.
5. System approach to management such as Vice-chancellor of university, Principles of college and head master of school.
6. Continual improvement.
7. Factual approach to decision making process.
8. Mutual beneficial supplier relationship.

This international Standard specifies the requirements for quality management system where an academic institution needs to demonstrate its ability to consistently provide the proper educational design and development, educational delivery process, procedures for implementation and the measurement of results. This helps in meeting statutory and regulatory requirements of society and nation. The documentary requirement is to have Quality Manual and Six mandatory quality management system procedures. If this international standard can be adopted properly by an educational organization and certification by third party can be obtained, the nation and society will be benefited from that academic institution.

Keywords: Customers' requirement and satisfaction, leadership, process approach, continual improvement and documentations.

ID: 128

Ranking Alternatives in Multiple Criteria Decision Analysis Based on a Common-Weight DEA

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Abstract

Ranking alternatives is an important issue in multiple criteria decision analysis (MCDA); especially that different approaches produce different results. This paper proposes a measure of relative distance, which involves the calculation of the relative position of an alternative between the anti-ideal and the ideal for ranking. In this case, minimizing the distance to the ideal is equivalent to maximizing the distance to the anti-ideal, so the rankings obtained from the two criteria are the same.

ID: 129

Recognition of Control Chart Patterns using Discriminant Analysis of Shape Features

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Abstract

Each control chart pattern (CCP) has its own geometric shape and various related features can represent this shape. The shape features can represent the main characteristics of the original data in a condensed form. Different patterns can, therefore, be efficiently discriminated based on these shape features extracted from the control chart plot. In this paper, a feature-based heuristic approach is proposed that can recognize nine main types of CCPs, including the mixture pattern. The important shape features are identified and extracted, and then, the heuristic in the form of a decision tree is developed based on discriminant analysis of the extracted shape features.

ID: 130

Selection of Weapon using Digraph and Matrix Methods

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Abstract

A country's wealth is shown by its armed forces. Weapons play an important role in the armed forces. A soldier of the armed forces should be fully equipped with suitable weapons during war period. Selection of suitable weapon from the set of weapons is a multi criteria decision making problem. In selecting weapons, there is not a single attribute and the decision maker has to take into account a large number of attributes. In this paper, graph theory and matrix approach is presented for solving the problem. A real world application involving five weapons is also presented.

Keywords: Weapon selection; Digraph and Matrix method; Multi criteria decision making

ID: 132

Managing Material Flow at the US Shipbuilding Industry

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Abstract

The shipbuilding supply chain is a very complex process, especially due to the length of time it takes to complete one finished product. It can prove very difficult to successfully manage this type of supply chain without causing a negative impact on the rest of business functions and the overall profit of the company. This paper focuses on the shipbuilder's supply chain and in particular the management of the material and its impact on the company's bottom line. Improvements in material management will help position the shipbuilder to receive future contracts and ultimately provide the customers with quality of ships needed to carry out its purpose.

ID: 133

Productivity Improvement through Line Balancing in Apparel Industries

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Abstract

The apparel industries are required to produce momentous quantities in shorter lead times. Researchers have emphasized the value of the effective and efficient sewing system for the achievement of high productivity rates. The observation of this research implies that the actual technology of a sewing system is largely depending on the balanced line for a particular product to achieve higher productivity. Since the style of the product is highly correlated with productivity, sewing line should be balanced in shortest possible time and effective way for each style and quantity. The focal constraint against the higher productivity is the difference among individual workstations capacity which is the mode of improper line balancing and bottle neck process. This paper will propose an effective layout model where to hit upon the bottleneck process through benchmark capacity and led us to use balancing process using two separate concept of manufacturing processes- modular line and bundle system both together. The workers have shared their works with each other to improve production of the less capacity stations and make the production flow smoother with minimum waiting time. Considering order quantity, style and type of machines, excess capacity sewing operator and service operator both will share works to bottleneck process. The research shows that this balanced layout model has increased the efficiency by 24%, and labor productivity by 22%. The findings of the study suggest a layout model by proper line balancing to improve the efficiency and productivity in apparel industries.

ID: 134

Scheduler- Flexible Scheduling Method, Interface with Planning and Production

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Abstract

This paper presents a probabilistic scheduling control system based on different order interval time and limited number of machine capacity that will perform flexible scheduling and schedule execution. The major features of the proposed system include 1) the allocation of the styles among the limited capacity machines, 2) the development of an interface between planning and production and 3) the use of shop floor scheduling techniques to dynamically use the optimum resources and the different levels of state of the system to the management decision making support. The paper sketches the framework, design and logical issues for the proposed scheduling system.

ID: 136

An Industrial Application of DMECA Approach to Management Process Analysis

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Abstract

This paper presents an industrial application of “Dysfunction Mode and Effects Critical Analysis” (DMECA) to determine and analyze possible dysfunctions in a complex management process. The approach conceptually derived from the Failure Mode and Effect Critical Analysis (FMECA) technique. DMECA enables user to analyze all possible dysfunctions of management processes, identify the subsequent effects of each potential dysfunction, make a list of priority interventions for all the dysfunctions, prioritize and classify the dysfunctions by the Risk Priority Number (RPN) which represents the severity of the consequences, investigate potential causes of dysfunctions and determine the improvement actions.

ID: 137

Surface Texture Investigation in High Speed Flat End Milling Of Ti-6Al-4V

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Abstract

Aerospace alloy Ti-6Al-4V is classified as “difficult-to-cut” material. But with their low mass, high strength, and excellent resistance to corrosion, titanium alloys solve many engineering challenges. In this study, high speed end milling of Ti-6Al-4V was applied as a potential machining technique for obtaining better surface finish using small diameter tools applying high rpm to facilitate the application of micro-meter level feed and depth of cut to ensure super finishing that could avoid the need of further grinding and polishing. Machining was performed on a Vertical Machining Centre (VMC) with a high speed attachment (HES 510), using cutting speed, depth of cut, and feed as machining variables. Three level full factorial designs were

followed for machining operations. Minimum average surface roughness (Ra) value of $0.13 \mu\text{m}$ was obtained which is within the acceptable range of avoiding grinding and polishing operations. Surface texture was investigated and no alternation in microstructures was observed and there was no presence of white layer on the machined surface. A strain hardened zone was observed beneath the machined surface with a small temperature-softened zone just below the machined surface.

ID: 138

Investigation of Effect of Chatter Amplitude on Surface Roughness during End Milling of Medium Carbon Steel

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Abstract

Chatter is a self-excited vibration that occurs during machining operations resulting from instability of the cutting process with system responses of the spindle-tool-chuck system. In metal cutting operation, surface finish of the machined parts is vital issue that most machinists are concern on. A particular emphasis is given to chatter formation study during end milling to proof that surface roughness or surface integrity of the machined parts is critically dependent on the stability of the whole system during machining operation. In this paper an effort towards determining the influence of chatter formation during end milling operation of medium carbon steel (S45C) specimen and surface roughness generated is proposed. A study on the stability lobes for the prediction of chatter formation was first conducted considering the effects of cutting parameters and tool cutter on the amplitude of chatter. Vibration data were recorded using on line vibration data monitoring system for different diameter of end-milling cutters at different cutting speeds and depths of cut. The stability lobes diagrams for the two tool cutters of different diameters were drawn based on cutting speed and depth of cut. Certain restrictions had been made during machining operation to eliminate the effect of tool wear and heat generated. The dependence of surface roughness generated on chatter amplitude is justified /explained through surface roughness analysis. The surface roughness analysis is obtained based on calculation of surface roughness (Ra) for both tool cutters at different cutting speeds. It is observed that the vibration between the cutting tool and the work piece affects the machining accuracy and quality of surface generated. The result shows that at stable cutting speed both cutters resulted in good surface finish with small difference of Ra value but at higher speed the effect of chatter amplitude causes a significant difference in Ra value.

ID: 139

Behavioral Analysis of Hydraulically Driven Fire Fighting Water Monitor Trailer

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Abstract

In case of fire hazards, it is observed that a large amount of time is required to extinguish fire due to long distance between the place of the fire point and water monitor. This leads to wastage of huge amount of water. It is impossible to take water monitor closer to fire point because of high temperature. Hence, the fire fighting efficiency is very less, as it requires delivery of water at right time, right place and in adequate quantity. To reduce the distance between water monitor and place of the fire, a new fire fighting water trailer is developed by the authors. The trailer uses pressurized water to move forward taking into account the property like straitening, elongation and buckling of hose. When the water is pumped, then the pushing force is developed due to straightening property of the fire hose. This helps in taking the trailer closer to the fire point. This paper presents the study of behavior of the trailer material subjected to high temperature. The response of the trailer, which includes stress distribution and displacements under various loading conditions are analyzed in this paper. The method used in the numerical analysis is finite element technique using Ansys software. The results are presented and it shows that the stresses developed lies within the range and ensure infinite life. Methods of protection of the steel are also suggested to increase the efficiency of the trailer.

ID: 140

Investigating the Relation between Ergonomic Risk Factors and Musculoskeletal Disorder (MSDS) of Computer Operators

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Abstract

Industrial revolution has advanced the present world since nineteenth century. In the late 1960s, human beings then combined machineries and computers to shorten the production time with the occurrence of information revolution. However, the application of a computer is not limited to the industrial practices. Computers have adapted everyone's life including working, education system and games. Because of the convenience of computers, the population of using computers increases day by day that can not be restrained. Although the applications of computers bring the advantages, the problems are also accompanied. Using computer for a long time, fatigue of eyes, pain of shoulders, wrist pain and back pain due to improper sitting position occurs. The paper aimed at investigating the relations between ergonomic risk factors and musculoskeletal disorder of computer operators (MSDs). The survey subjects include 30 office staffs, 40 computer typist and 30 computer graphics designers (out of 100 computer operators). According to the research

results, the most popular pain position of the computer graphics designers are the eye (56%), neck (61%), wrist/hand (73%), lower back (63%), and knee (74%). Similarly for typist, most pain position is eye (60%), neck (62%), Shoulder (85%), wrist/hand (71%), upper back (57%), lower back (87%), and feet (71%). Lastly for office computer operator, pain position is upper back (62%), feet (32%), lower back (30%) and wrist/hand (29%). Besides, this study also confirms that the musculoskeletal disorders were associated with the improper postures, time of using computers per day, the body weight, poor neck posture are also the causes of MSDs. Those findings of the current studies can be applied in determining adequate ergonomics interventions to reduce the MSDs in computer work. Lastly recommendations and suggestions for future work have been highlighted.

Keywords: Ergonomic, Risk Factors, Computer, Musculoskeletal Disorder and Pain.

ID: 141

Ensuring Safety, a Great Challenge for Electricity Distribution System

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Abstract

Electricity distribution is a vast sector and it is stretched out over the whole country. Huge quantity of distribution line, line equipment, workers and general public are involved in the system. Most of the activities of the distribution system are risky. The possibility of safety breaks in this system is very high for its complex and risks involved operation. Death due to electrical shock is as usual news published in most of the Daily Newspapers. For a country like Bangladesh due to economical and technological drawbacks and lack of giving proper importance of the sector, the management of distribution system in Bangladesh is still using very primitive methods with minimum or without using of personal protective devices (PPE) for completion of distribution system activities. Non availability of safety measures poses a great challenge to the workers and general public enhancing the uncertainties and risks result in accident and ultimately turned to sufferings of workforce, sometimes loss of human lives also. Paper indicates the safety problems both for workers and the public that exist in distribution system in Bangladesh. It is also investigated to find out the main causes of accidents. The proper application of the recommendations will be helpful to reduce the frequency of accidents and thereby will be possible a sound operation of the distribution organizations as a whole.

Keywords: Electricity distribution system, PPE-Personal Protective Equipment, Primitive methods, Workforce.

ID: 142

Decision Analysis for Avoiding Disastrous Consequence of Iran's Nuclear Conflict

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Abstract

Iran's nuclear conflict has been a controversial issue since few years ago. It possesses economic, political and perhaps the military aspects that may change the power equation in the Middle East. Hence the international powers are very sensitive to this issue. In this paper, we analyze the current decision of Iran over its nuclear activities. We studied different types of decision biases that Iranian officials might face in their decisions and attitudes. As the effect, the present decision of Iran in this conflict is not rational. Rather, they are overconfident and unrealistically optimistic about the most likely outcomes of the conflict. The conflict over Iran's nuclear program is a multi-player conflict that addresses the part of the uncertainty that Iran may face in their decision making process. To take into account the uncertainty in decision analysis effectively, the conflict over Iran's nuclear program has been modeled and analyzed using Graph Model for Conflict Resolution. The result shows that a peaceful resolution for the conflict occurs only if both Iran and the UNSC reform their perception on each other. All parties should keep seeking diplomatic efforts to avoid a disaster.

ID: 144

Modularity: Catalyst of Innovation

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Abstract

We use a simple stylized model to show that if a monopolist experiences increasing cost of innovation, it makes higher profit by selling a base product and its innovation simultaneously as long as innovation is cost efficient. Further, we show that if the cost differential of modularizing the product is not too high, the monopolist makes even higher profits by modularizing the products using a common interface between models in both the products. We thus argue that modularization stimulates innovation.

ID: 145

Measuring Organizational Leanness Using Fuzzy Approach

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Abstract

Purpose- To develop a methodology for measuring leanness degree in manufacturing companies using fuzzy logic. Design/methodology/approach- evaluation methods based on human perceptions; make this kind of measuring unreliable. Considering the deficiency, this research develop an approach based on linguistic variables and fuzzy numbers for measuring organizational leanness, and finally use the method for measuring a manufacturing organization's leanness. Finding- The method developed is usable simply by practitioners and

make more precise approximate for leanness and then better improvement path for them. Practical implications- Using this method help practitioners to evaluate leanness more precise than other methods presented by now and develop applied solutions to move toward organizational leanness effectively. Originality/value – This is a new method based on fuzzy logic for measuring organizational leanness using human perceptions.

Keywords: Lean production, Lean indexes, Measuring, Fuzzy logic.

ID: 146

The Effect of Display Type and Video Game Type on Visual Fatigue and Mental Workload

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Abstract

This study investigated the effect of display type (plasma TV and CRT TV) and game type (boxing game and tennis game) on visual fatigue and mental workload for both genders during one hour Wii game playing. The use of plasma display to play video games improved significantly CFF threshold ($p < 0.001$). But it also caused greater subjective eye fatigue rating ($p < 0.01$). The change in CFF threshold for playing boxing game would be doubled than playing tennis game. Moreover, the playing boxing game produced about 70% more eye fatigue rating and about 25% more mental workload than playing tennis game, respectively. The gender effect was not significant on all the measurements.

ID: 148

Management of Supply Chain in Petroleum Corporations in India

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Abstract

Supply chain initiatives have become a critical part of firms operations. Success is increasingly being dictated by how well a company can control its supply base and mitigate supply bottlenecks and liabilities. This paper used inductive and qualitative approaches to explore the salient factors that simultaneously enhance the “greening the supply chain” as well as maximizing the customer reach while maintaining the efficiency of the supply chain system of petroleum companies. The key indicators identified were environmental policies, supplier policies, sustainability, market orientation and commitment to human capital and diversity. A survey was conducted with key informants across many divisions of the LPG segment to investigate how well these environmental and customer reach in the supply chain are in synchronized with the top management’s commitment towards environmental responsiveness and maximizing customer orientation. The responses to the survey were statistically analyzed and a relationship model was constructed with Market orientation as the dependent variable and independent variables as: environmental policies, supplier policies, commitment to human capital and diversity, sustainability and market orientation. The paper proposes to measure the performance of the corporation with respect to greening the supply chain, maximizing the reach of consumers and operational efficiency with a view of re-engineering the existing supply chain of LPG cylinders in India.

ID: 150

A Model for Automatic Preventive Maintenance Scheduling and an Application Database Software

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Abstract

Maintenance is essential for machines or equipments. Without maintenance machine or equipment cannot work properly throughout its service life. To perform maintenance activities, the organization needs to ensure maintenance scheduling in time. Case study shows that, in Bangladesh most of the organizations are practicing preventive maintenance even some are still practicing only breakdown maintenance. Among them most of the organizations perform the maintenance scheduling manually which is time consuming and which is also troublesome for record keeping. In order to overcome those problems, this research proposes a model for preventive maintenance scheduling. Application database software using C# and MySQL is developed supporting the proposed model. This software may be treated as a helping tool to establish TPM partially in organization by sharing information for autonomous maintenance program and a scheduled/periodic maintenance program.

ID: 151

Educating Future Engineers: An Example

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Abstract

Engineering education in the United States is going through a change, much of it driven by two recent reports from The National Academy of Engineering and the internationalization of the profession. This is a normal process of evolution in the education of future engineers to make them better prepared to be effective professionals in the environment they will face. As part of this evolution and the normal process of quality improvement, Wichita State University has recently launched a strategic initiative, Engineer of 2020. This paper reviews the background and the rationale for this initiative as well the implementation of it. Also discussed is the experience to date.

ID: 153

A Market Driven Demand Estimation Model for the Indian Petroleum Industry

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Abstract

Volatile oil prices and uncertainty in oil supplies had a significant impact on the petroleum industry in India as dependency on imported crude is very high. This paper examines the deficiencies of the existing demand estimation process in the Indian petroleum industry. It proposes the formulation of a market driven demand estimation model which incorporates inter-fuel substitution, technological developments in energy efficiency, environmental regulations, major national socio economic issues and price of petroleum products in the international markets along with the historical trend and seasonality. The market driven demand estimation model envisages efficient resource utilization in the Indian petroleum industry.

