ABSTRACTS OF PAPERS IN ENGLISH

ASSESSMENT AND SELECTION OF DIRECT RAPID TOOLING PROCESSES USING ANALYTICAL HIERARCHY PROCESS

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Abstract

Rapid Prototyping (RP) processes are attractive technologies that are being used for rapid manufacturing of industrial parts. Nowadays, this technology has emerged in the Rapid Tooling field and has been recognized as one of the most important elements of the manufacturing process chain. So far, numerous techniques with different capabilities have been developed. This creates difficulties in choosing a proper method, according to industrial need, as the investment cost of purchasing and installing the equipment is high. In the present work, the analytical hierarchy process (AHP), which is a common decision dilemma in the solution of economical, social and management problems, was used to analysis the direct rapid tooling processes. This article describes the process and details it by describing a case study for the Supplier of Automotive Parts Company (SAPCO) of the Iran Khodro Industrial Group (Tehran, Iran).

INVESTIGATION ON THE EFFECT OF MODIFICATION AND COOLING RATE ON AS_5U_3G ALUMINUM ALLOY THROUGH MEASURING ELECTRICAL CONDUCTIVITY

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Abstract

Aluminum-Silicon alloys have a wide application in different industries. AS_5U_3G aluminum alloy is a hypoeutectic Al-Si alloy, in which silicon and copper are the main alloying elements. Silicon increases castability and resistance to hot tearing of the alloy. Copper increases high-temperature tensile strength and improves the machinability of the alloy. Therefore, this alloy has been widely used in the manufacturing of automobile engine parts. Modification treatment by strontium has a major influence on the properties of the alloy. In this research, electrical conductivity has been used to evaluate the modification and dendrite arm spacing (DAS) of the alloy as a non-destructive testing. Different levels of strontium have been added to the melt and electrical conductivity of the samples measured after solidification. The results indicate that electrical conductivity increases with modification improvement and its maximum value is obtained at full-modified state. Therefore, the modification rate of the alloys may be estimated before melt pouring and casting by measuring electrical conductivity. Non-destructive evaluating of DAS has also been done in both modified and un-modified samples.

STUDY OF SOLIDIFICATION OF WELDING OF NICKEL BASE SUPER ALLOY (UDIMET 520) IN GTAW METHOD

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Abstract

In this research the properties of Nickel base super alloy welding UDIMET 520 with worked Nickel base super alloy UDIMET 520 has bean compared from metalography studies point of view and XRD. The results of metalography studies of establishing MC thin carbides in between and on the inside of Dentertic arms and establishing a solid base phase full of Mo and W, show the result of lack of recognized XRD studies, recognition of current phases in welding structures for little volume of its existence phases and lack of having a useful welding of Nickel base alloy.

PREDICTION OF GRAIN GROWTH IN PURE ALUMINUM USING THE MONTE CARLO METHOD

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Abstract

With development of computer science, numerical methods have been used for the simulation of laboratory and industrial processes. Prediction of material microstructures is one of the processes of great interest to material designers since the property and performance of materials depend strongly on their microstructures. The Monte Carlo method, as a physical-statistical approach, has been utilized to predict microstructures in the last two decades. In the present paper, the Monte Carlo method is used to investigate the normal grain growth in pure aluminum and the grain growth exponent of metals. A 150 × 150 two dimensional triangular lattice is utilized to analyze the process. It was found that there is a good agreement between the mean exponent of the parabolic growth law and simulation results. The grain growth of alluminum microstructure was calculated at the certain temperature using the grain growth law and

compared with the simulation results by varying the Q as a parameter of lattice orientation. It was found that increase in Q icreases the accuracy of the predicted results.

QUANTITATIVE AND QUALITATIVE STUDY OF MICROSTRUCTURAL CHARACTERISTICS OF A356 CAST ALLOY AND THE CORRELATED MECHANICAL PROPERTIES

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Abstract

Quantitative and qualitative effects of the most important microstructural constituents of A356 aluminum alloy have been studied. Quality index of alloy as an indicator of overall strength and ductility has been calculated for different microstructural situations. Effects of dendrite arm spacing, spheroicity of silicon particles and superficial area of microporosity, as the three most effective parameters which influence the final mechanical properties of alloy, are studied. The results are presented as numerical equations.

SOME MICROBIAL OBSERVATION IN NITRIFICATION AND DENITRIFICATION PROCESS USING MOVING BED BIOFILM REACTOR (MBBR)

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Abstract

Biological treatment methods are the most common methods used for nitrogen removal. In a nitrification process, ammonia changes to nitrate by oxidation under aerobic conditions and in an anaerobic process (denitrification) nitrate nitrogen turns to gaseous nitrogen and exits the reactor.

The most common ammonia removal bacterias are nitrosomonas and nitrobacter. More various microorganisms are responsible for the dentrification process. In this research, nitrification and denitrificatian processes, in two series moving bed biofilm reactors, have been studied.

Most of the observed bacterias lie under the following groups: Bacillus, Beggiatoa or Archromatium.

Microorganisms of suspended and attached biomass are the same.

It is useful to find out the types of active nitrifiers and denitrifiers.

By this knowledge, these kinds of bacteria can be grown before starting up and a seeding technique used to reduce the time of batch operation which is necessary for nitrifiers and denitrifiers growth. Also, there are better results because of biological enhancement caused by the improved microorganisms seeded to the reactors.

