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A Study of Crankpin Failure in I.C. Engine

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Abstract

A detailed study was carried out on crankshafts used in two wheeler made from C45 (EN 8/AISI 1042) steel. Undesirable noise was heard in crankshaft when the engine is in running. This was stated as failure of crankshaft. Material has been peeled off and seemed to be scraped at the central portion of the crankpin. It was the bearing seating place where oil hole also provided. Under analysis the crankpin was identified as tempered. Chemical composition, micro-hardness and microstructure were studied and compared with the specified properties of the crankpin material. Reason for failure is identified as wear due to lower hardness, improper lubrication and high operating oil temperature.

Keywords

crankshaft, crankpin, chemical analysis, micro hardness, finite element analysis,hardening.

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PERFORMANCE ANALYSIS OF A COMBINED CYCLE GAS TURBINE UNDER VARYING OPERATING CONDITIONS

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Abstract :

The combined cycle gas turbine integrates the Brayton cycle as topping cycle and the steam turbine Rankine cycle as bottoming cycle in order to achieve higher thermal efficiency and proper utilization of energy by minimizing the energy loss to a minimum. In this work, the effect of various operating parameters such as maximum temperature and pressure of Rankine cycle, turbine inlet temperature and pressure ratio of Brayton cycle on the net output work and thermal efficiency of the combine cycle are investigated. The outcome of this work can be utilized in order to facilitate the design of a combined cycle with higher efficiency and output work. A MATLAB simulation has been carried out to study the effects and influences of the above mentioned parameters on the efficiency and work output.

Key-words :

Brayton Cycle; Rankine Cycle; Combined Cycle Gas Turbine; Efficiency; Pressure ratio.

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EVALUATING THE PREDICTED RELIABILITY OF MECHATRONIC SYSTEMS: STATE OF THE ART 1 N.

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ABSTRACT

Reliability analysis of mechatronic systems is one of the most young field and dynamic branches of research. It is addressed whenever we want reliable, available, and safe systems. The studies of reliability must be conducted earlier during the design phase, in order to reduce costs and the number of prototypes required in the validation of the system. The process of reliability is then deployed throughout the full cycle of development; this process is broken down into three major phases: the predictive reliability, the experimental reliability and operational reliability. The main objective of this article is a kind of portrayal of the various studies enabling a noteworthy mastery of the predictive reliability. The weak points are highlighted, in addition presenting an overview of all approaches existing in quantitative and qualitative modeling and evaluating the reliability prediction is so important for the futures reliability studies, and for academic researches to innovate other new methods and tools. the Mechatronic system is a hybrid system; it is dynamic, reconfigurable, and interactive. The modeling carried out of reliability prediction must take into account these criteria. Several methodologies have been developed in this track of research. In this article, we will try to handle them from a critical angle.

KEYS WORD

Functional analysis; failure; dysfunctional analysis; mechatronic; reliability engineering; modeling qualitative analysis; stochastic model; Bayesian Network; Petri nets; Dynamic; Hybrid; Interactive; Reconfigurable; FMEA, redundancy.

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ANALYSIS AND STUDY THE EFFECTS OF VARIOUS CONTROL FACTORS OF CNC-WIRE CUT EDM FOR S7 STEEL

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Abstract

Wire electrical discharge machining (WEDM) is a non conventional machining process which is widely used in machining of conductive materials. The applications of WEDM are in automobiles, aero-space, medical instruments, tool and die industries. In the present study analysis of effect of various control factors like Ton, Toff, Sv, Ip, Wf, Wt on checking the cutting rate of S7 steel is studied by using wire cut EDM and one factor time approach. S7 steels contain less carbon and higher toughness than the high carbon types that are more wear resistant. Shock resistant steels are used where heavy cutting or forming operations are required and chipping or breakage of high-carbon wear-resistant steels is a problem. The other big advantage of this study is to select the range of significant control factors for final experimentation.

Key words :

Wire Electric discharge machining (WEDM), OFAT (one factor time approach), S7 steel, Control Factors (like Pulse On-Time, pulse off time, Peak Current, servo voltage, wire feed and wire tension), Cutting rate (CR).

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ANALYTICAL SOLUTION FOR THE TEMPERATURE DISTRIBUTION IN CROSS-FLOW PLATE HEAT EXCHANGER CHANNELS OF ISOSCELES TRIANGULAR GEOMETRY

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ABSTRACT

This paper presents the analytical solutions for the temperature distribution in cross-flow plate heat exchanger under uniform temperature boundary conditions. The heat transfer channel is in a form of an isosceles triangular geometry. The governing equations are based on the conservation of energy principle. The mathematical models, for both unmixed fluid, are solved by Laplace Transform leads to the developed analytical solution that is in the form of modified Bessel function of the first kind and zero order.