ID: 154

Application of Systematic Layout Planning in Hypermarkets

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Abstract

Systematic Layout Planning (SLP) is widely used in manufacturing industry for facility layout planning. However, it has not found application in hypermarkets. Store layout is a very important part of the store atmospherics and plays a major role in the customer's store experience. The store experience decides the customers repeat visit to the store. From a retailer's perspective, the store layout determines the exposure to goods and thus affects the chances of customer buying the goods. There is a need for developing a systematic procedure of layout planning in retail stores which can provide a competitive advantage to the retailer. Store Planning is considered more of an art. Introducing a systematic procedure in the store layout planning can make the process holistic and bring-in objectivity. An attempt is being made to modify and customize the SLP for application in retail store/hypermarket planning. The modified SLP can then serve as a very useful planning tool for the store layout planner. The approach can be further extended by application of analytical methods to store layout planning.

ID: 155

Reengineering of Logistics Value Chain of a Petroleum Products Marketing Company – Formulation of a Performance Measurement System

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Abstract

A petroleum product marketing company faces many an upheaval in its journey towards attaining excellence. It is more pronounced for a long-established nationalized company, when its pricing remains governed; while it continues to face the challenges from private players with Green field Refineries & modern approach to Supply Chain. In this context, at some point or the other, it has to look towards its logistics value chain and reengineer the same. This paper dwells formulation of Performance measurement tool for the value chain of a petroleum marketing company, with the ultimate purpose of using it to reengineer the value chain.

ID: 156

Performance Appraisal of Public Sector Service Organization

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Abstract

Service sector organizations can compete by innovating and developing the core competencies of their human resources. The human resource system can be made effective by having a valid appraisal system that also acts as a true motivator. This is especially relevant for public sector organizations in the developing countries, like India, which are challenged about improving their services in backdrop of the need for downsizing employees. Staff reductions undoubtedly reduce the short term costs but create the need for enhanced efficiency of the existing workforce. There is no such thing as an “ideal” appraisal format and system so every public sector unit must design an appraisal instrument and process that supports the organizational goals of optimizing the efforts of the workers. The paper presented will address the issue before the public sector service organizations, where measurement of the intangible output is subjective and difficult to quantify. It will consider the case of the Indian railways, a state owned and managed organization engaged in the service sector, and suggests an effective performance appraisal system that must satisfy the needs of the parties involved in the process. The primary requirement is that the managers and subordinates should have a shared perception of the purposes and functions of the process. Since the contribution of each employee of the Indian railway is not verifiable or traceable in the final passenger satisfaction level, performance appraisal is often rater’s perception based. Such organizations place special emphasis on appraisal errors (halo effect, leniency effect) that can harm perceptions about the fairness of appraisal system. In order to be effective the organization needs to recognize intangible productivity and relate it to tangible rewards; and be cognizant of appraiser leadership qualities.

ID: 157

Modification of Spur Gear Using Computational Method-Involutes Profile Being Modify

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Abstract

This Dissertation is a study characteristic of involutes gear system including contact stresses, bending stresses and the transmission error of the gear in mesh. To estimate the transmission error in the actual gear system which arises because of an irregular tool geometry or imperfect geometry or mounting? A model of a spur gear is used to study the effect of intentional tooth profile modifications by using two dimensional FEM. The deflection of teeth is calculated by using the bending and shear influence function. In this paper tooth relief modification is consider for profile modification, by using computational method.

Keywords: spur gear, transmission error, tooth relief, profile modification, computational method.

ID: 158

Modelling Choice of Mobile Technology for M-Banking

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Abstract

Research in the adoption of mobile services has not offered a comprehensive explanation of low demand for the service. This paper proposes a more comprehensive framework to account for the explanations of consumer choice in the context of m-banking. The model underlies the cognitive processes of reasoning, referencing and contextualizing, as postulated in the behavioral decision making. The proposed theoretical framework is based on a review of literature from marketing, behavioral economics and information systems.

ID: 160

Collaboration as a Strategy for Auto-service Business at Supermarkets

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Abstract

The paper is to establish collaboration as a strategy for auto-service business at supermarkets. Secondary market study has been made on the retail sector, especially in supermarket segment and on auto sector in India to assess the potential and growth. The drivers of possible collaboration of auto-service sector and supermarkets have been identified. From literature it is established that collaboration gives competitive advantage. A case study of collaborative auto-service at a supermarket reveals customer confidence on such set up. The idling of vehicles at supermarkets and growing demand of auto-services could be a strategic solution to tap this business potential.

ID: 161

Impacts of Common Components in Multistage Production System under Uncertain Conditions

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Abstract

The work desires: i) to determine the optimum level of batch size in bottleneck facility and ii) to analyze the effect of common components on work-in-process (WIP) level and cycle time in a multistage production system under uncertainties. The uncertainty is created by machine breakdown and quality variation. Few simulation models are developed based on a live case from a company. The models are verified and validated with the historical data from the company and by face validity. Taguchi approach for orthogonal array is used in designing experiments and these are executed in WITNESS. It is observed that the variation in level of common component in the system has significant impact on the production WIP level and cycle time. The main contribution of this research is determination of the optimal level of batch size in a bottleneck resource under the uncertainties. This approach can be generalized to any multistage production system, regardless of the precedence relationships among the various production stages in the system

ID: 163

Possibility Programming Application in Analysis of Fuzzy Knapsack Problems

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Abstract

This paper investigates knapsack problems in which all of the weight coefficients in the objective function and in the constraints are fuzzy numbers. Also, the knapsack's capacity is not known exactly and is represented by a fuzzy number. The approach in this paper for dealing with this kind of problem is based on Buckley's concept. But, instead of trying to obtain the possibility distribution, we try to solve the problem with a given possibility level. As a result, we can compare this approach with distance ranking method that was used for defuzzifying fuzzy knapsack problem by Lin and Yao.

Key words: Fuzzy number, possibility theory, knapsack problem, multiple choice knapsack problem, Multi constraint 0/1 knapsack problem, multiple criteria knapsack problem.

ID: 164

Enhancement of Tool Material Machining Characteristics with Cryogenic Treatment: A Review

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Abstract

For cost effective machining it is necessary to identify and quantify changes in tool material machining characteristics. Cryoprocessing, a supplementary process to conventional heat treatment, involves deep-freezing of materials at cryogenic temperatures to enhance the mechanical and physical properties. The execution of cryoprocessing on cutting tool materials increases wear resistance, hardness, and dimensional stability and reduces tool consumption and down time for the machine tool set up, thus leading to cost reductions. The present research paper reviews the machining characteristics of tool material with cryogenic treatment for industrial applications.

ID: 165

Effect of Total Quality Management on Performance of Indian Pharmaceutical Industries

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Abstract

The pharmaceutical industries are heavily regulated and the reasons are obvious: mistakes in product design or production can have severe, even fatal, consequences for patients which sometimes leads to recall of the drug from the market; where the fact is that out of 10,000 NCEs (New Chemical Entities) tested in the lab, only one reaches to the market and that too takes almost 18-20 years of research and approximately \$800 million. Hence quality and its management are very critical in this industry. Total Quality Management (TQM) acts as an umbrella under which everyone in the organization can strive for customer satisfaction, reduce cost and wastage and increase the efficiency of services. This paper surveys and reviews various Quality Management practices including ISO implementation in Indian pharmaceutical industries to explore the relationship between Total Quality Management practices and performance of the company. It also attempts to identify and analyze the significant factors affecting Total Quality Management implementation in Indian Pharmaceutical Industries. The survey is carried out by a self designed questionnaire and circulated to select pharmaceutical industries in India.

ID: 166

Automotive ssector: A Country Wise Comparative Analysis: India-Spain-Brazil

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Abstract

The automobile industry in any nation has always been a good indicator of the economic progress the country has been making. Also, being highly multinational; it is the auto industry which paves the way for reforms in foreign trade; gets in foreign investment and facilitates exposure of the country on a very broad international stage. Further; this industry is highly responsible for channelizing a country's technically skilled population; as it employs everyone from Engineers to Managers; from Shop floor work men to Advertising experts. Through a country wise comparative analysis; this paper tracks the automotive sector in the countries of: India; Spain; Brazil. Through a detailed study in each of these countries; and an exhaustive analysis of the collected data; this paper presents the challenges faced by the automotive sector in these countries. In the second part; the authors have made an attempt to highlight the differences in the market demands of the auto sector in these countries and how the industry has to cater to them. In the final facet of this paper; we discuss the recent economic slowdown; how did it affect these nations; their auto sectors and the attempts made to recover from it.

ID: 167

BRTS- Bus Rapid Transit System in Pune Modeling, Simulation and Feasibility analysis

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Abstract

The City of Pune, Maharashtra, India is well known as the city of Two Wheelers and has a large two wheeler population; Also the traffic here is prone to frequent congestions during peak hours; leading to jams causing huge delays in travel times. Moreover, pollution created by these vehicles is a huge cause of concern for the public and local authorities alike. To tackle this problem, the Pune Municipal Corporation came up with a plan to implement the BRTS in Dec. 2006, and successfully introduced it on a 13 KM stretch, becoming the first city in India to do so. This system has dedicated lanes and signaling system for Buses and thus is independent of the on road traffic, aimed at decreasing congestion and pollution by encouraging Pune motorists to take the BRTS instead of driving. The author has made an effort to compare the BRTS system with the regular one by Modeling and simulating both systems under various scenarios. Further on, the feasibility of implementing this system is discussed, along with its pros and cons, and the final section is dedicated to future developments to system and how it can be improved to make life easier for commuting Puneites.

ID: 168

A New Balancing Approach in Balanced Score Card by Applying Cooperative Evolutionary Game Theory

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Abstract: Balance scorecard is a widely recognized tool to support decision making in business management. Balance Score Card (BSC) has many advantages but it also suffers from some drawbacks features. In this paper, we develop a new balancing approach based on game theory. We propose an interaction method among different strategic agents of scorecard as players providing a methodology for collaboration among different players to reduce any inconsistency. We implement four-person cooperative evolutionary game theory (as a new game theory concept) to balancing in BSC.

Keywords: Balanced Scorecard (BSC), Balanced Scorecard (BSC), cooperative evolution game theory, evaluation Performance.

ID: 169

Translating the Student's Voice into Teaching Techniques: A Quality Function Deployment Approach

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Abstract

Quality Function Deployment (QFD) is a planning tool used to fulfill customer expectations. It is a disciplined approach to product design, engineering, and production and it provides in depth evaluation of a product requirements. An organization can improve technique of delivering engineering knowledge implementing QFD techniques. The main goal of this paper is to translate the student's voice into teaching techniques applying QFD approach. For this purpose a questionnaire based survey is performed in an Engineering department to sort out the student requirements. From the collected data, a house of quality is developed and finally prioritizes the teaching techniques corresponding to the student requirements. The higher the relative weight of the technique, the more the concentration needed. Any Engineering discipline can use the QFD tool to improve their teaching techniques.

Keywords: Student's voice, quality function deployment, house of quality

ID: 170

Models for Bed Occupancy Management of a Hospital in Singapore

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Abstract

This paper describes three bed prediction models in aiding hospital planners to anticipate bed demand so as to manage resources efficiently. The Poisson bed occupancy model provides an estimation of bed occupancy and optimal bed requirements in each class based on length of stay and admissions data. The simulation model was developed to predict bed occupancy levels for every class for the following week utilizing historical previous year's same week admissions data. Regression equations were formulated based on relationship between identified variables to aid bed managers to predict the weekly average number of occupied beds.

ID: 172

Envisages of New Product Developments in Small and Medium Enterprises through Virtual Team

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Abstract

New product development (NPD) in small and medium-sized enterprises (SMEs) virtual team has not been systematically investigated in developing countries. Literatures have shown no significant differences between traditional NPD and virtual NPD in general. New product development especially for SMEs virtual team are somewhat lacking in the literature and constitute a research gap. This paper aims to bridge this gap. This study first reviews the NPD and its relationship with virtuality and then identifies the critical factors in definition of NPD in SMEs virtual team. The statistical method was utilized to perform the required analysis of the data from survey. The results are achieved through factor analysis at the perspective of NPD in some of Malaysian and Iranian manufacturing firms. The 20 new product development factors were grouped into five higher level constructs. It gives valuable insight and guidelines which hopefully will help managers of firms in developing countries to consider the main factors in NPD.

ID: 173

An Empirical Investigation of Inventory Management Practices of Processed Food Supply Chain in Sri Lanka-Manufacturer's Perspective: A Case Study

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Abstract

In today's highly competitive business world demand for processed food is becoming popular among the Sri Lankan society, therefore proper management of the processed food supply chain is vitally important. It is argued that the final resort for any supply chain is the proper management of the inventory among the players within the chain. Less number of research has been conducted about inventory management practices and the issues within Sri Lanka in this sector. This study was conducted to investigate the inventory management practices and the issues of processed food supply chain in Sri Lanka. This study conduct to fill the gap in theoretical and empirical knowledge of inventory management practices of processed food supply chain in Sri Lanka. The study was conducted as a single case study analysis. Data was collected using in-depth structured and non structured interviews with senior managers, lower level managers, operational workers, site-observations and analysis of existing documented data sources. Validity of the data is ensured through triangulation. This qualitative research uses critical analysis of the facts to present aspects of the findings. The research findings reveals that manual operation of the inventory management process, no proper linkages with in the supply chain partners, focus towards developing computerized inventory management system with lack of commitment from the relevant stakeholders, no proper analysis of demand data and raw materials as major hindrances of the existing inventory management practices that ultimately affect all the partners in the processed food supply chain. Recommendations based on the findings for the enhancement of the inventory management practices of the processed food supply chain were discussed.

ID: 174

Searching for an Efficient Fouling Index for Reverse Osmosis Desalination: A Statistical Approach

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Abstract

Desalination using a reverse osmosis (RO) membrane is a complex process that requires preventive maintenance to control the fouling potential of feed water for long-term successful operation. Fouling is caused by scaling, bacterial growth, or the deposition of suspended or dissolved substances. The widely accepted measure of the fouling potential is the silt density index (SDI). We conducted filtering experiments under diverse conditions to gain new insight into the performance and deficiencies of the SDI from a statistical point of view. Based on the results, we developed a new fouling index that is more reliable and feasible than the SDI.

Keywords: SDI, permeation coefficient, fouling, desalination, statistical analysis

ID: 175

Design and Kaizen of Automated Assembly Production Lines Using 3D Computer Graphics

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Hitoshi Takeda, Department of Information Management, Bunkyo University, Chigasaki, Kanagawa 253-8550, Japan

Abstract

This paper proposed the design method for an automated assembly lines, for carrying out basic design using three-dimensional computer graphics (3DCG).It also proposes a method for performing kaizen and evaluation of automated systems utilizing hierarchic structure diagrams, state transition diagrams, improved tooling flow diagrams, a method for creating a Ladder Logic Diagram(LLD).Using a time Petri net, analyze the bottleneck process, identify problem points, and propose ideas for kaizen.

ID: 176

Pharmaceutical Care of People in the Community for the Recognition Rate and the Pharmaceutical Service Satisfaction Study

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Chi-Yuan Chen, Department of Industrial Engineering and Management, National Yunlin University of Science and Technology, Yunlin, Taiwan, R.O.C.
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Abstract

2009 Taiwan long-term care needs of 35 million people, if the medication through the pharmaceutical care of patients involved, the average monthly NT 324 per person for medicine to reduce the overall area will be able to reduce the billions of dollars. This study, through home visits survey, different villages, cities and towns the public health education before and after, drug awareness rate and differences in service satisfaction. This study show that during pharmaceutical care, the community and the public about safer drug use and the rate of environmental awareness and satisfaction, there is a substantial upgrade and improvement.

ID: 177

A Robust Optimization Approach for the Milk Run Problem with Time Windows with Inventory Uncertainty

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Abstract

In this paper we introduce a robust optimization approach to solve the milk run system with time window with inventory uncertainty. This approach yields routes that minimize transportation costs while satisfying all inventory in a given bounded uncertainty set. The idea of Milk Run problem has been used in the context of logistic and supply chain problems in order to manage the transportation of materials. Since the resulted problem formulation is NP-Hard, In order to solve the underlying problem, a novel algorithm entitled robust optimization has been proposed. We apply the model to solve some numerical examples to show robust solution efficiency versus deterministic. Since the resulted problem illustrate that grows up time in this method is progressively, In order to solve problem in large scale, particle swarm optimization has been proposed. We also observe that the robust solution amounts to a clever management of the remaining vehicle capacity compared to uniformly and non-uniformly distributing this slack over the vehicles.

Keywords: Logistic, Milk Run problem with time windows, robust linear optimization, Vehicle Routing Problem, Inventory uncertainty, Particle Swarm Optimization

ID: 178

QMS Positive Impact for SMEs: An Indian Textile Exporter's Example

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Abstract

Quality is associated with improving processes, products and services. Many large Indian businesses corporate have adopted one or other from of QMS like ISO, TQM, and Six Sigma to realize improved financial returns. But many small and medium Enterprises (SMES) sought registration to any one recognized QMS either due to external customer pressure or as a helpful business promotion tool. Though they have invested huge resources in adopting these QMS doubts still persist about the positive impact of the QMS on the enterprise financial benefits. This paper presents a case study analysis of a small scale textile exporter who followed the principles of ISO certification in true spirit and achieved remarkable improvements in the organization's financial front and serve as a stimulant for scores of other Indian SMES.

