



**Faculty of Management,  
University of Tehran**  
***JOURNAL OF INDUSTRIAL  
MANAGEMENT***

ISSN: 422831868391

Fall & Winter 2013-2014, Vol. 5, No. 2

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## **Checking and Prioritizing the Rate of Sensitivity of Machines for Precautionary Maintenance with Martel & Zaras Method (The Case: Tolid Atash Factory)**

**Seyed Hosein Ahmadi<sup>1</sup>, Nima Mokhtarzadeh<sup>2</sup>**

**Abstract:** Maintenance process is one of the most necessary processes in every organization, whose main task is maintaining machines in desired conditions or restoring machines from non-optimal (non-operational) conditions to optimal (operational) conditions. Machines failure would result in loss of machines availability time, and rise of both organization costs and production time. Also, it may cause irreparable damages to company. Therefore improving the performance process and as a result improving the maintenance process has been considered by experts. This paper aims to provide an answer to the question that based on the selected criteria which machine needs more precautionary maintenance (PM). This research was carried out in order to improve machines lifetime, to increase customer satisfaction and to decrease delays. In this paper, first the researchers identified the most important PM criteria in the observed factory (within 12 months in 1391(2012-2013)). Then the MCDM method was used for prioritizing and identifying the most vital machine in the factory. At the end some solutions for preserving these machines in the highest quality level were proposed.

**Keywords:** *Indexes of Sensitivity, Martel & Zaras Method, Non-compensatory Method, Precautionary Maintenance (PM).*

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*Submitted: 30 / April / 2013*

*Accepted: 28 / August / 2013*

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## ***A System Dynamics Approach for Analyzing the Human Resource Changes in Sedan Tire Industry of Iran***

***Morteza Elahi<sup>1</sup>, Mohammad Mehdi Lotfi<sup>2</sup>***

**Abstract:** The human resource managers have to make strategic and prospective decisions to respond to the unexpected changes in national tire industry. In this regard, system dynamics is one of the most practical tools for searching causal structures in systems, simulating their behaviors against unpredicted variations, and making some reactive policies for possible future conditions. We try to predict and sensitively analyze the required human resource capacity of national sedan tire industry over the horizon of Iran 1404 vision through developing a system dynamics model. The structures of sedan tire industry are designed based on Sterman's methodology and the recent 10 years corresponding data on the effective variables is identified. Collected data described by mathematical equations is then considered as the model's input in *Vensim*. Based on the designed model, the behavior and final results of variables are evaluated until the end of time horizon. Numerical results indicated that the number of human resources employed in sedan tire industry at the end of Iran 1404 vision will approximately be equal to 15000. By establishing a sensitivity analysis, the effect of the key variables, particularly the demand, on sedan tire industry is examined and suggestions for making macro-planning policies for production and human resource in different conditions are provided.

**Keywords:** *Dynamic Analysis, Dynamic Modeling, Human Resource Analysis, Tire Industry.*

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## **University Course Timetabling Using Graph-based Hyper Heuristics**

**Khodakaram Salimifard<sup>1</sup>, Gholamreza Jamali<sup>2</sup>, Salman Babaezadeh<sup>3</sup>**

**Abstract:** University course timetabling is a complex optimization problem. There are many components like departments, faculties, rooms, and students making the problem huge and difficult to solve. Each component enforces a set of normally conflicting constraints on the solution space. The problem will be solved if courses are scheduled in different rooms and within some specific time slots such that a set of constraints are satisfied. In this paper, a graph-based hyper-heuristic is proposed to find a solution to the problem. This is a two tiers modeling approach combining hyper heuristic with graph coloring technique. The upper tier heuristic is used to select a suitable heuristic to find a feasible solution on the lower tier. To find the suitability of the proposed approach, it has been applied to a real world case. The proposed approach was able to satisfy all the hard and soft constraints. Based on the research findings, it can be concluded that a graph-based hyper heuristic approach is a suitable and computationally efficient method to find a solution to university course timetabling problem.

**Keywords:** *Graph Coloring, Hyper heuristics, Local Search, University Course Timetabling.*

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## **Measuring Efficiency Using Fuzzy DEA and Fuzzy Constraints to Control Weights and to Find a Common Set of Weights**

**Mohammad Reza Sadeghi Moghaddam<sup>1</sup>, Ali Hosein Gharib<sup>2</sup>**

**Abstract:** In this paper it has been tried to present a model by using some changes in the classical DEA models and combining these models with fuzzy models to eliminate these weaknesses. Inputs and outputs are recognized by using MCDM and AHP techniques and experts views. In the next step, the gathered data is compounded by fuzzy techniques and entered in the special DEA model after changing to the crisp amounts. Solving DEA model and attaining common set of weights will help illustrate the efficient and inefficient units. As an illustrative case study, the present research applies the proposed approach to evaluate the efficiencies of 18 regional management units of Fars Power Distribution Company in the year 1384 (2005). Finally, some areas are also suggested for further research to be undertaken in future.