KEYWORDS

Triangular, Plate Heat Exchangers, Analytical Solution, Laplace Transform, Modified Bessel Function

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PRODUCTION PROCESS ANALYSIS ON MANUFACTURING OF HYDRAULIC GEAR PUMP

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ABSTRACT

Manufacturing Firms sometimes suffers from Productivity, Low Production rate and Delivery problems. Production time is the top priority at every manufacturing firm, and each firm wants to minimize it as much as possible to deliver their product on time to time their valuable customers. . Some of the biggest time eaters in the industry are Setup time, Manufacturing time, Material handling time, and wait time. After the brief survey at VBC Hydraulics, we have conclude that setup time, manufacturing time, and wait time can not be utilize more than current because they are already using best possible machines and technology to manufacture Gear Pumps. But, material handling time and man-machine utilization can be improved by some

engineering analysis. We did man-machine utilization by using man-machine utilization charts and some brief calculations and also focused to improve the material handling in the industry by implementation of GT(Group Technology) layout as they are mainly focused to manufacturing of Gear Pumps of different specifications with bulk Production.

KEYWORDS

Group Technology(GT), Rout sheet, Man Machine Utilization, Production Process Analysis, Material handling time&cost,, Plan layout ,

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USING GIS AND REMOTE SENSING TECHNIQUES FOR SOLAR HOTSPOTS INSTALLATION IN THIRU NAGAR, DINDIGUL DISTRICT N.D.

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ABSTRACT

Solar energy has been widely tapped around the world replacing conventional non-renewable energy. Currently, one of the most challenging problems is to increase the quantity of energy tagged from solar energy. Before installing solar panels, assessing where solar panels should

be placed can significantly benefit panel performance. This study aims to conduct a site selection analysis for solar panel installation using Geographical Information Systems (GIS). The focus of the analysis is on building rooftop PVC panel installation. In this study, Google Earth images were used to digitize the rooftop that is potential for solar PVC panel and derive the areas using ArcGIS software.

KEYWORDS

Solar energy, GIS, Remote Sensing, Renewable energy.

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INVESTIGATION OF SPRING BACK BEHAVIOR OF SS-304 STEEL AND ITS BI-LAYER MATERIAL IN V BENDING

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ABSTRACT

Components press formed from layered or laminated metallic materials have wide engineering application in aerospace, automobile, electrical, electronic and process industries. High strength ferrous metals are widely used in automobile industries for utilization of its high strength to weight ratio. Such high strength metals offer poor formability. Formability of such metals can be improved by applying a layer of metal having higher formability. This paper deals with springback behavior of a laminated stainless steel and aluminum in V bending. Investigation of bending characteristics like thickness ratio and bending angles of sheet before/after springback is carried out in this paper. First part of this paper is on numerical analysis for springback prediction of laminated sheet. In second part, experiments are performed for different cases on V bending machine. The experimental results show that springback of sheet metal laminate is greatly affected by relative position of strong/weak layers and thickness ratio of each layer.

KEYWORDS

Springback; High strength steel; Layered material; V bending;

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DELAMINATION BEHAVIOUR AND EXPERIMENTAL VALIDATION OF GLASS FABRIC/EPOXY MATRIX AND CARBON FABRIC/EPOXY COMPOSITES IN MODE-1 LOADING

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ABSTRACT

Delamination is a common kind of failure observed in various composites. Delamination due to the opening mode of a double cantilever beam (DCB) is quantified and analyzed in this investigation. A Finite Element Method (FEM) approach using ANSYS software is employed here to evaluate the delamination due to in plane loading in addition to opening mode. A new technique of using a Teflon tape has been used for a exact results of delamination results. Various parameters that affect delamination are studied and evaluated in this investigation. Experimental validation has been done using ASTM5528 standard with the help of INSTRON machine.

KEYWORDS

Delamination, DCB, FEM, In-Plane loading, INSTRON, ASTM 5528

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THREE-DIMENSIONAL STUDY FOR THE RELATIVE POSITIONING OF MECHANICAL ELEMENTS IN MECHANISMS CONSTITUTED BY PARALLEL JOINTS WITH CLEARANCES

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ABSTRACT

The great evolution of the data-processing tools during the last years allowed for the development of the computer aided design in the field of mechanical structures. Controlling the clearance in joints between parts, is one of the required objectives to provide accurate relative movements and to minimize geometrical errors. For that purpose, a new method of static study allowing for the computation of the equilibrium positions of various elements in spatial mechanisms constituted by parallel joints and subjected to mechanical loadings is proposed. The isostatic study takes into account the presence of the clearance in the mechanism joints. The method is based to the minimization of the potential energy by means of some algorithms of optimization. The results obtained show the effectiveness of the method.

KEYWORDS

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