ID: 179

Designing a Quality Control System for Mean Vector and Change Point Diagnosis in Multivariate Normal Process

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Abstract

This paper considers the problem of contamination in process distribution as well as identifying a combination of variables which are responsible for the change in process. Three interactive steps for the control of mean vector in a contaminated multivariate normal process are proposed. The first step is to estimate the process parameters by robust statistics. The control chart is introduced in the second step. In the third step, we consider a change point model to monitor a step change in mean vector. The simulation results reveal the efficiency of model for detecting a specific step change in the process.

ID: 180

Structural Modeling of a Manufacturing Organization Focusing on Worker Allocation

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Najmun Naher, Tesco International Sourcing Bangladesh.

Nusrat Sarmin, Planning and Coordination Department, Rahimafrooz Accumulators Limited, Bangladesh

Abstract

Managers in the modern manufacturing world are under constant pressure of time cost and quality of products and services. As a result having a wrong structural model for any part of the production floor would be expensive enough to carry on. In this research a detail study was conducted to illustrate the structural model for the packaging section of a renowned pharmaceutical of Bangladesh. The prime objective was to set a structure for the packaging lines of their secondary packaging section. The target was to find out the optimum number of workers needed to give the maximum output from each line of the secondary packaging. Along with this other objectives were defining each steps needed to pack the products, measuring the time required to perform each step, measuring the work performance of the worker, scheduling the work and allocate the capacity, finding out the unoccupied time, calculating the output per hour with the detail use of work measurement and time study and Gantt chart. Thus a complete model was developed to organize the packaging section with an optimum number of workers for eight different types of products.

ID: 181

Assessment of the Risks for Workers Using FMEA: A Case Study in a Pharmaceutical Industry

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Abstract

Safety is a relative quantity that is a function of the situation in which it is measured. This research was conducted in a well established pharmaceutical company in Bangladesh practicing GMP (Good Manufacturing Practice), which has a tablet manufacturing facility. Tablet manufacturing comprises a number of manufacturing activities and machineries. Each of these activities, requiring amalgamated interaction of man, machine, equipment and environment has the potential of producing unforeseen hazards. Therefore, analysis of risk is not only necessary here, it is also important to use an appropriate tool that can incorporate all the risk-producing parameters. The research work conducted here using a very effective tool named Failure Mode and Effect Analysis (FMEA), consisted of observing the works at different sections, breaking them down into sequential steps, noting the surrounding variables of each task, and using these data to perform risk analysis to find out the most hazardous works for the workers.

Keywords: Failure Mode and Effect Analysis (FMEA), Good Manufacturing Practice (GMP), Risk Analysis, Risk Matrix, Tablet Manufacturing

ID: 182

CBM (Condition Based Maintenance) Through Score Normalization of Voice Biometrics

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Abstract

Condition Based Maintenance (CBM) is a type of preventive maintenance that enables replacement of components optimally before the failure of these. It is aimed that optimal output of a component be obtained thus increasing the service life of the components. For the CBM it is mandatory that appropriate measures for the monitoring of the condition of the components are deployed and the correct screening is ensured. For this purpose, in every industry people are assigned the roles and responsibilities so that the defined processes are executed effectively and at the lowest possible cost. Like every other industry, aviation industry has been hit badly by the current economic meltdown. The effects of the meltdown on the aviation industry of developing countries like Pakistan are more pronounced as maintenance of the aircraft is heavily dependent on the foreign vendors and OEMs. This has resulted in the increased maintenance costs and poor delivery schedule of the vendors. In this scenario the focus has been shifted to increase the equipment performance and useful life of the components to obtain the optimized service life of equipment and machinery. This requires an effective new approach to employ systems for real-time condition monitoring, predictive maintenance and Condition Based Maintenance (CBM). At present the testing plants/equipment of the aircraft components/accessories are subjected to the schedule inspection mostly based on the calendar time and very few on the hours based. In the

process whole of the equipment is dis-assembled and its various parts are subjected to the inspection. After the inspection although the parts may be serviceable but there are several items which are once used and cannot be used again. Now when the requirement of new spares for the assembling arises it is learnt that the OEM has not yet delivered the requisite spares even though the orders have been placed and due date of delivery has passed. This results in the production delay of the components which are queued up for the testing or other processes before installation on the aircraft. As a consequence of this delay, the assembly line schedule is disturbed resulting in huge human resource wastage and financial loss. In this paper an attempt has been made to use the modern communication technology to determine the health of the equipment by using voice biometrics. This will enable the monitoring of the performance of the equipment without disassembling it. It will be based on the concept that each part of the equipment when it operates has a specific voice signature and deterioration of that signature detected through sensors will enable to judge the health of the equipment and thus performing the inspection as required.

ID: 183

Emerging Trends in e-Manufacturing, Web-enabled Integration and Smart Manufacturing

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Abstract

E-manufacturing is a system methodology that enables the manufacturing operations to integrate enterprise operations through web-enabled platform. A smart machine can make decisions about manufacturing processes in real-time and diagnose itself to minimize downtime. Smart manufacturing provides beyond lean paradigm by exploitation of real-time information across the manufacturing enterprise to optimize value chain. Emerging trends of e-manufacturing and smart manufacturing will be presented.

ID: 184

Measurement of Service Quality of an Automobile Service Centre

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Abstract

Service quality is an essential aspect for any service provider, and automobile service industry is no exception. Here customers are much concerned about after sales service. This paper aims at measurement of current service quality level of a typical automobile dealership in an Indian city. The study was conducted using a representative survey of respondents, owners of one of the popular brand vehicles. In this paper, satisfaction/dissatisfaction of the customer has been measured using standard statistical tools, and an attempt has been made to find out reason(s) of dissatisfaction by applying root cause analysis. Current performance of the service centre was not found up to the mark. Necessary suggestions have been made and service centre has started executing them for the improvement in current service quality level.

ID: 185

An Empirical Study of Educational Supply Chain Management for the Universities

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Abstract

The exploratory study addresses education supply chain and research supply chain as major constituents in the educational supply chain management model for the universities. Model constructs were identified and confirmed by 493 respondents, representing university administrators, faculty and staffs, employers, and graduates. The resulting model was subsequently evaluated for accuracy and validity by multiple linear regressions (MLR) analysis and the structural equation modeling (SEM) technique. The research model furnishes stakeholders of the supply chain with appropriate strategies to review and appraise their performance toward fulfillment of ultimate goals, i.e. producing high-caliber graduates and high-impact research outcomes for the betterment of the society.

ID: 187

An Inventory Model with Linear Demand Rate, Finite Rate of Production with Shortages and Complete Backlogging

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Abstract

This paper deals in developing inventory model with linear demand rate allowing shortages in the inventory. These shortages are considered to be completely backlogged. We have assumed that the production rate is finite and proportional to the demand rate. The analytical solution of the model has been done to obtain the optimal solution of the problem. Suitable numerical example has been discussed to understand the problem. Further we have made sensitivity analysis of the optimal solution with respect to the changes in the values of the system parameters. This model is suitable in case of steady increase or decrease in the demand in the market for some product

ID: 188

Effectiveness of Advanced Manufacturing Technologies in SMEs of Auto Parts Manufacturing

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Abstract

In the present turbulent times, survival and success of any organization increasingly depends on competitiveness. The Small-Medium Enterprises (SMEs) play an important role in both developed and developing country economies. To remain competitive, SMEs must adopt strategic technologies and innovative management practices to survive. In finding ways to increase competitiveness and productivity, the use of advanced manufacturing technologies (AMTs) is one alternative for SMEs to become or remain competitive. This paper presents the detailed survey carried out to find out the contribution of AMTs in SMEs. This paper reveals the motives of implementing AMTs and its benefits to SMEs. The survey shows that the most important motive of SMEs is to attain customer satisfaction.

Keywords: SMEs, AMTs, motives, benefits.

ID: 190

A Framework for Assessing Management Losses from TPM Perspective

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Abstract

The term “Management Loss”, from Total Productive Maintenance or TPM perspective, means the productivity losses in an organization due to delays or impedances caused by human. These include four kinds of losses: losses due to awaiting material, awaiting dolly, awaiting repair and awaiting cleaning. TPM aims to minimize these losses through the proper maintenance schemes. Therefore it is very important to get a proper view of these losses. But human losses are often taken as qualitative losses and their effects are not measured. This study, conducted in an eminent pharmaceutical industry of Bangladesh, presents a structured way of quantifying the management losses under TPM. A way of assessing and comparing the effects of delays was established.

ID: 191

Measurement of TPM Losses Due To Skill Level Difference of Workers: Case Study of a Pharmaceutical Company

Farhana Afreen Proma, Tahera Yesmin, and M. Ahsan Akhtar Hasin, Dept. of Industrial and Production Engineering, Bangladesh University of Engineering and Technology, Dhaka- 1000, Bangladesh

Abstract

Total Productive Maintenance, TPM, has been proven to be a very effective tool for the improvement of productivity and efficiency of employees and equipments, and the overall environment of a company. From the TPM perspective, 16 losses have been identified to exist in an organization, of which some are attributed to human error. Among these, Operating Motion Loss and Multiwork loss are directly related to deficiency in both skill and work allocation. The study was conducted in a pharmaceutical company to find out a relative scenario of these losses in different sections of the tablet manufacturing facility. The losses were quantified in terms of loss of productive time and labor.

ID: 192

Integrated Scheduling of Equipments in a Container Terminal Using Simulation and Analytical Methods

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Abstract

Efficient operation of container terminal equipments directly links with the turnaround time of vessels at respective ports and this leads to increase the productivity of supply chain or logistics. The efficiency of a container terminal primarily depends on effective scheduling of handling equipments: query cranes, prime movers and yard cranes. Currently, many researches attempted to schedule these equipments on individual basis where different types of equipments were scheduled separately. Even the few works on integrated scheduling, only considered one cycle of either loading or unloading operations from or to a vessel. Therefore, it is very difficult to synchronize solutions generated for individual problems in order to increase the overall efficiency of the terminal. Hence this research focuses on an integrated scheduling of operational equipments of a terminal along with dual cycle mode as one problem, thereby attempts to increase the overall efficiency of the terminal. Problem is modeled using Arena simulation package and queues were maintained based on queuing theory to minimize congestions in query crane areas. Later, the simulated model was formulated as a flow-shop scheduling problem and solved with Genetic algorithm. Different case studies were performed with both approaches and results reveal that integrated scheduling reduces vessels turnaround time considerably. Furthermore, congestion around query crane areas was minimized with the introduction of queuing theory.

Keywords: Integrated scheduling, simulation, Genetic algorithm, queuing theory, supply chain management, logistics, Container terminal

ID: 193

Simulated Annealing and Tabu Search Based Hybrid Algorithm for Multi depot Vehicle Routing Problem with Time Windows and Split Delivery

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A.K. Kulatunga, Department of Production Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka

Abstract

Effective co-ordination of distribution operations of a manufacturing organization is paramount since it represents the major cost component of the logistic supply chain. In order to deal with high demand of orders with shorter lead time, distributed warehouse concept is introduced and this is currently being practiced. Furthermore, due to inherent deficiencies in VRP, rules have been extended to accommodate large scale orders by splitting the delivery. Artificial Intelligences (AI) based approaches widely used in the literature to solve VRP problems with extensions. In this research, hybrid algorithm (SATS) is developed based on Simulated Annealing (SA) and Tabu Search (TS) techniques to improve the solution quality of the complex Multi Depot Vehicle Routing Problem with Time Windows and Split Delivery (MDVRPTWSD). The simulation results reveal that SATS outperform in solution quality and the computational time.

ID: 194

Simultaneous Task Allocation and Motion Coordination Algorithm for Multiple Autonomous Vehicles in Dynamic Environment

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S.B. Siyambalapitiya, and U.S.S. Dharmapriya, Department of Engineering Mathematics, Faculty of Engineering, University of Peradeniya, Sri Lanka

Abstract

Task allocation, path planning and collision avoidance of autonomous vehicles is a complex problem. However, currently there are number of practical applications which are available in automated material handling systems in manufacturing and transshipment terminals where fleet of automated guided vehicles or automated straddle carriers operate. Presently this complex problem is solved in a sequential manner so that overall solution quality cannot be guaranteed. In order to avoid this, this problem is solved in simultaneously in static task allocation environment where vehicle, tasks and path related information known beforehand. However, it is difficult to find any researches attempted to solve these three sub problems in simultaneous manner due to inherent complexity. Therefore, this research focuses on solving these complex problems in dynamic environment where tasks, vehicle and path complete information are not known beforehand. Meta heuristic / evolutionary techniques and dispatching rules are used to generate near optimal solutions along with simultaneous Path and Motion coordination algorithm, which was based on Dijkstra algorithm and dynamically weight updating mechanism

for path network. The simulation studies reveals that proposed approach can be used to solve complex problem in simultaneous manner and the proposed approach can quickly alter the previously decided schedules in the case of sudden vehicle breakdowns etc.

Keywords: Simultaneous task allocation and motion coordination, Meta heuristic, autonomous vehicles

ID: 195

Artificial Intelligence Computational Techniques to Optimize a Multi Objective Oriented Distribution Operations

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Abstract

Artificial Intelligent (AI) techniques make a great influence on real-world distribution operations due to the complexity and the difficulty of finding an optimal solution within the limited time frame. To bridge the gap between standard problems in distribution and the real world problems, in this research, the standard VRP problem is extended to Multi Depot Vehicle Routing Problem with Time Windows and Split Delivery (MDVRPTWSD). The objective of the study is to (a) minimize the overall transportation cost (b) minimize distance (c) fully utilizing the fleets vehicles (d) distribute balanced load throughout the vehicles. The study tries to investigate the applicability of AI techniques to solve the multi objective problem.

ID: 196

Simulation of an Interdependent Metro-Bus Transit System to Analyze Bus Schedules from Passenger Perspective

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Abstract

Simulation has been a very important tool in scheduling rapid transit systems (metro). We took an interdependent transit system comprising of metro and bus and looked at the existing bus schedule from passenger-experience perspective. Passenger experience of metro users is described by typical waiting time. For buses, user satisfaction of commuters depends mainly on waiting time in queues and length of queue. Also commuters get dissatisfied when they wait in queue and yet fail to take the bus and have to wait for the next bus. In this paper, at different metro stations, fixed schedule metro and bus arrival is simulated and field data of passenger arrival is added to that. Average waiting time for each bus is observed in this regard. A bus schedule is changed here and the effect of the change on the waiting time also is observed. Following this practice, feasibility studies for new bus schedule can be carried out to obtain certain levels of user satisfaction. Three stations from the Montreal Metro system are taken for this purpose. The system is simulated with simulation software Arena.

ID: 198

An Optimal Rotational Cyclic Policy for a Supply Chain System with Imperfect Matching Inventory and JIT Delivery

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Abstract

A supply chain system of a Just-in-time production facility consists of raw material suppliers, manufacturers and retailers where inventory of raw materials and finished goods are involved, respectively. This research focuses on reducing the idle time of the production facilities by assuming that the production of succeeding cycle starts immediately after the production of preceding cycle. In reality, the inventory of a supply chain system may not be completely empty. A number of products may be leftover after the deliveries are made. These leftover inventories are added to the next shipment after the production of required amount to makeup a complete batch for shipment. Therefore, it is extremely important to search for an optimal strategies for these types production facilities where leftover finished goods inventory remains after the final shipment in a production cycle. Considering these scenarios, an inventory model is developed for an imperfect matching condition where some finished goods remains after the shipments. Based on the previous observation, this research also considers a single facility that follows JIT delivery and produces multiple products to satisfy customers' demand. For this problem a rotational cycle model is developed to optimize the facility operations. Both problems are categorized as mixed integer non-linear programming problems which are to be solved to find optimum number of orders, shipments and rotational cycle policy for multiple products. Also, this solution will lead to estimate the optimum production quantity and minimum total system cost.

ID: 199

Applying Quality Cost Analysis in Manufacturing of Power Generators

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Abstract

The aim of this paper is to determine the quality costs in Hydro and Thermal manufacturing. The purpose of this paper has been to make measurement suggestions for cost of quality. This also contributes to the measurement of individual cost of quality characteristics. . The key issue is to select the once approach that need emphasis in order to make balanced, continuous improvement in overall performance that satisfies the customers. The measures were derived from reflection on mission, products, service, customers and objectives. They could be aggregated using a powerful approach called the objectives Matrix, which is described in this paper.

ID: 200

Meta Analytic Approach to Compare Competence Indices of an Automobile Company

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Abstract

Big or small companies and organizations put much effort on “human capital” and its development. They know that internal competences are able to give a distinctive identity for the company, and that the knowledge of their human competence index has become the common practice to all human resource development researchers. Various definitions and resources represent the primary wealth of the organization. They therefore develop and implement tools and methods to manage, transfer and capitalise competence, and to define standards for their evaluation and validation. As an indicator to the growth of an organisation the estimation of human resource index or methods are used for such estimation by these development practitioners with their own different perceptions on the concept of competence level. Authors in this paper have made an effort to compare four such estimation methods (Analytic Hierarchy Process (AHP), Human Development Index (HDI), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) and FUZZY) using the Human Resource (HR) indices for 8 departments with 4 types of managers. Finally a comparison on different methods using the concept of META Analysis has been made and the best method has been identified.