PREPARATION AND EVALUATION OF THE NEEDED CATALYST FOR SULFUNATION PROCESS IN THE DETERGENT INDUSTRY

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Abstract

Catalytic oxidation of SO_2 is one of the oldest chemical processes known for the production of sulfuric and sulfunic acids. Throughout the world, the extent of production of sulfuric acid is taken to be a measure of the industrialization of a country, where the annual world

production of H_2SO_4 reaches about 150 million tons. One of the applications of the V_2O_5 catalyst is the catalytic oxidation of SO_2 to SO_3 en route to H_2SO_4 and sulfunic acid production. Preparation of such catalysts, therefore, on the one side, causes the saving of foreign currency spent on purchasing them from abroad and, on the other hand, leads to gaining proper technical knowledge, both of which point out the rationale and necessity of performing this reseach. Thus, in this work, a vanadium pentaoxide catalyst on silica support has been prepared and evaluated chemically (i. e.; BET surface area, X-ray diffraction and prosimetery measurements) and physically (i. e.; activity tests in an appropriate reactor) and results are compared with a fresh Monsanto Chemicals catalyst.

SIMULATION STUDY FOR PRODUCTION OF HEAVY OIL FROM KUH-E-MOND,FRACTURED CARBONATE RESERVOIR WITH STEAM ASSISTED GRAVITY DRAINAGE (SAGD)

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Abstract

Because of the decreasing rate of light oil production in the world, heavy oil production, using thermal recovery methods, has become very attractive. Steam assisted gravity drainage (SAGD) is one of the thermal recovery methods which utilizes horizontal wells for both injection of steam and production of oil. This work is the application of such a method in naturally fractured reservoirs and, specifically, the application of SAGD in the heavy oil field of KUH-E-Mond (Sarvak Formation) that is a heterogeneous and fractured reservoir. Based on the available field data a model is constructed and a simulation study using CMG-STARS 93.00 software. is accomplished first, in the parameter study, essential factors, such as steam injection rate, production and injection location and the vertical distance between wells, oil properties (density and viscosity) and steam quality were investigated. Secondly, matrix porosity and permeability and fracture density were studied. In this model, is a dual permeability method was used and the optimum steam rate was found. In this work, oil density in the range of 6.2-19.8 API was stdied and it was found that it does not have considerable effect on oil recovery and SOR. Also, it was found that steam quality of 70% is optimum and matrix porosity is not an important parameter. The distance between fracture or vertical fracture density and matrix permeability demonstrate a considerable effect on the SAGD process.

CANTALOUPE (SAMSORY) JUICE PRODUCTION AND SENSORY EVALUATION OF THE JUICE

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Abstract

The bottled sterilized nector and juice from cantaloupe (musk-melon) var. (cucumic melo cantalupensis), which is called Samsory (in Iran), was prepared. Sugar was added to juices in order to increase the Brix to 12-13°. The acidity was adjusted by citric acid addition. 5 samples of juices with different additives (ascorbic acid, citric acid and pectinase) were prepared and were kept at room temperature for three months. Sensory evaluations of the products were carried out. A panel of 40 judges were asked to follow the prescribed charts. Sample No. 4 (fruit juice + citric acid to pH 3) was more acceptable than the others in terms of color, flavor and taste.

Abstract

A wide variety of projects are designed and carried out in industrial organizations today. Most of these new projects, however, face delays and, subsequently, inflation and lack of financial resources. On the other hand, in many cases, a change in the management staff of companies has a devastating effect on the process of a new project. In this paper, a standard method is sought to streamline the process of pre-investment studies, preparation phase, test production and, finally, mass production. To achieve this goal, after defining project input and output, process flow diagrams are provided to serve as guidelines to lead project progress towards predefined goals.

ANALYTICAL SIMULATION OF A RAPID PROTOTYPING PROCESS IN A VIRTUAL ENVIRONMENT

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Abstract

In Rapid Prototyping processes, a solid model of a part or product is directly obtained from its 3D model by adding successive layers. The need for costly materials and equipment, as well as repeating the process to reach the acceptable prototype, is the main obstacle. This paper analyzes and categorizes some common commercial processes and, afterwards, designs and, develops a simulation model and, consequently, software for a selection of technology among four rapid prototyping techniques. This software offers the most appropriate manufacturing technique using an Analytical Hiearchy Process (AHP) and in respect to the designer's criteria. Moreover, quantified quality requirements according to process parameters are displayed in an interactive environment.

AN IMPROVEMENT OF PRODUCTIVITY OF TRANSPORTATION SYSTEM BY USING MATHEMATICAL PROGRAMMING AND AHP

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Abstract

The improvement of transportation systems is one of the most important issues in the economic improvement programs of a country. In this paper, a mathematical programming model is developed to measure the productivity in the transportation system of Iran. In this model, the labor and capital are considered as inputs and the maximum amount of total factor productivity of the transportation system is considered as an objective function of our model. In order to define a more accurate system, the labor input is divided into three categories: management, operational and officials. The objective function is also a weighted function of different factors consisting of total factor productivity. For determining the weight of these factors, the Anlytic Hierarchy Process (AHP) is used. The model is also tested on a real problem. In this case study, the optimal levels of partial productivity, total factor productivity and the optimum values of decision variables are determined by solving the model. Furthermore, a sensitivity analysis of the model under unexpected circumstances of passenger demand fluctuation is also reported.

36AN EFFECTIVE PART-PROCUREMENT MANAGEMENT SYSTEM FOR COMPANIES OF IRAN'S MOTOR VEHICLE INDUSTRY

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