**Keywords:** *Data Envelopment Analysis, Efficiency, Fuzzy Logic, Fuzzy Data Envelopment Analysis, Power Distribution.*

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## **Analyzing the Factors Influencing Delay of Projects in Zone 3 of Iranian Gas Transmission Company**

*Ali Attafar<sup>1</sup>, Mohammad Eghbali<sup>2</sup>*

**Abstract:** Organizations particularly in project structure pay special attention to the efficient management and make a lot of efforts to achieve this goal by reducing delay in projects. Gas transmission zones are among those kinds of organizations whose main activities are considered to be in project structure. Thus the significance of project management and the pathology of delay that imposes exorbitant costs on organization will be more noticeable. In the present essay, project pathology and leading causes of delay in the projects of zone 3 of Iranian Gas Transmission Company have been investigated. In a similar vein, some managers and experts have been interviewed and a questionnaire has been used to prove theories from T test and to rank the major causes of delay in projects from Friedman test. Based on finding from this essay, the most effective cause of project delay from the respondents' point of view is the contractor's failure to perform his obligations and the least effective cause tends to be the external issues. The findings stemming from this essay can be utilized for the purpose of project pathology in all the gas transmission zones and similar organizations.

**Keywords:** *Project, Project Management, Project Pathology, Zone 3 of Iranian Gas Transmission Company.*

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## ***Explaining the Role of Transferring Technology in Fuzzy QFD for Competitiveness of Product (Case Study: Iran Transfo Rey Corporation)***

***Hassan Farsijani<sup>1</sup>, Mohammad Ali Torabandeh<sup>2</sup>***

**Abstract:** Nowadays, with increasing competition among companies, producing product or a service that is consistent with customers' requirements is an important problem. In other words, companies should identify customers' requirements in a suitable manner and should implement them in technical requirements of their products. Also, for feasibility of technical product requirements, the conflicts between these requirements must be eliminated in the shortest possible time. This research introduces a tool for designing transformers on the basis of customers' requirements in Iran Transfo Rey Corporation. For this purpose first the researcher used Fuzzy Quality Function Deployment (QFD). In the process of House of Quality (HOQ) the Fuzzy Analytical Hierarchy Process (FAHP) was used for weighting the customers' requirements and Super Decisions Software was used for calculating the reliability of the questionnaire. In the HOQ output, the importance of technical designing was expressed on the basis of customers' requirements. But there was a conflict between these technical requirements. Therefore, we used TRIZ tools based on the importance of these requirements for elimination the conflicts in the shortest possible time, and this means transferring technology.

**Keywords:** *FAHP, Fuzzy Theory, HOQ, QFD, Transferring Technology, TRIZ.*

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## ***A Hybrid PCA-GP Model for Attack Helicopter Selection***

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**Abstract:** This study provides an alternative approach to decision making and its application in selecting the best attack helicopter. In this way, Principal Component Analysis (PCA) is used to find the weights of the criteria after identifying the effective criteria for the evaluation and selection of attack helicopters. These weights, then, applied in the objective function of Goal Programming (GP) model. Finally, the best option was selected through implementing GB model per corresponding parameters for the available options. Several advantages of the model, such as less reliance on user's perceptions and subjective opinions, greater emphasis on real data, removing multicollinearity among the evaluation criteria, significant reduction of evaluation problem dimensions without much loss of information, flexibility in the application of quantitative and qualitative criteria, and ease of application show the proposed approach is more capable in solving the evaluation and selection problem.

**Keywords:** *Goal Programming, Helicopter, Principal Component Analysis, Weapon System Selection.*

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## ***Identifying Functions of Parent Organization: A Case Study in Project-Based Organizations of the Construction Industry***

***Ali Mohaghar<sup>1</sup>, Ahmad Jafarnejad<sup>2</sup>, Mahmood Golabchi<sup>3</sup>, Younis Jabarzadeh<sup>4</sup>***

**Abstract:** The performance of organizational projects has an eminent role in successfully implementing strategies. This is especially important in project-based organizations whose business is projects. Parent organization as one of the groups that determines projects' success and failure has various functions regarding its projects. Identifying these functions develops literature on project-based organizations and helps to understand them more deeply. Using qualitative approach and a multiple case study, seven project organizations in construction sector were studied. The results of within-case analysis revealed seven main functions. Having identified these functions, project-based organizations should try to develop necessary capabilities to better perform them and formulate strategies and policies to support them.

**Keywords:** *Construction Industry, Organizational Functions, Project-Based Organizations, Project Management.*

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