ID: 201

A Compact FPGA Implementation of Triple-DES Encryption System with IP Core Generation and On-Chip Verification

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Abstract

This paper presents a fast and compact FPGA based implementation of the Data Encryption Standard (DES) and Triple Data Encryption Standard (TDES) algorithm, widely used in cryptography for securing the Internet traffic. The main objective of this paper is to provide the reader with a deep insight of the theory and design of a digital cryptographic circuit, which was implemented in a Vertex 5 series (XCVLX5110T) target device with the use of VHDL as the hardware description language. In order to confirm the expected behavior of these algorithms, the proposed design was extensively simulated, synthesized for different FPGA devices both in Spartan and Virtex series from Xilinx viz. Spartan 3, Spartan 3AN, Virtex 5, Virtex E device families. The novelty and contribution of this work is in three folds: (i) Extensive simulation and synthesis of the proposed design targeted for various FPGA devices, (ii) Complete hardware implementation of encryption and decryption algorithms onto Virtex 5 series device (XCVLX5110T) based FPGA boards and, (iii) Generation of ICON and VIO core for the design and on chip verification and analyzing using Chipscope Pro. The experimental as well as implementation results compared to the implementations reported so far are quite encouraging.

ID: 203

Green Supply Chain Management: Critical Research and Practices

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Abstract

The waste and emissions caused by the supply chain have become the main sources of serious environmental problems including global warming and acid rain. Green supply chain policies are desirable since reactive regulatory, to proactive strategic and competitive advantages. The novelty of this topic makes it difficult to truly determine contradictory and conflicting issues that could be considered true “debates”. We will present some of the debates that do occur, but this paper appraisal of investigation, practice and evaluation of green supply chain management.

ID: 204

Optimization Technique-Supply Chain in Reverse Logistics

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Abstract

Supply chain planning systems in reverse logistics present the industry with new problems that demand new approaches. The specific problem of the reverse logistics for the end-of-life (EOL) products addressed in this study is to determine the number of products to disassemble in a given time period to fulfill the demand of various components during that and subsequent time periods. We present a mathematical programming based model to solve the problem. When the problem is solved, it gives the number and timing of each product type to be disassembled in order to fulfill the demand of components needed at minimal disassembly and disposal costs.

ID: 205

An Inventory Model with Linear Demand Rate, Finite Rate of Production with Shortages and Complete Backlogging

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Abstract

This paper deals with in developing inventory model with linear demand rate allowing shortages in the inventory. These shortages are considered to be completely backlogged. We have assumed that the production rate is finite and proportional to the demand rate. The analytical solution of the model has been done to obtain the optimal solution of the problem. Suitable numerical example has been discussed have to understand the problem. Further we have made sensitivity

analysis of the optimal solution with respect to the changes in the values of the system parameters. This model is suitable in case of steady increase or decrease in the demand in the market for some product. The advantage of the linear functional form of the demand take care of steady increasing or steady decreasing and constant demand for different ranges of values of its parameter.

Keywords: Inventory; deterioration; linear demand; complete backlogging; shortage.

ID: 206

Solving Capacitated P-Median Problem by Hybrid K-Means Clustering and Fixed Neighborhood Search algorithm

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Abstract

Capacitated P-median problem (CPMP) is one of the popular discrete location problems. CPMP locates P facilities between the candidate points, in order to satisfy the customer demand. This problem is a NP-hard problem. In this paper, a new hybrid algorithm is proposed to solve CPMP. In proposed method, K-means clustering algorithm will find a proper solution for Fixed Neighborhood Search algorithm (FNS). Then, FNS algorithm improves the quality of obtained solutions for standard benchmark instances with facilities locations exchange and omit the unsuitable candidates' points. The Computational results show the efficiency proposed algorithm in regard of the quality of solution.

ID: 207

A Decision Support Model for Bank Branch Location Selection

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Abstract

Location selection is one of the most important decision making process which requires to consider several criteria based on the mission and the strategy. This study's object is to provide a decision support model in order to help the bank selecting the most appropriate location for a bank's branch considering a case study in Turkey. The object of the bank is to select the most appropriate city for opening a branch among six alternatives in the South-Eastern of Turkey. The model in this study was consisted of five main criteria which are Demographic, Socio-Economic, Sectoral Employment, Banking and Trade Potential and twenty one sub-criteria which represent the bank's mission and strategy. Because of the multi-criteria structure of the problem and the fuzziness in the comparisons of the criteria, fuzzy AHP is used and for the ranking of the alternatives, TOPSIS method is used.

Keywords: MCDM, Fuzzy AHP, TOPSIS, location selection.

ID: 208

Design of a Facial Prosthesis

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Abstract

Facial disfigurement may be caused by many different reasons. By using facial prosthetic device, a patient can avoid uncomfortable experiences. For creating customized prostheses, computer aided design, surface scanning and rapid prototyping technologies are widely used. Now, laser scanner is mostly used as data capturing device. By using that data, it is possible to develop a prosthetic device with the help of surface modeler and fabrication system. But, success of a prosthetic device depends on its aesthetic look and matching capability with facial contour. In this project, a nasal prosthetic device has been tried to develop using laser scanned face data and Rhinoceros 3.0 as a surface modeler. Different surface analysis tools are used for critical evaluation of the device. After discussing the problems faced during different designing stages, some suggestions are given for further improvement of the device.

ID: 209

Minimizing Makespan in Flowshops with Bounded Processing Times

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Abstract

The two-machine flowshop scheduling problem of minimizing makespan is addressed where jobs have random processing times which are bounded within certain intervals. The probability distributions of job processing times within intervals are not known. The only known information about job processing times is the lower and upper bounds. The decision about a solution of the problem, i.e., finding a sequence, has to be made based on these bounds. Different heuristics using the bounds are proposed, and the proposed heuristics are compared based on randomly generated data. The computational analysis has shown that three of the proposed heuristics perform well with an overall average error of less than one percent. Moreover, for symmetric distributions, it has also shown that one of the heuristics, which applies Johnson's algorithm to the average of the lower and upper bounds, perform as the best with an overall average percentage error of 0.71. The obtained results are also shown to be consistent with the recent results obtained in the literature.

Keywords: Scheduling, flowshop, makespan, random and bounded processing times

ID: 211

Reliability Modeling of a Manufacturing Cell Operated Under Degraded Mode

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Abstract

A Manufacturing cell consists of a machine served by a loading and unloading robot and a pallet handling system, which moves a batch of parts into and out of the system. In this study, a stochastic model is developed to analyze performance measures of a cell, which is allowed to operate under degraded mode. The model is used to determine state probabilities of the system, which are used to determine reliability and productivity of the cell, as well as the utilization of its components, under various operational conditions, including equipment failures and fault-tolerance states. The model and the results can be useful for design engineers and operational managers to analyze performance of a system at the design or operational stage.

ID: 212

Modeling and Analysis of Fire Center Locations in a City to Minimize Response Time

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Abstract

Facility location problems have been subject of analysis and have received considerable attention over the past several years. Location problems may arise under a variety of conditions. One of the important location problems encountered in real life is the location of emergency service centers, such as fire stations. Effective location of an emergency service center within a geographical area significantly affects the level and quality of the service it provides. A fire station supports the needs of the fire department and the community in which it is located. The location of the station is largely driven by the need to minimize response time. Response time is the duration between receiving a call and reaching the place of incident. This paper presents a real application related to the location analysis of fire stations in a city. Models are utilized to determine optimum locations and assignments of fire stations in various regions of a particular city under different conditions including obstacle overcoming points between the regions considered.

Keywords: Location analysis, Emergency center location, Fire station location

ID: 213

TQM for Bangladesh Power Generating Sector

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Abstract

Bangladesh Power Development Board (BPDB) is the most important and largest organization of Bangladesh in power sector. BPDB has taken some managerial changes and reforms in power station to increase its managerial strength in the light of TQM. But some problems have arisen that may terminate the TQM activities. So, this paper became to find out these problems and take some measures to solve these barriers considering the national interest. Some recommendations are made for successful implementation of TQM in BPDB. The proper application of the recommendations will be helpful to improve the present situation of Total Quality Management in BPDB and thereby will be possible a sound operation of Bangladesh Power Development Board as per Total Quality Management.

ID: 214

The Rationale of Lean and TPM

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Abstract

TPM is mostly regarded as an integral part of Lean. TPM role in maintenance is similar to TQM in Quality. This paper aims to reach a prescription about the best attitude toward both Lean and TPM as well as their implementation. Two companies which have implemented TPM without considering Lean were investigated. They had implemented TPM before Lean, but now believe that a company should start with Lean and grow Lean thinking among the employees. In this paper, Lean and TPM comparison proves that they have several common tools and concepts.

ID: 215

Connectivity Management in Mobile Ad Hoc Networks: A Fuzzy Based Semi-Distributed Approach

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Abstract

The highly dynamic character of a Mobile Ad-Hoc Network (MANET) poses significant challenges on network communications. Previous work on MANET has resulted in numerous routing protocols aiming to maintain network connectivity among the active nodes. It is really a challenging task to provide a connected network during the movement of the whole network.

This paper, presents a fuzzy based algorithm to maintain the connected topology of a MANET by suitably selecting 'Leader' among the nodes constituting the MANET. All the nodes are enabled with GPS receiver. The basic philosophy behind the algorithm is to select 'Leader' amongst the system based on positional data and the node's energy level. Once elected, the 'Leader' is entrusted with the responsibility to broadcast its positional information periodically while the other nodes will individually decide its movement depending on the fuzzy based analysis of positional data of the leader in order to maintain the connected topology. The algorithm is going to be formulated in such a way, that the entire network is going to move in one direction while each node can move freely. Both the 'Leader' election and the movement algorithm is fuzzy logic based. We have simulated the algorithm in a number of synthetically designed situations and the results we have obtained have been quite encouraging.

ID: 217

Layered OSGi-based Reconfigurable Lightweight RFID Reader Protocol

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Abstract

Radio Frequency Identification (RFID) systems are emerging as a practical means of auto-identification in a wide variety of applications in the modern era and as one of the most pervasive computing technologies in history. A typical RFID system is usually composed of four parts: tag, RFID reader, RFID middleware and application system. The host system seeking between the hardware and the enterprise system should introduce intelligent operational environment using configurable rules and lightweight, event driven architecture for smoothing and restricting high volume of raw events injected from the physical world. Such implementation should be part and parcel of a generic middle-ware platform to ensure an open environment and adaptability. To make the RFID reader integration uniform and effective, and meet the low calculation requirement of low-cost readers, a layered OSGi-based Reconfigurable Lightweight RFID Reader Protocol is presented here. Bearing in mind that the EPC standard has become a virtual standard of RFID system due to its rapid development, to meet the demand of EPC Reader Protocol Standard (RPS), the presented protocol is specified in four layers, respectively the Discovery Layer, the Reader Layer, the Tag Layer and the Notify Layer. Differ from EPCRPS, in which different Messaging/Transport Bindings provide for different kinds of transport, the Messaging Layer and the Transport Layer are no longer designed to be working in pairs. This protocol makes the reader integration uniform and effective.

ID: 218

A Fuzzy Cost-based FMEA Model

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 Reza Baradaran Kazemzadeh, Department of Industrial Engineering, Tarbiat Modarres University, P.O. Box 14115-143, Tehran, Iran

Abstract

Nowadays, improving and upgrading quality of products and services is one the main reason for outgoing the competitors and penetration into markets. This article is about the deficiency of the traditional FMEA, and introduces a new method based on estimated costs fuzzy FMEA and utility values. In the proposed method a new fuzzy RPN is defined. A pair wise comparison among Severity, Occurrence and Detection by the AHP method has been done to obtain a new fuzzy membership function. In the proposed method the limited budget of company for improving activities is also considered. Finally, the case study shows this new membership function calculate actual costs due to failures, can better prioritize failure modes, can improve more potential failures than Dong method and this is the most important superiority our new method.

ID: 219

Complexity Level in Industrial Firms: Case Studies Implementation

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Abstract

Industrial firms require reduction in their complexity. Complexity in industrial firms represents a new challenge in the next decade. Estimation the level of complexity in industrial firms is difficult due to complicated analyses. This paper will put a framework to deeply analyze and estimate the expected complexity level in industrial firms. Also, a computer software package was created to manipulate a huge amount of collected data. Several case studies were conducted in industrial organizations to demonstrate the proposed methodology of analysis and estimation. The results show that the complexity of industrial organizations is unclear and need more attention from manufacturers and academicians.

Keywords: complexity of manufacturing systems, performance measurements.

ID: 220

Point Process Based Maintenance Modeling for Repairable Systems: A Review

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Abstract

In this article, the intricacies involved in the maintenance of the industrial repairable systems are analyzed. Based on the practical requirement, the mathematical models for repairable system maintenance which are using point process theory are listed and reviewed. The available estimation, inference and prediction methodologies are also listed. The future issues which are to be addressed in the mathematical modeling for maintenance are also pointed out.

Keywords: Point process, repairable systems, Poisson process, intensity function, multiple repairable systems, competing risks.

ID: 221

Minimizing Total Completion Time in Flowshops with Bounded Processing Times

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Abstract

We consider the two-machine flowshop scheduling problem where jobs have random processing times which are bounded within certain intervals. The objective function is to minimize total completion time of all jobs. The decision of finding a solution for the problem has to be made based on the lower and upper bounds on job processing times since this is the only information available. The problem is NP-hard since the special case when the lower and upper bounds are equal, i.e., the deterministic case, is known to be NP-hard. Therefore, a reasonable approach is to come up with well performing heuristics. We propose eleven heuristics which utilize the lower and upper bounds on job processing times. The proposed heuristics are compared through randomly generated data. The computational analysis has shown that the heuristics using the information on the bounds of job processing times on both machines perform much better than those using the information on one of the two machines. It has also shown that one of the proposed heuristics performs as the best for different distributions with an overall average percentage error of less than one.

Keywords: Scheduling, flowshop, total completion time, random and bounded processing times

ID: 222

Evaluation of the Current Maintenance System and Maintenance Management System in KIMIA Co

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Abstract

This paper describes the current condition of the maintenance system and maintenance management system in one of the petrochemical subsidiaries in Iran. It also assess approaches in both side of maintenance aspects such as the human resources and the technical issues in KIMIA Co by means of a questionnaire and concludes practical recommendations to help the company to reach to the reasonable performance for the future excellence in the maintenance organization. Such as:

- Development of training in the organization of the maintenance contractors
- Improve the work order system
- Improve the spare parts supply chain management system
- Development of the knowledge management culture in the maintenance organization

ID: 223

Modelling Cost of Maintenance Contract for Rail Infrastructure

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Abstract

Maintenance contracts have received significant attention in last ten years. It has huge potential to reduce the upfront investments in maintenance infrastructure, specialised maintenance facilities, and risk for owners through expert services provided by the original equipment manufacturers and/ or specialist maintenance providers. There is a growing trend for asset intensive Industries to outsource the maintenance services of their complex and critical asset through maintenance contracts due to economic pressure and technical complexities not within the capability of the owner/ user. One of the complex and critical assets in transport infrastructure is rail. To maintain reliable service through safe and uninterrupted rail operation maintenance contracts are currently being used as a cost effective option. However, there is a need to develop mathematical cost models to build into the contract price. In this paper, a conceptual rail maintenance contract model is proposed for estimating cost of outsourcing maintenance that takes into account cost of maintenance, inspection and risk of accidental failure.

ID: 224

Energy Consumption, Energy Savings and Emission Analysis for Industrial Motors

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Abstract

Energy is one of the indispensable factors for continuous development and economic growth. The industrial sector is the largest user of energy in Malaysia. Since motors are the principle energy users, different energy savings, strategies have been applied to reduce their energy consumption and associated emissions released into the atmosphere. These strategies include using high efficient motors and Variable Speed Drive (VSD). It has been estimated that there can be a total energy savings of 1765MWh, 2703 MWh and 3605MWh by utilizing energy-efficient motors for a 50%, 75% and 100% load respectively. Similarly, it is hypothesized that a significant amount of energy can be saved using VSD to reduce speed, thus cutting energy costs. Moreover, a substantial reduction in the amount of emissions can be effected together with the associated energy savings for different energy savings strategies. It is clear that the use of VSDs and energy efficient motors leads to substantial energy savings and an enormous reduction in emissions.

Keywords: Industrial motors, Energy consumption, Energy savings, Variable speed drive, Emission reduction.

ID: 225

Development of a Web based Education Module for Verilog HDL

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Abstract

Now a days web-based education is getting popularity all over the world since it provides a platform to make education easy, cost-effective and wide-spread to the people. This paper presents web based education module for Verilog Hardware Description Language (HDL) which is an industry standard procedure for advanced electronic design and automation. The materials have been used in different lectures and short courses and it has been proved effective. It provides a platform for easy learning of Verilog HDL to the students of the university and VLSI designers in the industry. Web-based Educational (WBE) module for other engineering courses can also be developed following the similar approach as presented in this paper.

ID: 226

Simulation Based Decision Support System (SBDSS) for the Vehicles Repair and Maintenance in Dynamic Business Environment

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Abstract

Maintenance support system is formed by all the needed support resources which are related and coordinated between each other to achieve certain objectives such as operational availability of the supported object during its life cycle. This paper describes the decision support system using simulation in the dynamic environment of vehicles repair and maintenance. The study illustrates a case relevant to repair and maintenance decision support system, in which different feasible scenarios has been modeled and modules developed for the analysis and improvement of the existing system. This is done by process mapping of the existing systems and modeling of the existing system in simulation language. Various feasible alternatives illuminated a pathway to significant improvements in customer service, management of work in process, resource utilization, over time and cycle time. It has been learnt that WIP and overtime are the major impediments in the system affecting the performance of the system which can be controlled by suggesting feasible alternatives.

ID: 227

Employee Attrition in Engineering Firms: Case Study of DCIPS Pvt. Ltd, India

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Abstract

Retention of talented workers is not primarily driven by fair and equitable compensation at par with the industry trend. The purpose of the study is to investigate and analyze the causal factors influencing attrition and how engineering firms can retain their operational employees. This research has studied the retention pattern of managerial personnel engaged in operational activities in an engineering firm in India named DCIPS. The methodology used to unearth the

causal factors determining the attrition propensity was a study of exit documents of engineering managers leaving the organization over a 10-year period (1999 - 2008). The results revealed that attrition is due to the lack of growth and a career advancement opportunity. Length of association with the firm has been related to attrition pattern. Such a case study of an engineering firm may be extended for other engineering firms, which goes to establish the need for career growth and planning in ensuring employee satisfaction and hence bring about satisfactory retention levels.

ID: 228

Grounded Linguistic Symbols and WordNet Ontologies

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Abstract

The notion of symbols and concepts has always created confusion in cognitive science and artificial intelligence. How are the symbols related to concepts? Can we consider the words in a language to be symbols? The above two questions relates to symbol grounding problem as proposed by Harnard (1990). The words in a language can be considered as linguistic symbols where an intelligent agent adds a label or name to it to refer to one of its concepts. A concept is a cognitive unit of meaning – an abstract idea or mental symbol. Linguistic symbols acquire meaning in large part from their relationships with other linguistic symbols. The relationships between linguistic symbols may be, ‘part-of’ (leaves and branches are part of trees), ‘kind-of’ (banyan and palm are kind of trees), to mention a few. In this paper, we have addressed (1) To specify the relation or mapping between sensorimotor data and linguistic symbols and (2) To construct real-world knowledge about what roles linguistic symbols have and what relations they have with others. Our proposed model is an extension of Harnard model for grounding of linguistic symbols, augmented with Wordnet ontology-representing real-world knowledge.

ID: 229

A Pair of Large-incidence-angle Cylinders in Cross-Flow with the Upstream One Subjected to a Transverse Harmonic Oscillation

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Abstract

Cross-flow past a pair of circular cylinders, with pitch ratio 2.0 and stagger angle 45°, and the upstream one subjected to forced harmonic oscillation in the transverse direction is investigated experimentally for Reynolds numbers, $Re = 515-730$. Flow-visualization and hot-film measurements of the wake formation region are reported. Results show that when the cylinders are stationary an integral relationship exists between two distinct Strouhal numbers. Oscillation of the upstream cylinder causes considerable modification of the wake vis-à-vis when the cylinders are stationary. In particular, there are distinct regions of synchronization between the dominant wake periodicities and the cylinder oscillation.

ID: 230

Intermittent Demand Forecast and Inventory Reduction Using Bayesian ARIMA Approach

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Abstract

Natural calamities (e.g., hurricane, excessive ice-fall) may often impede the inventory replenishment during the peak sale season. Due to the extreme situations, sales may not occur and demand may not be recorded. This study focuses on forecasting of intermittent seasonal demand by taking random demand with a proportion of zero values in the peak sale season. Demand pattern for a regular time is identified using the seasonal ARIMA (*S-ARIMA*) model. The study proposes a Bayesian procedure to the ARIMA (*BS-ARIMA*) model to forecast the peak season demand which uses a dummy variable to account for the past years intermittent demand. To capture uncertainty in the *B-ARIMA* model, the non-informative prior distributions are assumed for each parameter. Bayesian updating is performed by Markov Chain Monte Carlo simulation through the Gibbs sampler algorithm. A dynamic programming algorithm under periodic review inventory policy is applied to derive the inventory costs. The model is tested using partial demand of seasonal apparel product in the US during 1998-05, collected from the US Census Bureau. Results showed that, for intermittent seasonal demand forecast, the *BS-ARIMA* model performs better and minimizes inventory costs than do *S-ARIMA* and modified Holt-Winters exponential smoothing method.

ID: 231

A New Organizational Structure for the Managing Production Process by Focusing on the Maintenance and Process

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Abstract

This paper describes a new method and somehow different organizational chart for managing production process in the industrial companies such as oil, gas and petrochemical company. Since the maintenance and process department in this type of companies play a significant role in the production, it is crucial and vital to have a proper approach toward these two departments. The last experience in this regard shows that the company's managers do their best to achieve high productivity in the human resource side and the reliability for the equipments in the technical side. This method shows how with a simple new structure for these two departments we can achieve these quit important goals. According to this new method we propose a new relationship between the process department and the maintenance department as well. In this regard we focused on the direction of information that transfers between these two departments. For instant how the companies can shift from just process oriented approach a little more to the maintenance oriented approach without splitting their activities. This new approach tries to share knowledge between these two departments and of course without devoting one department to another department.

ID: 232

Advanced Design for Robot in Mars Exploration

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Abstract

Mars Planet Exploration requires a new design of robot to explore it in a new way. This robot has been equipped with specially designed wheels to overcome all possible obstacles. In other words it helps to explore the unknown land in the mars especially the craters. This robot has a special type of plates mounted on the wheels, which can pass over all obstacles, especially suited for mars. The instruments inside the robot will be protected by suspension system in wheels. It can extend the life time of the Robot, saves instruments in it from physical damage. This robot will be having a extra setup to explore craters. Since DTMF technique has high coverage area as per service provider it helps this robot to be used in the field of military and forest application. It is first time using a mobile phone to control a robot with 3G technology.

ID: 233

An Integrated Supply Chain Model for the Supply Uncertainty Problem

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Abstract

This paper considers a dyadic supply chain with uncertain supplier. Both retailer and supplier use continuous review policy. The supplier is randomly available for supplying the retailer. The retailer faces Poisson demands. In this system, lead time is a random variable consists of a constant transportation time plus a random delay occurs due to availability of stock at the supplier. This paper considers both the integrity and the uncertainty in the above supply chain. We derive a good approximation for the total cost function of described system, as weighted mean costs of the one-for-one ordering policy. Finally, using simulation studies, we show that absolute errors are significantly ignorable.

ID: 234

Secure Mobile Payment System in e-Commerce

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Abstract

Security issue is very important for mobile payment system in e-commerce. The proposed work introduces secure and fast mobile payment services aimed at J2ME enabled mobile phones over GPRS communication. The scope of the proposed solution is the combination of J2EE and J2ME capabilities and also uses SMS gateway to send secure and confirmation information to the mobile user. This paper defines the secure mobile payment system to allow mobile users to

conduct mobile transactions over GPRS communications but also supports the related secured transactions between the payment server and mobile user. This paper analyzes the development of secure mobile payment system in ecommerce using J2EE and J2ME. In this system, consumers fill up the required information with mobile number from the Internet for purchasing goods. In payment option, a SMS with a security code, consumer id and product id will be sent over GPRS communication network to the consumer mobile number. Consumer uses a Mobile application, developed by J2ME, to send that secure information to the server by J2EE (JSP). The server application authenticates that information from the database server. If the authorization is fulfilled then the mobile payment system has completed the payment system and updates the information of database. Finally, we have discussed a case study for mobile payment for online bus ticket reservation as a case study.

ID: 235

Model for Forecasting Passenger of Airport

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Abstract

This research forecasts the growth of air traffic in one of int'l airport.. It actually estimates the growth of air traffic with the trend model, and then the growth is forecasted by monthly air traffic and time series data. To estimate the coefficient of the model in general econometric methods use the time series data, it is suggested that the data should be stationary, otherwise false regression would be probable. Then before using, the data (variables), the data should be tested so as to be stationary. However, there are different methods to make data stationary such as Drawing Diagram and Augmented Dickey- Fuller Test (ADF), which were used in this dissertation. Finally, the estimation is base on the fifth month, namely (Mordad).

ID: 236

A 1-V LNA for UWB Applications in 90 nm CMOS Technology

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Abstract

Ultra Wide-band (UWB) communication has great demand for applications in short range low power and high speed modern wireless systems. At the receiver front end, LNA is the most important component as it can determine the total noise figure of the system. Many topologies currently exist, such as distributed amplifiers, resistive shunt feedback, cascade amplifier and current-reuse amplifier. To achieve good gain, noise figure, and keep good wide-band for 1-V supply voltage, this paper proposes an LNA design based on the existing current-reuse topology. A gain of 15 dB is obtained over the entire 2-6 GHz range of operation. DC power consumption is below 8mW for 1-V supply voltage. Impedance matching at input and output of LNA is set at 50-ohm over 2-6 GHZ, resulting in $S(1,1)$ and $S(2,2)$ below -13dB. Noise less components like inductors and capacitors are used to keep noise factor below 3dB. Due to minimum area consideration, matching is obtained by using only a two stage LC ladder network. The design also provides a good isolation between input and output of the LNA with $S(1,2) < -40$ dB.

Keywords: UWB, LNA, current-reuse, ladder network.

ID: 237

Development of a Mobile Agent for Modern e-shopping

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In e-shopping sector, electronic agent is becoming popular day by day. Agent is mediators in e-commerce sector. There are varieties of commodities web page in this arena. People searching their dedicated product using personalize information through their electronic agent. Now-a-days mobile browsing is popular day by day. People want all the information in their handset based agent. But main problem is that all commodities web or portal has not written for mobile. So the searching information cannot view properly for user side. A solution is that web page can be written for mobile agent. But there needs tedious redundant work for writing portal for different agent which is not practical. In this paper we show our developed technique to minimize this trade-off. We develop an API which can convert any web document for mobile agent using some embedded tag defined by us. Experiments have been conducted on various popular e-shopping sites and find that a huge tedious work can be reduced for vendor.

ID: 238

Corner Effects in SOI Vs Bulk Tri gate FinFETs using 3D device simulation

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Abstract

SOI FinFET transistors have emerged as novel devices having superior controls over short channel effects (SCE) than the conventional MOS transistor devices. However despite these advantages, these also exhibit certain other undesirable characteristics such as corner effects, quantum effects, tunneling etc. Usually, the corner effect deteriorates the performance by increasing the leakage current. In this work, the corner effect of SOI and Bulk Tri-gate FinFETs are investigated by 3D device simulation and their electrical characteristics are compared for different body doping and bias conditions. The corner effect in small size SOI tri gated FINFETS for typical device parameters does not deteriorate the performance and an enhancement in the on state current and sub-threshold performance have been observed. In corners due to charge sharing effects between two adjacent gates, causes premature inversion in corners and produces high drain current in case of SOI tri gate FinFETs.

Keywords: SOI, SCE, corner effect, Tri gate-FINFET, premature inversion.

ID: 239

Global Outsourcing Strategy: Product Development Perspective

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Abstract

World economic recession, globalization of business environment and advances in technologies pushing manufacturing firms for the adoption of outsourcing strategy in their product development processes. Nowadays, firms are realizing that being alone in product development process do not provide them any differentiation in their production lines. The objectives of such approach are not only for cost effectiveness and focus on core competition but firms adopt outsourcing for a distinct marketing edge and to score over their competitors. In this paper, strategic views of outsourcing in manufacturing industries are critically analyzed and discussed with the potentials and pitfalls of this approach.

ID: 240

Cost and Return Analysis of Tea Industry - A case Study on Dauracherra and New Samanbagh Tea Estate

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Abstract:

This case study examines the economic profitability and break-even yield of mature tea cultivation of two estates. The objective of this thesis is to analysis cost off tea processing and to find out the profit return of tea estate. The outcome of the analysis is found to be Tk 34.04 and Tk 31.50 respectively. The average cost of production per kg and per hectare at New Samanbagh tea estate is found to be Tk 42584 and 41923 respectively. The average average yields per hectare of Dauracherra & New Samanbagh tea estates were found to be 1250 kg 1331 kg respectively. The average per kg & peer hectare cost of Dauracherra tea estates were found to be 13.91 and 17354 respectively. The average per kg and per hectare cost of New Samanbagh tea estates were found to be Tk 12.75 and Tk 16973 respectively. On an average the benefit cost ratio for Dauracherra & New Samanbagh tea estate is found to be 650 kg and 750 kg respectively. The average break –even annual production at Dauracherra & New Samanbagh tea estate were found to be 231136 kg and 466834 kg respectively. This case study research was carried out in order to know or to determine the current economical status of industries average cost of production per kg and per hectare. Current yield per hectare as well as average break even yield per hectare determined to find out tea estates were operating profit .For both estates cost ratios found greater than 1 and also arrange yield per hectare was much higher than average breakeven yield per hectare. This implied that both the estates were operating a profit.

Keywords: Economic profitability, Break-even yield, Break-even point.

ID: 241

Optimal Production Run Length for Products Sold with Warranty in a Deteriorating Production System with a Time Varying Defective Rate under Allowable Shortages

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Abstract

The paper studies the optimal production run length for a deteriorating production system. The optimal warranty cost is determined by a balance between the warranty cost of the manufacturer and the buyer during its warranty period. It is assumed that the elapsed time until the production process shift is age dependent and arbitrarily distributed. The objective is to minimize the total cost per item for determining the optimal production run length and the length of time when backorder is replenished. It shows that there exists a unique optimal production run length to minimize the expected total cost.

ID: 242

A Tabu Search Algorithm for Determining the Economic Design Parameters of an Integrated Production Planning, Quality Control and Preventive Maintenance Policy

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Abstract

In this work, an integrated model of economic production quantity, economic design of an - control chart, and preventive maintenance are investigated under non-uniform quality control parameters. The effect on the expected total cost and quality control cost is investigated with three different assumptions of the quality control parameters. Using a tabu search algorithm, the optimal values of quality control parameters, for different PM levels, are found. A non-uniform scheme for sampling frequency, sample size and control limit co-efficient provides lower cost as compared to schemes where only sampling frequency is taken as non-uniform.

ID: 243

Analyzing and Evaluation of Quality Management System in Bandar Imam Petrochemical Company (BIPC)

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Abstract

In holistic manner the petrochemical industry in Iran growth rapidly and targeted the internal and external market. Beside of its huge effect on social, environment and sustainable development, life time management is necessity for this industry to growth and exist. In light of increasing pressure from internal /external stakeholders, implementation/ certification of quality management systems has been a challenge and major activity for any organizations .The diffusion of Quality management system in petrochemical industry in Iran is very high, so analyzing of such system is a key to find out the process of merging of traditional management system with new system and challenges between this two concepts. This research implements the background to find out how much systemic approach is successful to penetrate in traditional behavior of organization and if not, what are the reasons. The research is based on case-study approach and it is in alignment with the scope and benefits expected from this methodology.

ID: 244

Tradeoffs among Paradigms in Supply Chain Management

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Abstract

Supply chain paradigms have been explored, but it is still very difficult to integrate some concepts that seem to be contradictory. This paper explores production and supply chain paradigms such as lean, agile, resilient and green. Tradeoffs between these management paradigms are identified and explored to help organizations and their supply chains to become more efficient and competitive. This paper intends to find if (and how) these paradigms have been under researchers' attention, putting into perspective eventual contributions from integrated approaches

ID: 245

Stochastic Investment Decision Making with Dynamic Programming

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Abstract

Proper investment decision making is key to success for every investor in their efforts to keep pace with the competitive business environment. Mitigation of exposure to risk plays a vital role, since investors are now directly exposed to the uncertain decision environment. The uncertainty (and risk) of an investment is increasing with the increased number of competing investors

entering to market. As a result, the expected return on investment (ROI) of a decision quite often carries a high degree of uncertainty. Our objective is to formulate a dynamic programming mathematical model for the investment decision with incorporating this uncertainty in a probabilistic manner. Policy iteration algorithm of the dynamic programming is adopted to solve the model. Our simulation result shows that the algorithm is able to help us in taking optimum investment decision.

ID: 246

Application of the Lean Six Sigma Problem Solving Methodology in Law Enforcement: A Case Study at the Philippine Drug Enforcement Agency

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Abstract

The Lean Six Sigma (LSS) methodology is a process-focused, data-driven, and customer-centric approach to solving quality problems in the profit-oriented sector. This research explores the non-traditional application of the LSS methodology and related principles in determining the root causes of drug case dismissals and acquittals in a law enforcement agency. The paper explores the cost of poor quality (COPQ), definition of defects, determination of customer requirements, process-oriented thinking, root cause analysis, and the application of the DMAIC (Define-Measure-Analyze-Improve-Control) methodology in enforcement work. By applying the rigors of LSS, the study reaches surprising conclusions about what causes failures in the judiciary process.

ID: 247

Demand Based Pricing Model for Outsourced Software Application Maintenance

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Abstract

The maintenance of the software applications are being outsourced across countries. There are increased concerns from the customers regarding productivity of the personnel of the vendor working out of a different country. Traditional methods of estimating effort and cost for outsourced software application maintenance are proving to be inadequate. Companies are looking for a flexible model where they will pay for the exact amount of service they are consuming and the cost should not be dependent on productivity of the individual programmers, familiarity of the programmers with the application, organization climate of the vendor etc. The Demand Based Pricing model suggested by the authors provides a solution which addresses productivity concerns of the programmers of the vendor as well as provides the flexibility required by the customer in terms of the production capacity.

ID: 248

Leveraging Web 2.0 for Increasing Competitiveness of Offshore-Driven IT Industry

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Abstract

The offshore IT industry is largely driven with an aim to reduce cost of IT services, leveraging labor cost arbitrage. The upsurge of US Dollar in the nineties with respect to weaker currencies like Rupees has motivated the US companies to send their IT work to countries like India, Russia, and Philippines. The rising labor cost in these countries was balanced by the continuous appreciation of the Dollar. With recent depreciation of Dollar, the IT companies whose labor force is mostly at offshore are facing tremendous challenge to maintain profitability. To overcome this challenge, offshore IT companies are looking at innovations that would increase the productivity of their resource pool and increase competitiveness in the market place. The authors being closely associated with IT Industry, shares their experience of leveraging Web 2.0 in solving this problem. Though the current paper mostly delves into IT industry, the benefits of Web 2.0 can be attained by a wide range of industries where knowledge-sharing, collaboration and co-invention by the employees are very important. Finally, authors have certain recommendations for any organization to make the best use of this paradigm shift to Web 2.0.

ID: 249

Crashing Project Time by Linear Programming: A Case Study

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Abstract

Nowadays business managers are dealing with different types of projects ranging from implementing a large scale manufacturing plant to a simple sales campaign. While dealing with projects, to become competitive, sometimes it is required to complete a project within the predetermined deadline to keep cost at lowest possible level. Failure to do so ultimately leads to increase in total cost. In order to meet the project due date, sometimes project manager needs to expedite the project. It means that some activities must be done faster than normal. Crashing an activity saves time but increases the cost. Thus there must be a time-cost trade-off. This paper mainly provides a framework for reducing total project time at the least total cost by crashing the project network using Linear Programming (LP). Then the model is solved with real project data of an installation project by using Solver in Microsoft Excel. In this work real data is used from machine installation projects in Siemens Bangladesh Healthcare. An illustrative example with a project network consisting of 19 nodes and 22 activities is provided. The computational study includes tabulation of the interrelationships among time and cost.

Keywords: Project Time Crashing using LP

ID: 250

Design of On-Board Weighing System for Effective Supply Chain Management

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Abstract

Today we have stepped into the 21st century, and our science and technology should be abreast with the fast growing world. Supply Chain Management (SCM) is now at the centre stage of Manufacturing and service organizations. According to the strategies in markets, supply chains and logistics are naturally being modeled as distributed systems. The economic importance has motivated both private companies and academic researchers to pursue the use of operations research and management service tools to improve the efficiency of Transportation. New developments in sensing technologies have emerged in response to the ever-increasing demand for solutions of specific monitoring applications. So we planned to design such a monitoring device with the help of the sensors and microcontrollers. Today the vehicle consists of several provisions to monitor the condition of the vehicle during travelling and even in static position also. The dash board of the vehicle consists of the odometer, fuel level indicator, speedometer and many other required details. But there is no provision for the weight measuring in the vehicles. This weight of the vehicle is the most important one because each vehicle is designed to withstand certain load. Beyond that limit the vehicle gets failure. So to reduce that and identify the actual weight of the vehicle we designed an on-board weighing system for a highway cargo truck. This system consists if strain gauge fixed at the chassis of the truck and also a microcontroller to control all the electronic operations. The strain gauge produces deflection based on the amount of load in the truck; this causes resistances variation the strain gauge. This variation in resistance is directly proportional to the weight of the cargo in the truck. This is analog signal which is processed by the microcontroller and displayed in the liquid crystal display which is fixed at the dashboard. This is one of the mechatronic based automation system. This paves way to supply the goods to the customers in time effectively.

ID: 251

Open Loop Supply Chain Model for the Automotive Industry Using Hybrid K-Means GA with SA

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Abstract

Supply Chain Management (SCM) is now at the centre stage of manufacturing and service organizations. According to the strategies in markets, supply chains and logistics are naturally being modeled as distributed systems. Supply Chain is the network of suppliers, manufacturing, assembly, distribution and logistics facilities that perform the function of procurement of

materials, transformation of these materials into intermediate and finished products and distribution of these finished products to the customers. The task of managing entire supply chain constitutes the core of the Supply Chain Management. The economic importance has motivated both private companies and academic researchers to pursue the use of operations research and management service tools to improve the efficiency of Transportation. Refereeing to such scenario, integration of Genetic Algorithm (GA) with Simulated Annealing (SA) approaches adopted to optimize Open Loop supply chain distribution Automotive Industry Unit are reviewed.

Keywords: Open Loop model, Simulated Annealing, Genetic Algorithm, SCM.

ID: 252

Re-balancing of Generalized Assembly Lines – Searching Optimal Solutions for SALBP

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Abstract

Assembly line balancing is an attractive means of mass manufacturing and large-scale serial production systems. Traditionally, assembly lines are arranged in straight single-model lines and the problem is known as ‘Simple Assembly Line Balancing problem’ (SALBP). The objectives of this case study research are to investigate the performance of generalized assembly line – currently which is dedicated to effectively manufacturing the end product (a tricycle), to identify the opportunity of re-balancing the existing assembly line, and to consider alternative optimal solutions to this traditional flow line balancing. With regard to the traditional assembly-line layout, perhaps the greatest problems the operations department is facing today are the high levels of boredom, absenteeism, personnel turnover, and dissatisfaction among assembly-line workers. In order to overcome the negative consequences experienced from traditional assembly line, re-balancing of generalized assembly lines is particularly essential. Through the analysis of re-balancing the existing assembly line, it has been identified that an existing balance might have been changed to accommodate changes in the work force and the desired output rate in order to cope up with the demand variation of the product.

ID: 253

Simulation Modelling of ‘PHN (public health nurse) – Dyad (a pair of new born baby and mother)’ Postpartum Home Visiting System

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Abstract

This simulation modelling project paper describes the design and development procedure of a simulation model of a specific service system's problem – postpartum (after birth) care. The model is an Arena simulation model of a day in the life of the PHN (public health nurse) - Dyad (a pair of new born baby and mother) postpartum home visiting system. The developed model will assist in understanding the postpartum home visiting system and will provide an animation

of the system's operation in practice as well as it will evaluate the system performance under different circumstances. Everyday a set of new dyads of different categories is generated using the characteristics in the data base. The dyads generated need to get visited by the public health nurses (PHN) of various classes, the only defined resources in the system required to visit the dyads. The visits of PHNs will be carried out on the basis of unvisited dyads created each day as well as taking into consideration some of the previously generated dyads that have been deferred from earlier days as they could not be seen within the specified time frame. In this connection, this simulation modelling will be focused on the problem of analyzing the assignment of PHNs to the corresponding dyads on a daily basis which need to get accomplished as per the scheduling defined. The most important performance measures of interest illustrating the system's behavior include, among others, the percentage of dyads visited within the recommended time frame, the percentage of tardy visits, the average tardiness over all visits, and the average daily overtime expected for each nurse. The output reports in the form of performance measures generated from various simulation runs will be exploited to test alternative assignment procedures of public health nurses to the corresponding dyads necessary to attain optimal performance from the system and to examine how the system performance would be varied with changes to key input parameters or under different external conditions.

Keywords: Simulation modelling, public health nurse, dyad, postpartum care, assignment problem.

ID: 254

Ranking of Bangladeshi Coals Based on Fuzzy Set Theory

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Abstract

This study develops a computational framework for ranking Bangladeshi coals for industrial use based on fuzzy set theory. The ranking process considers coal quality parameters (known as selection or ranking criteria) such as sulphur content (ultimate analysis), fixed carbon, volatile matter, moisture content, and ash content (proximate analysis) and calorific value. The selection criteria are fuzzified according to expert's opinion and the ranges prescribed in literature. Fuzzy sets are employed to recognize the importance of the selection criteria. Finally, Yager's fuzzy multi-criteria decision-making approach with min-max aggregator is employed to get the best-ranked coal. Based on the proposed methodology, a software system is developed to facilitate the decision-making process.

ID: 255

A MIMIC Model Approach for Viewers' Response Analysis of Mass Entertainment Television Channels

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Abstract

With digital revolution, rapid multiplication of channels has resulted in scarcity of attention faced by broadcasters in the context of an advertiser supported television program distribution system. Ex-post program rating information does not serve the purpose of exploring their selling points adequately. Viewers are heterogeneous in demographic features. Two latent factors (a) coverage and content of programs and (b) quality of presentation are found to be important determinants of channel attraction to be reflected by observed indicator variables. To handle two sets of relationships: one between latent factors and observed indicator variables and the other between latent factors and exogenous demographic features, Structural Equation Model (SEM) can be applied. In the present study a special variant of SEM, Multiple Indicators-Multiple Indicator Causes (MIMIC) model has been used. Data analysis reveals that for (a), niche programs like news based, health-cooking based and travelogues and for (b) absence of vulgarity are found to have highest factor loadings. Two demographic features age and occupation of respondents are found to play significant role. Equipped with such information, channels might segment their heterogeneous market more effectively and reach each segment with specific program characteristics, leading to an expected long run channel loyalty.

ID: 256

The Relationship between Project Management and E-Collaboration

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Abstract

Understanding and enhancing the value of electronic collaboration (E-collaboration) technologies is essential for supporting distributed projects. Development of E-collaboration has provided workable infrastructures for group communication and information processing. Also E-collaboration has the potential of networking and collaborative technologies to support the project management teams in the creation of shared understanding. On the other hand, project management has been considered as an academic field for planning, organizing, controlling to producing products with predictable cost, time and quality and, in other applications of engineering requirements. A conceptual relationship between project management and E-collaboration can play a vital role in addressing many problems among the participating companies. In this paper we review the relationship between E-collaboration and project management in industry. And it is going to present some definitions such as E-collaboration, its evolution, past research on E-collaboration, and project management, and the need of it to project management based on conceptual model. A guide line for future research is also presented.

ID: 257

Minimizing Makespan for a Flexible Flow Shop Scheduling Problem in a Paint Industry

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Abstract

Shortfall in production in any manufacturing concern has always been a critical issue. This paper focuses on formulating a multi-machine multi-product production scheduling problem in a paint industry in order to obtain the minimum possible production makespan. The production scheduling problem considered is a Flexible Flow Shop (FFS) problem with a set of preconditions as: (a) products having sequence dependent set up times, (b) production lines having dedicated machines at few stages (c) production lines with infinite intermediate storage and (d) all the products do not visit all the stages. A Mixed Integer Linear Programming (MILP) problem has been formulated based on the present FFS problem structure. As the number of products, the number of machines, and the number of stages increase, the FFS problem becomes computationally complex due to its highly combinatorial nature. Because of this, general MILP problem solving methodologies are disadvantageous consuming more computing time and resources. To confront this, two heuristic methods are applied to solve the problem. The first heuristic is based on the Theory of Constraints and the second heuristic is based on a Genetic Algorithm. The Genetic Algorithm approach has given a better result (minimum makespan) for the given problem.

Keywords: Flexible Flow Shop, Mixed Integer Linear Programming, Theory of Constraints, Genetic Algorithm.

ID: 258

Production Planning using Simulation Approach verses Hybrid Approach: A Case Study

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Abstract

The traditional production planning model based upon the famous linear programming formulation has been well known in the literature. Simulation approach is also used to solve production planning problem as alternative method. Hybrid approach is tried to extract the advantage of both approaches and as well as the capacity feasible production plan. In this paper simulation approach is used to obtain production plan for the MPMP problem. It is found that the simulation approach has shown the better result which can be concluded that the hybrid approach may not be suitable for all situations.

Keywords: Production Planning, Simulation, Hybrid Approach.

ID: 259

Reliability Assessment of Used Components in Consumer Electronics Products

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Abstract

Products need to be considered for their entire life cycle from design, manufacture, and sale, through to use and end-of-life in order to optimize the production processes and to reduce impacts on the environment. To competitively exploit these products, one option is to incorporate used components in “new” or remanufactured products. However, this option is partly limited by a firm’s ability to assess the reliability of used components. The methodology proposed in this paper addresses the problem of reliability assessment of used parts by considering two important aspects. Firstly, it assesses the overall reuse potential of components with a clear understanding of the failure mechanism. Secondly, it determines the actual (used) life of the components by analyzing the operating history of components. This is a critical advance in sustainable management of supply chains since it allows for a better understanding of not only service requirements of product, but the remaining life in a product and hence its suitability for reuse or remanufacture.

Keywords: Reliability assessment, Sustainability, Remaining life

ID: 260

Applications of Data Mining Techniques in Customer Churn Prediction

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Customer churn prediction creates the opportunity of designing preventing strategies for managers and marketers. Yet, application of data mining techniques in that field even enhances the process by hastening it and improving its accuracy. According to the lack of a comprehensive literature review about the application of data mining techniques in customer churn prediction, an overview of the existing literature about that topic is provided in this paper. It examines the subject from different points of view, including historical, technical, and statistical perspectives. From the historical point of view, the paper includes a brief history of outstanding researches that has exploited data mining and statistical techniques in the field of churn prediction, the emergence, necessity and importance, and current situation of such researches. This is based on a review of about 40 papers. From the technical point of view, a classification of papers regarding the data mining and statistical techniques used in different stages of their research methodologies is provided. Some of those techniques are neural networks, random forests, support vector machine, decision trees, etc. In each class, one paper is discussed briefly as a representative of that class. Finally, papers are analyzed from statistical point of view. Some of the considered factors are year of publication and techniques used. This may give an overview of less explored areas to whom may want to contribute to the current literature.

ID: 261

Design and Manufacturing of a Stair Climbing Vehicle

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Abstract

This article deals with the designing and manufacturing of a vehicle, which can climb stair or move along very rough surface. The technical issues in designing of this vehicle are the stability and speed of the vehicle while climbing stairs. However, the steepness of the stairs is also the important concern of this study. The uses of this special vehicle are in the frequent lift of goods such as books for library, medicines for hospital, regular mails for any institutes, or transportation any toxic material for industries and give freedom to the retarded person or paralyzed patients to move anywhere over flat surface as well as stairs. The vehicle has four set of wheels arrangement to support its weight when it moves over the flat terrain. Each wheel frame consists of three sub-wheels attached with the sun wheel through three idler gears. Using of this vehicle, the labour cost can be reduced as well as huge amount of loads can be transferred uniformly with less power consumption. Moreover, considering some drawbacks due to lack of implementation of all techniques during manufacturing phase the test and trial run showed considerably significant and encouraging results that might help the future researchers to incorporate a gear box and steering mechanism to make the vehicle more versatile.

ID: 263

On Developing an Adaptive Gage R&R Evaluation Model of Measurement System

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Abstract

To ensure the consistency of a process, a stable and appropriate measurement system which also meeting the practical limits of technology is fundamental. In many previous studies, the judgment of system stability requires a measurement system operating under routine and stable conditions being scheduled, where the execution of so called Gage R&R (reproducibility and repeatability) is important. A common practice is to perform MSA (Measurement System Analysis) which calculates the variation of measurements by operators (reproducibility) and variation of a gauge (repeatability). The total variation of a system, however, concerns not only the appraiser variation and equipment variation but also the part-to-part variation. That is, an unstable production process may cause an unstable measurement system due to tampering or over-adjustment of the process. A simultaneous consideration between the traditional MSA and statistical process control (SPC) in order to recognize and analyze the sources of variation is therefore very critical. This work proposes a model to calculate the BEP (break-even point) between the Gauge R&R of a measurement system and the process capability (C_p/C_{pk}). Based on the developed model, the part-to-part variation components can be better identified within the measurement system and the critical factors of the process can be better controlled. A real life case is also presented in order to justify the feasibility of the proposed model.

ID: 264

A Stochastic Multi-Product, Multi-Stage Supply Chain Design Considering Products Waiting Time in the Queue

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Abstract

In this paper, we develop a supply chain network design (SCND) model considering both strategic and operational decisions. The model determines plant and DC locations as well as product shipments among components of network regarding single sourcing and capacity of plants and distribution centers (strategic level) while the shipments have to wait in the queue for transporting from plants to DCs (operational level), which result in the lead time is incorporated in model. In practice, the parameters of problem such as demand, cost and capacity are changed and aren't described as certain. Hence, we extend proposed SCND model by defining demands as different scenarios and apply the two-stage stochastic programming approach to solve it. Finally, a numerical example is given to illustrate the mentioned model and some other scenario based approaches are presented so that decision makers select one of the approaches based on their policy.

ID: 265

Supplier Evaluation Using Loss Function and AHP

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Abstract

Process of purchase or supply is one of the most important factors of competitiveness of companies. Therefore, the supply managers of companies are expected to select and evaluate the suppliers, to provide the company needs. Evaluation of suppliers based on only one factor is not possible and it is necessary to adopt a method that several factors simultaneously be evaluated. Suppliers can be evaluated by using different factors such as quality, on time delivery, price, type of service, national and international standards regard. In this paper, we try to use Taguchi loss function for conversion of qualitative factors into quantitative values, and use it to measure and compare suppliers. Then it is utilizing the loss function as a decision variable in Analytical hierarchy process for evaluation of suppliers in a completely practical method. In addition, a sample case study based on suppliers of a real company, is presented to display the real performance of model.

ID: 266

Challenges in Sustainable Manufacturing

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Abstract

Since the release of Brundtland Report in 1987, sustainability practices have received a fair share of attention from researchers and practitioners alike. Sustainable manufacturing practices seek to optimize production efficiency while minimizing environmental impact and maintaining social equity. Research has shown that companies that adopt sustainable practices are able to achieve increased product quality, increased market-share and increased profits. In this work, we examine some of the challenges that companies face and the tools they can use to overcome them as they embark upon this journey.

ID: 267

A Hybrid Data Mining Model for Intelligent Customer Segmentation: The Case of Banking Industry

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Abstract

Customer segmentation is a prerequisite to all three phases of customer relationship management which consists of customer acquisition, customer retention and customer development. Input variables which are used in clustering techniques determine which phase of customer relationship management it is dealing with. As a result this paper aims at a review on the input variables used in customer segmentation studies; besides data mining techniques used in customer clustering is classified and discussed too. Finally, a new hybrid segmentation technique is introduced, and the results are compared to previous segmentation techniques using lift charts.

Keywords: customer relationship management, segmentation, data mining, banking, Iran

ID: 268

Comparative Study between Mixed Model Assembly Line and Flexible Assembly Line Based On Cost Minimization Approach

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Abstract

Mixed Model Assembly Lines are widely used to produce different models as per customer's demands. The Sequencing problem is an important factor for an efficient use of Mixed Model Assembly Lines. We resolved the sequencing problem in favor of minimizing the total cost and keeping uniform usage of each part. In this research project, the cost model is presented. To get merits and demerits between Mixed Model Assembly Line and Flexible Assembly Line, a comparison is done, concerning the sequencing problem with cost savings and keeping continued usage of each part. Previously, researchers worked to minimize the utility time or setup time within Mixed Model Assembly Line. However in this research, different models are produced within Mixed Model Assembly Line and without setup. Then Mixed Model Assembly Line is

compared with Flexible Assembly Line, where setup is required. Hence, this research is new and has its novelty. To measure the performance of Mixed Model Assembly Line and Flexible Assembly Line, different parameters, i.e. different sequence patterns, constant and random demand, cycle time, and setup time, are used to check the effect on total cost. Finally a triangle between total demand, total production, and average total cost per unit is computed. This analysis yields a comprehensive result in favor of Mixed Model Assembly Line in cost savings. The outcome of this research suggests best sequence pattern which gives continued consumption of each part and cost saving as well, reducing cycle time would provide higher production.

Keywords: Mixed model assembly line, Flexible assembly line, Cost model, Sequencing, Cycle time, Demand

ID: 269

Acquiring a Knowledge Base of Continuous Processes through a Distributed System

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Abstract

This paper presents a new approach to acquire a knowledge base (MKB) of continuous processes through a distributed system. The proposed methodology combines MKB and case-based reasoning (CBR) for adaptive knowledge base creation, maintenance and updating through the use of an architecture with the following aspects: i) distributed architecture network; ii) real-time operation; iii) advanced visual interface. Although originally developed for use in hydroelectric power plants it is useful for other industrial processes in mission-critical with high cost of interruption. This work presents the system requirements, the aspects of the case base formation, the CBR cycle and the believe network.

ID: 270

Application of RFID in Supply Chain System

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MD Sarder, Industrial Engineering Technology, University of Southern Mississippi, USA

Abstract

Supply chain strategic planning requires accurate information from reliable sources. This study investigates the usefulness of radio frequency identification (RFID) technology in an assembly flow line of a supply chain. To evaluate its usefulness in an assembly production, a simulation model is generated. Two types of components, preprocessed and semi-finished, are entered into assembly facility (or area) with and without RFID tag integrated. Each component needs certain processing separately prior to assembly operation. The model compares the utilization of time

and resources between two configurations, ‘with’ and ‘without’ active RFID-enabled component tracking in the assembly production facility. The result from the case study show better performance of an RFID-enabled model than manual material handling model because of quick identifying components, automatic component separation, fast tracking and effective relocation based on condition and time.

ID: 271

Feasibility of Hydrogen Production from Micro Hydropower Projects in Nepal

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M. S. Tango, School of Engineering, Acadia University, Wolfville, NS B4P 2R6, Canada

Abstract

The current energy crisis in Nepal clearly indicates that the future energy-demand cannot be met by traditional energy-sources. Community-based micro-hydropower operations are considered to be one of the most feasible options for energy development. However, the power plant capacity factor remains very low due to limited commercial and business opportunities. Generation of hydrogen (H₂) from the unutilized power could eradicate this problem. This new energy carrier is clean, can save foreign currency and increases the energy-security. The aim of this study is to determine the potential of H₂ production from excess energy of a micro-hydro project in rural Nepal using “HOMER” from NREL.

ID: 272

Smart Driving: A New Approach to Meeting Driver Needs

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Abstract

The use of machine learning algorithms in different automated applications is increasing rapidly. The effectiveness of algorithms performances helps the user to operate their machine accurately and on time. Road sign classification is a very common type of problem for an automated driving support system. In this research, road speeding measure and sign identification is conducted using four popular machine learning algorithms to develop a smart driving system. This system informs forward-looking decision making and the initiation of suitable actions to prevent any future disastrous events. The robustness of the classification algorithms is examined for classification accuracy through 10-fold cross validation and confusion matrix. Experimental results proofs that the accuracy of Support Vector Machine (SVM) and Neural Network (NN) is almost 100% and it is very promising compared to the earlier research performance. However, in terms of computational complexity NN is a slower classifier. Therefore, the experimental results suggest that SVM can make an effective interpretation and point out the ability of design of a new intelligent speed control system.

ID: 273

Demand Planning Methodology in Supply Chain Management

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Abstract

A supply chain is the system of organizations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer. In Supply Chain Demand planning is a critical business process that impacts Fast Moving Consumer Goods (FMCG) companies' ability to manage their value chain business performance. Revenues, costs and asset utilization are all affected by the quality, timeliness and accuracy of demand planning. Cleaning History and Reason Code Analysis offer new solutions that can improve the demand planning process and yield business results. A demand planning methodology and few applications have been shown here. The potential of this Demand Planning Methodology is to improve the certainty of demand planning decision making of a FMCG company. This methodology helps to maintain less excess and shortage quantity over the supply chain. Hence save the value lost and improve the Supply Chain Efficiency.

Keywords: Industrial Engineering, Supply Chain Management, Demand Planning Methodology, Winter Model, Forecasting.

ID: 274

Hazard Based Inspection-Repair Policy for Safety Systems

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Technology, Board Bazar, Gazipur 1704, Bangladesh

Abstract

In this article, a general model for inspection-repair policy based on inter-inspectional hazard has been presented and an efficient algorithm to derive cost-optimal inter-inspection hazard has been presented. Considering the case of wear-out failures twenty five case problems have been constructed by four-factor second-order rotatory design for the specified ranges of cost of inspection, cost of repair, cost of undetected failure and repair time. For all case problems, results have been obtained in the form of cost rate, expected cycle length and optimal inter-inspection hazard. Results have also been compared with those of Barlow-Proschan inspection-repair policy. It has been found that for small characteristic life, the percentage cost increase for optimal hazard policy over Barlow-Proschan policy is within 5% and for large characteristic life percentage cost increase is within 10%. The effects of cost parameters and repair time on the optimal hazard policy have analyzed by multiple regression analysis. It has been that for large scale parameter, inspection and undetected failure costs are quite significant both independently and interactively and for small scale parameter, only undetected failure cost is significant. Repair cost and repair time do not have any significant effect.

ID: 275

Supply Chain Risk Management in Aerospace Industry from System Dynamics perspective

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Abstract

Twenty first century supply chain faces increased turbulence in supply market due to globalization and demands risk mitigation strategies. Vast industry like aerospace managing complex businesses expects disruption risks at every stage in Supply chain. In the paper, system oriented modeling approach is used to analyze the aerospace supply chain. A networked framework is designed using Parallel and Discrete event Simulation (PDS) for integrating local production system, production management and scheduling activities of multi-ownership aerospace supply chain to mitigate risks.

Keywords: Supply Chain Risk Management, Simulation, System-oriented modeling.

ID: 276

Process Capability Analysis of a Centrifugal Casting Process

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Abstract

The concept of process capability was proposed in early 1970 with the introduction of ‘capability ratio’ by Juran, a world known quality expert. Thereafter almost 40 years have been passed and many indices such as C_p , C_{pk} and C_{pm} were developed for measuring process performance. However, many researchers, for example, Kotz and Johnson [1-2] raised concerns about the application of the diversified indices owing to three reasons (i) too theoretical for practitioners, (ii) mismatch with performance values measured through different indices, and (iii) inadequacy to mimic the reality. This study therefore focused on the application of the different indices developed so far with a case study on a centrifugal casting process. Five important quality variables were considered and 12 UPCIs (such as C_p , C_{pk} , C_{pm} , ..., S_{pmk} , and C_a) values were calculated based on data collected from the plant. Results obtained are compared with percent conforming products as well as amongst the indices themselves. The values differ considerably for some indices. The application shows that the developed indices can create confusion to practitioners unless a clear and concise implementation scheme is provided.

ID: 277

Application of Integer Linear Programming Model for Vendor Selection in a Two Stage Supply Chain

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Abstract

Contemporary organizations rely on outsourcing for success in today's competitive marketplace, and selecting a vendor is an important process as developing new products. Vendor selection is one of the most important decisions of purchasing function. As organizations become more dependent on vendors, the direct and the indirect consequences of poor decision-making become more severe. Literature shows many vendor evaluation models. In this paper we have proposed a vendor selection model using Integer Linear Programming (ILP) Model for multi-product, multi-vendor environment. The contribution of this research lies in the implementation of this model as a customized decision support system according to the expectation of any company. The model is validated with a case study by implementing the model for Agricultural equipments whole sale company.

Keywords: Vendor selection, Integer Linear Programming (ILP) Model, Supply chain, Vendor Assignment.

ID: 278

Procurement Management Challenges in Gas Projects of Iran

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Abstract

Procurement problems are usual in gas projects in Iran, resulting in contractual claims and increased project time and cost. This study was aimed to collect the perceptions of gas projects practitioners on how significant are the procurement problems using mean score method. The results of the study showed that the respondents except suppliers somehow admit their own shortcomings. The client and contractor groups held extremely different perceptions and a quite strong consensus was found between the management contractor and consultant groups on the significance of the various causes of delay. It was also observed that financial problems got the highest significance and contractor problems got the lowest significance in the procurement process of gas projects.

Keywords: Procurement Management, Delay factors, Gas Projects, Iran

ID: 279

Application of Integer Linear Programming Model in Vendor Selection

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Abstract

Contemporary companies rely on outsourcing for success in today's competitive marketplace, and selecting a vendor is now as important a process as developing new products. Vendor selection is one of the most important decisions of purchasing function. As organizations become more dependent on vendors, the direct and the indirect consequences of poor decision-making become more severe. Literature shows many vendor evaluation models. In this paper we have proposed a vendor evaluation model using integer Linear Programming Model. The model is validated with a case study done in Agricultural equipments whole sale company.

Keywords: Vendor selection, Integer Linear Programming Model, supply chain, Vendor evaluation.

ID: 280

Preventive Maintenance Optimization of Critical Equipments in Process Plant using Heuristic Algorithms

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Abstract

The rapid growth of industries has complicated the functioning system and has intensified the maintenance process emphasizing the need for effective maintenance planning. Maintenance planning is complex and inherently stochastic, indicating the need for heuristic techniques. In this paper, maintenance planning problem for a process industry is addressed. The problem is formulated to predict which of the two possible actions (viz. imperfect maintenance or component replacement) is to be carried out for each of the components during the planning period. The net present cost for the entire design out period is minimized and furthermore, improvement possibilities during the preventive maintenance action are analyzed in terms of Mean Time Between Failures (MTBF) & Mean Time To Repair (MTTR). Two search techniques, Simulated Annealing (SA) and Genetic Algorithms (GAs), are used to solve the problem.

ID: 281

Application of a Plug-and-play Guidance Module for Hospital Robots

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Abstract

This paper explores the design and development of an intelligent plug-n- play guidance module for hospital robots to recover the shortage of healthcare personnel in hospitals and healthcare centres in EU countries. The module is developed by using Orca which is an open-source framework for developing component-based robotic systems. Active RFID system is used in this module to guide patients or visitors to any known place in the hospital. If the patient or visitor is lost the robot will automatically notify the authorised hospital personnel. It is hoped that this robot swarm system will contribute to better patient care in hospitals.

ID: 282

FFT Based Spectrum Analysis of Three Phase Signals in Park (d-q) Plane

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Samarjit Sengupta, Department of Applied Physics, University of Calcutta, Kolkata-9, India

Abstract

In this paper, spectrum produced by a balanced three phase signals and their consequent form in Park (d-q) plane has been analyzed. The spectrums show that the peaks of the different orders of spectrums have changed after Park Transformation. Thus well renowned Park transform technique is introducing the new spectrum. The spectrum characteristics of signals from a balanced system in Park domain have been analyzed. Observation reveals the widening interrelation among the spectrums.

ID: 283

Development of Interactive CAD Teaching System

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Abstract:

Computer-aided design (CAD) uses computer based facility to assist engineers and design professionals in their day to day activities. As a fundamental engineering skill, CAD software is normally taught to the first year undergraduate student. Unlike the other undergraduate engineering courses, the CAD teaching mainly relies on one to one teaching and learning environment. This requires extensive teaching resource in a reiterative manner. In addition, the traditional learning practice has been changed significantly by advance of the computer technology. All of these form unique features of modern day's CAD teaching and learning environment. In this paper, an interactive CAD teaching system was proposed to meet the above requirement and enhance the teaching process and software was developed to test the proposed system.

Keywords: Computer-aided design; Interactive teaching; Multimedia; Network communication

ID: 284

Discount Pricing Model to Coordinate a Two Stage Supply Chain under Stochastic Demand Environment

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Abstract

In this paper, a single-vendor multi-buyer supply-chain coordination problem through optimal discount pricing policy has been studied. The seller offers multiple pricing schedules to the buyers and each buyer selects a schedule that maximizes the corresponding individual profit. The model considers the reaction of each buyer and ensures that the motivation of each buyer to select local optima can also lead to global optima with maximum channel profits. The results show that, channel profit increases with the increase in the number of pricing schedules. The model can find significant practical applicability towards solving industrial problems.

Keywords: supply chain coordination; heterogeneous buyers; discount schedule; evolutionary computation.

ID: 285

Shippers-Providers Perception of Third-Party Logistics Services – An Importance-Performance Matrix Analysis

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Abstract

Using a sample of companies drawn from Logistics Association Australia's current membership list, this study assessed the relative importance assigned by shippers and logistics service providers (LSP) to various elements of third party logistics services. The importance-performance matrix (IPM) analysis was conducted to assess the gap between what is required by the shippers and what is provided by the LSPs, and categorised the logistics service elements into four categories such as 'low priority', 'possible overkill', 'concentrate here', and 'keep up the good work'. The results indicate that the LSPs must improve image in terms of their capability to provide service and at a necessary quality level. They must be able to shorten delivery time, reduce product/service cost and be flexible while providing services. It is critical that they use EDI and stand-alone IT platform to integrate with the shippers.

Keywords: Australia, Importance-Performance Matrix, Logistics services, third-party logistics, shippers

ID: 287

Operating Point Optimization of a Poly-phase Asynchronous Machine for Energy Saving

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Samarjit Sengupta, Department of Applied Physics, University of Calcutta, Kolkata-9, India

Abstract

In this paper, a simple algorithm has been developed to choose the optimum operating point keeping the system stable and saving power as much as possible. It has been proved that optimum use of supply voltage saves power to a great extent. The developed algorithm is advantageous with respect to energy saving, optimum sacrifice of speed and flexibility to change its characteristics as desirable.

ID: 288

Signal Assessment of a Current Transformer Used in Load Demand of Variable Active and Reactive Power Ratio

Subhasis Kundu, and Surajit Chattopadhyay, Electrical Engineering Department, Hooghly Engineering & Technology College, West Bengal, India
Samarjit Sengupta, Department of Applied Physics, University of Calcutta, Kolkata-9, India

Abstract

This paper presents behavior of a current transformer (CT) with respect to different ratio of active and reactive power demand in primary side. This has been done by using Fast Fourier Transform (FFT) of the patterns of CT primary current, secondary voltage and CT flux. Nature of primary current has been changes and consequently spectrums hare formed of these signals. Some specific order of spectrums are observed to be changing and are part-wise linear but having different slopes at different range of L/R ratio of CT primary side, knowledge of which should be helpful in design and application of CT and its burdening adjustment.

ID: 289

OR Modeling and Public Policies in Bangladesh: Implementation Challenges

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Abstract

Over the last three decades a large number of Operations Research (OR) studies in the context of developing nations have been published. Many of these studies deal with public policy issues. Using OR case studies in the context of Bangladesh health and agriculture sectors, this study investigates the development process of these models and identifies the challenges for implementing the results of the models.

Keywords: Agriculture, Bangladesh, Health, OR Models, Implementation challenges

ID: 291

Kanban Supplier System as a Standardization Method and WIP Reduction

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Abstract

A kanban production planning system is presented for a company which makes temperature control products for trailers and other types of transportation. A Kanban supplier system was established to control the quantity of raw material. Its production process is composed of thermoforming, routing and gluing. This tool will be used to make negotiations with the supplier in order to incorporate the scrap percent into the daily demand looking for a standardization size of the raw material. The sanitation system will help for work-in-process reduction.

Keywords: Thermoforming, Kanban supplier system, Lead time, Just-in-Time

ID: 292

Fuzzy Clustering for Initialization of Simulated Annealing Algorithm to Solve a Capacitated Vehicle Routing Problem

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Abstract

Vehicle Routing Problem (VRP) has been an interesting research area since its introduction. There are various types of VRP models and different solution techniques proposed for this problem. This paper uses several clustering algorithms in initialization of Simulated Annealing to solve VRP. The main contribution of this research is to assess the effect of using some clustering methods in building the initial solution. For this purpose, Hard C-Means (HCM), Fuzzy C-Means (FCM), and Possibilistic C-Means (PCM) are implemented versus random (RANDOM) and heuristically-built (HB) solutions. These algorithms are compared using two well-known standard datasets and results show that using FCM and PCM in initialization of solutions can lead to promising results.

ID: 294

A Granular Computing Approach to Decision Analysis using Rough Set Theory

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Abstract

This paper presents a granular computing approach to decision analysis using rough set theory and its variable precision extension. The multiattribute structure of decision domain is mapped to the notions of equivalence relations of rough set theory. It allows expressing decision categories in terms of approximation space wherein a decision class can be approximated through the partition of boundary region. The variable precision extension of rough set the memberships function is used to generalize the lower and upper approximations. The decision analytic problems can be mapped into rough set theory at predefined precision level.

ID: 295

Analysis of Potential Wind and Solar Energy at Selected Airport Locations in Canada

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Ahad Ali, A. Leon Linton Department of Mechanical Engineering, Lawrence Technological University, 21000 W Ten Mile Road, Southfield, MI 48075, USA

Abstract

Both wind and solar energy have huge potential as a source of sustainable / renewable energy. In this paper, we analyzed wind speed and sun-shine hour data from 21 major Canadian airports over 1971-2000. On the basis of this analysis, we further investigate wind and solar energy potential for four locations (i.e. having long term annual average wind speed greater than 4.8 m/s and long term annual average 2000 hours of sun-shine). Our analysis reveals that during the winter month wind energy could be generating much higher than summer month. On the other hand, solar energy can be generated higher in summer month.

ID: 296

The Application of Occupational Safety and Health Management in Train Workshop “Balai Yasa” PT Kereta Api (Persero) Yogyakarta

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Abstract

Balai Yasa Yogyakarta is the center of locomotive maintenance of diesel locomotive that operating in Java Island, Indonesia. It is very important for maintaining the quantity and quality or reliability of operated diesel train. This must be supported by strong and professional industrial management. Therefore, it has been preparing to be an outstanding “maintenance industry” in the country based on the integrated industrial management principle. Yet, so many

lacks of human resources it has that to apply the dreaming concept is still a big problem, mainly of standard Occupational Safety and Health (OSH) management. This paper aims to research the aspects concerning about human resources in applying Occupational Safety and Health (OSH) management thoroughly. The study focuses on problem happening in human, tools, materials, and management aspect. It uses observation and document research approach and presents descriptive data collecting. While, qualitative approach is used for analyzing based on standards of Occupational Safety and Health (OSH) Management System published by Manpower Ministry of Indonesia. The output and discussion of the research becomes descriptive fact of Occupational Safety and Health (OSH) application in Balai Yasa Yogyakarta. The conclusion is recommendation in nature that should be practically carried out by the manager in the industry.

ID: 297

The Audit of Occupational Safety and Health in Train Workshop “Balai Yasa” PT Kereta Api (Persero) Yogyakarta – A Report of Inspection

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Abstract

Balai Yasa Yogyakarta is the center of locomotive maintenance of diesel locomotive that operating in Java Island, Indonesia. It is very important for train operation service because the quantity and quality or reliability of operated diesel train is determined here. Discussing about the reliability of working system, particularly to prevent work-causes accident, incident, illness as well as technology-causes disaster, there needs a periodic auditory. A practical, applicative, and compatible audit instruments will make the management board easy to cope with the problems concerning Occupational Safety and Health (OSH) in Balai Yasa Yogyakarta. In the mean time, audit activity has been applied but the details of audited aspects do not match with the instruments. The paper aimed to discuss the audited output in Balai Yasa Yogyakarta in accordance with Occupational Safety and Health (OSH) Management System. Then, it is analyzed using other more detail and applicative “special” audit instruments, therefore, practical solution can be obtained. And then, detailed improvement will follow based on the work system, based on “special” instruments. The discussion on this paper focuses on comparison of the significant between Occupational Safety and Health (OSH) management and “local-special” instruments (specially designed for work system in Balai Yasa Yogyakarta). The conclusion is, there is a requirement for audit “special” instrument specified for locomotive “maintenance industry” in Indonesia. It is very important for modernization of train industry in Indonesia concerning with the application of the Occupational Safety and Health (OSH) management audit.

ID: 299

Productivity Assessment and Its Improvement Strategies for a Ceramic Industry – A Case Study

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Abstract

As more and more industries experience the globalization of business activities, measuring productivity performance has become an era of concern for companies and policy makers in Europe, the United States and Asia. In modern era of competitive business, Bangladesh, a developing country should put emphasis on measuring productivity performance. Technical advance and technical efficiency change are two key factors to productivity growth, which are associated with different sources, and so different policies may be required to address them. In this study, different measures of productivity have been measured at the plan level with the aim to improve the understanding and awareness about the term “Productivity”. The core idea behind the research work was to survey the partial productivity and total productivity of an organization and therefore discuss some probable important strategies, according to necessity. In this context a study was conducted at Khadim Ceramics Ltd. manufacturing organization Situated in Sylhet. The industry manufactures various types of tiles. The first part of the study deals with the measurement of total productivity and partial productivity of the studied organization. The second part deals with seeking of improvement strategies. This work depicts the actual scenario of the studied organization which indicates some weak points that hinder the overall productivity. By findings the weak points in the existing organization’s production system, some improvement strategies are presented which might be helpful to overcome these weak points and to improve the productivity level of the studied organization.

Keywords: Productivity, workers, man, machine, raw material, ceramic and production

ID: 300

Method and Algorithm for Solving the Bicriterion Network Problem

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Abstract

In this paper, a bicriterion shortest route problem is formulated as a two criterion linear programming problem. A method and algorithm are presented for solving bicriterion network problem, which are based on introducing the fuzzy sets of the value “near to the optimal values” for each criterion, and transforming the initial problem into a mixed integer linear programming problem. The applicability of the algorithm is demonstrated by considering an example.

ID: 301

Developing an Information Model for Supply Chain Information Flow and its Management

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Abstract

In order to deal with the accompanying challenges, organization must embrace latest information technology, e-business and the internet that allow increasingly better opportunities for assisting with supply chain management and improving business performance. Supply chain management, a management method to optimize system-wide costs has evolved as an application of information technology (e-commerce, e-business). Information technology plays a vital role for increasing collaboration among supply chain members. From the information point of view the effective supply chain management must provide the right amount of relevant information to the right person at the right time. To develop an information model and to build an application database system are the current research emphasis of this paper. The information model deals with the integration of supply chain members and concentrates the flow of information among the chain members. A case study is performed to identify the data/information necessary to represent the communication for the production management of a supply chain. The data specification is used as the basis for developing the application software to support the supply chain integration and management. The application software is developed using the Java and SQL.

ID: 302

Recognition of Control Chart Patterns using Discriminant Analysis of Shape Features

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Abstract

Each control chart pattern (CCP) has its own geometric shape and various related features can represent this shape. The shape features can represent the main characteristics of the original data in a condensed form. Different patterns can, therefore, be efficiently discriminated based on these shape features extracted from the control chart plot. In this paper, a feature-based heuristics approach is proposed that can recognize nine main types of CCPs, including the mixture pattern. The important shape features are identified and extracted, and then, the heuristics in the form of a decision tree is developed based on discriminant analysis of the extracted shape features.

Keywords: Control chart pattern, Shape feature, Pattern recognition, Decision tree, Discriminant analysis

ID: 303

Superplastic Behavior of Al5083 Alloy during Microforming Process

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Abstract

Microformability and superplastic behavior of Al5083 alloy was investigated by finite element analysis and the simulation result was compared with the previously reported experimental result. Micro V-groove die was modeled to analyze the effects of forming time, load, temperature, and interface friction on the microformability of the Al5083 alloy. Geometrical transferability was used to represent the formed surface topology and the area of material flow into the die groove. The microformability of the Al5083 alloy was estimated by R_f values ($=A_f/A_g$), where A_f is the filled area of microformed sample, and A_g is cross sectional area of V-groove. The simulation result suggests that the temperature and the interface friction have significant effects on the accuracy of the hot microforming model. Also, high strain rate detected during microforming simulation is suspected to be another important parameter affecting microformability.

ID: 304

Six Sigma based Control Chart for the Number of Defectives

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Abstract

A control chart is a statistical device used for the study and control of repetitive process. W.A.Shewhart (1931) of bell Telephone laboratories suggested control charts based on the 3 sigma limits. Now the companies in developed and developing countries started applying Six Sigma initiatives in their manufacturing process, which results in lesser number of defects. The companies practicing Six Sigma initiatives is expected to produce 3.4 or less number of defects per million opportunities, a concept suggested by Motorola (1980). If the companies practicing Six Sigma initiatives use the control limits suggested by Shewhart, then no point fall outside the control limits because of the improvement in the quality of the process. In this paper an attempt is made to construct a Six Sigma based attribute control Chart for the number of defectives specially designed for the companies applying Six Sigma initiatives in their organization. Suitable table is also constructed and presented for the engineers to take quick decisions.

ID: 305

Construction and Selection of Tightened-Normal-Tightened Schemes of Type TNT-($n_1, n_2; c$) indexed through Six Sigma Quality Levels

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Abstract

Six-Sigma is a tool used to convert management problem into a statistical problem and to find a statistical solution then convert it to a management solution. Six-Sigma is a set of practices originally developed by Motorola to systematically improve processes by eliminating defects. In particular processes that operate with Six Sigma quality initiatives produce 3.4 defects or below per (one) million opportunities (dpmo). In this paper a new procedure for the construction and selection of Tightened-Normal-Tightened sampling scheme of type TNT-($n_1, n_2; c$) indexed through Six Sigma Quality Level-1(SSQL-1) and Six Sigma Quality Level-2 (SSQL-2) are presented. Tables are also constructed and presented for the easy selection of the plans.

Keywords: Six Sigma Quality Levels, Tightened-Normal-Tightened sampling scheme, Poisson distribution and Operating Characteristic curve.

ID: 306

Dynamic Analysis of Petrochemical Project Progress: A System Dynamics Approach

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Abstract

Petrochemical projects are generally classified as high profit projects. On time finishing of these projects would be a critical factor for the development of the oil or gas based countries. Recent experiences in petrochemical project management in Iran, indicate some important problems in operating of these kinds of projects such as long delay and cost overrun. Considering the lost benefit of the projects delay, this paper aims to modeling the delay process using System Dynamic approach. This method provides a powerful support mechanism for resolving problems in highly complex and dynamic contexts. After a brief reference to delay causes in research and practice, the model is discussed. The results of this study emphasize the lack of available capacity effects on projects progress. Finally, the paper briefly debates the implication of the model structure for analyzing policies to solve the problem.

Keywords: Project, System Dynamic, Petrochemical Project.

ID: 307

Optimal Solution for Multi-Objective Facility Layout Problem Using Genetic Algorithm

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Abstract

This paper addresses optimization of multi-objective facility layout problem. Facility layout plays a key role for companies, and it is an inseparable part of the manufacturing system design process. Traditionally there are two approaches to the facility layout problem. One is the quantitative approach aiming at minimizing the total material handling cost and another is qualitative approach aiming at maximizing closeness rating score. In this paper both approaches have been taken into consideration separately. Again, the research also solved the problem combining these two approaches at the objective function level. Genetic algorithm (GA) is developed for the multi-objective facility layout problem and found out the optimal facility location for a particular problem considering the two objectives, i.e. minimization of the material handling cost and maximization of the closeness rating score. In GA, primarily an initial population is created and by the crossover operator and mutation process new offspring is generated and if the offspring meet the stopping criteria the result was selected for the process. From this approach, a non dominated solution set is found (Pareto optimal) approximately for the multi objective facility layout problem.

ID: 308

Performance Analysis of Coal fired Power Plants in India

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Abstract

With over 150GW of installed capacity and around 723.8 BUs of electricity generation during 2008-09, India remains the 5th largest consumer of electricity in the world. Coal fired power plants account for more than half of the installed capacity and caters to more than 65% of the power demand. Against the prevalent practice of ratio analysis being used for the performance estimation, the study uses non-parametric Data Envelopment Analysis (DEA) to estimate the relative technical efficiency and scale efficiencies of coal-based power plants in India. It is found that the average technical efficiency of these plants is 83.2% with as many as 38 plants below the mean level. Distribution of the less efficient plants in different sectors, regions, their peer groups and the return to scale properties are analyzed.

ID: 309

A Quality Function Deployment Approach for Improving Quality of Yarn: A Case Study

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Abstract

Manufacturing industries have become very competitive and customers are more concerned about quality today. Customers now-a-days are very choosy for spending money. Quality product is there first and foremost preference. This paper focuses on the application of Quality function deployment on a manufacturing company to improve its quality of product through designing the house of quality matrix. QFD is a structured approach to defining customer's needs or requirements and translating them into specific plans to produce product to meet those needs. The objective of this work is to provide the case company: Beximco Synthesis Limited that supply polyester yarn to different customer by different ways and all products are using the textile sector. The QFD methods are applied in order to correlate the expectation of the customers and the internal quality indicators of the process. The expectation of the customers are gathered, analyzed and dealt with. This focus on satisfying the customer's needs by placing emphasis on QFD technique to help understand those needs and plan a product to provide a superior value.

ID: 310

Reliability Modeling of a Manufacturing Cell Operated under Degraded Mode

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Abstract

In this study, a stochastic model is developed to analyze performance measures of a manufacturing cell, which is allowed to operate under degraded mode. The model is used to determine reliability and productivity of the cell, as well as the utilization of its components, under various operational conditions, including equipment failures and fault-tolerant states. The model and the results can be useful for design engineers and operational managers to analyze performance of a system at the design or operational stage.

ID: 311

Decision Analysis in Sector Selection: A Case Study of a Development Organization

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Abstract

This paper addresses a decision problem for a development organization in Bangladesh where outcome of an intervention is highly uncertain and depends on several uncontrollable factors. The case study is classified by the proven techniques of Decision Analysis and portrays how decisions can be made by using knowledge based decision support system. The case study demonstrates how sector selection decisions of development organization can be modeled in an intelligent decision support system and also how optimal decision is reached. Sensitivity analysis is also performed by the system to identify the sensitive parameters of the model and how they impact on the optimal decision.

ID: 312

Heuristic Solution of Multi Item Dynamic Lot-Sizing: A Case Study

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Abstract

The dynamic economic lot sizing model, which lies at the core of numerous production planning applications, is one of the most highly studied models in all of operations research. And yet, capacitated multi-item versions of this problem remain computationally elusive. This paper addresses the multi-item single level capacitated dynamic lot-sizing problem which consists of scheduling N items over a horizon of T periods. The objective is to minimize the sum of setup and inventory holding costs over the horizon subject to a constraint on total capacity in each period. No backlogging is allowed. Only one machine is available with a fixed capacity in each period. In case of a single item production, an optimal solution algorithm exists. But for multi-item problems, optimal solution algorithms are not available. The current research work has been directed toward the development of a model for multi-item problem considering this parameter. The models have been executed with data of a real life problem.

ID: 314

Optimal Replenishment Policy under Supplier-Retailer's Partial Credit Financing In a Supply Chain

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Abstract

Trade credit is an increasingly important payment behavior in real business transactions. To reduce non-payment risks, a supplier/retailer frequently offers partial trade credit to its credit risk downstream member who must pay a portion of the purchase amount at the time of placing an order and then receives a permissible delay on the rest of the outstanding amount. This paper develops an EPQ model to investigate the retailer's inventory system as a cost minimization problem under the condition of two echelon partial trade credit financing in a supply chain. An easy to use criterion has been provided to find the optimal replenishment strategies. Numerical examples are presented to illustrate the theoretical results. Comprehensive sensitivity analysis has been performed on different parameters.

ID: 315

Literature Review and Future Directions in SCM Research

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Abstract

Supply Chain Management (SCM) is a well recognized area of academic debate. Scholars have argued that SCM research has not reached a level where it has a sufficiently significant body of knowledge to call itself a discipline. However, there has been a marked increase in top practitioner and academic publications, conferences, professional development programs and university courses in the area. The aim of this paper is to analyze how research in this area has evolved during the last few years (2003 to 2007) and identify some lines of further research. To do this a literature review in five prestigious academic journals in Operations Management and SCM has been conducted.

ID; 316

New Insights into Industrial Leadership Assessment and Development: Assessment, Antecedents, and Development

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Abstract

This research focuses on new insights into industrial leadership assessment and development. It introduces theory on triads of typical-maximal-ideal (a) inspirationally motivating, (b) intellectually stimulating, (c) extra effort inspiring, (d) leading by exception (active), (e) idealized influence (attributed), (f) idealized influence (behavioral), and (g) satisfactory leadership performances (for example via triad of typical, maximal, and ideal satisfactory leadership performances) adding diversification and precision to leadership assessment. It explores the proposition that within each triad - each of typical, maximal, and ideal leadership performances is theoretically and conceptually distinct and supports this distinction through database empirical analyses by using mean difference via one sample t-test and one way analysis of variance. Thereafter, it uses each triad of the distinct typical, maximal, and ideal leadership performances to introduce and empirically test the mechanism to quantify respondents' intrinsic desire and inherent potential to enhance their respective leadership performances. Finally, it suggests precedents of each leadership performance and presents implications for leadership development training on the basis of correlations and multiple regression analyses.