Birkholz H. {birkholz@imw.tu-clausthal.de}

Technical University Clausthal   DEU

Design of Axial Pin Connections for Torque Transmission

No extended sizing bases exist for the stability test of axial pin connections with clearance, in the technical literature only simplest calculation equations are indicated. The influence of different geometry parameters remains unconsidered. At the Institut für Maschinenwesen extensive investigations were carried out for the behavior of torque-loaded longitudinal pin connections.

Chignola S., Gadola M., Leoni L., Resentera M. {gadola@ing.unibs.it}

University of Brescia   ITA

On the Design of a Low-Cost Racing Car Chassis

The paper presents a project under development at the University of Brescia with the co-operation of Metra, a leading company in the field of aluminium extrusion. A racecar chassis has been designed with the target of matching reduced manufacturing costs with high safety and structural performance, the whole concept being based on aluminium extrusion. The chassis sidewalls are one-piece, wide section alloy beams providing torsion stiffness as well as energy absorption properties. They directly support front suspension and engine. The project is under evaluation by the Motorsport National Authority in Italy for a new championship where the budget is affordable for a large number of drivers.

Chudzikiewicz A. {ach@it.pw.edu.pl}

Warsaw University of Technology   POL

MATLAB/Simulink Package as a Environment for Rail Vehicle Simulation Study

The paper sets out to present considerations and some result from track/vehicle investigations area. The goal of the investigations was to build up a modular software tool for carrying out complex study: theoretical and experimental ones, on the relations between travelling speed and forces within the wheel-rail contact zone depending on the state of track maintenance. The basic assumptions of the study were: frequency range of the interest: 0 - 25 Hz, the track is epresented by rigid rails, the state of the track maintenance is represented by geometrical irregularities of the track which were excitations of the motion in the simulation process, the passenger car with bogies type MD522 was taken as an object of the investigations.

Di Francesco G., Marini S. {difrance@dimi.uniroma3.it}

Universitá di Roma   ITA

Gear Pump Design: Optimization for Delivery Increas

Our objective is to build lighter and smaller gear pumps vs. those being currently produced. The need to reduce weight and dimensions is strongly felt also by the manufacturers who want to reduce production costs. his was made possible thanks to the optimization of all the possible combinations of the geometrical toothing parameters.
The new optimized pump makes it possible to obtain a significantly greater delivery (more than 20%) versus that of the latest gear pumps. Optimized gear pumps subject of this study are built using the same techniques and machines currently in use and, therefore, they do not mean higher costs.

Filipovic I., Pikula B. {ifilipov@lsinter.net}

Faculty of Mechanical Engineering, Sarajevo BIH

Optimization of Injection Law at Modern Diesel Fuel Supply Systems

The most important element that contributes better atomization of air-fuel mixture, as well as better performing of combustion processes, is an introduction of direct injection of fuel under high pressure into the working chamber of the diesel engine. Beside reduction of pollutants emissions, injection under high pressure makes possible a lower fuel consumption and lower external noise of the diesel engine. A method of calculation of the optimal injection law, as well as an influence of elements of fuel supply systems on the injection law, is presented in the paper.

Kegl B., Pehan S. {breda.kegl@uni-mb.si}

University of Maribor SVN

The Electronic Control Ignition and Fuel Injection System for Formula Student Racer Engine

In this paper some aspects of the Formula S project, team and racing car is briefly presented. Attention is focused on the air and fuel supply of engine. The intake manifold is planed from the scratch, created, designed and manufactured by the team Formula S. The engine management relates to the multipoint fuel injection and fully electronic ignition systems. The paper present a review of programming procedure of the electronic control unit to control fuel injection and ignition systems.

Krstulovic A., Matic T. {krsta@pmfst.hr}

Faculty of natural sciences, mathematics and education HRV

Fatigue Damage and New Design of Gantry Crane Equalizer Beam

During regularly inspection of gantry cranes on equalizer beams (part of a crane used to distribute the load to the wheels) a numerous cracks in regions of weldments was observed. Repair by simple welding of cracks was not successful, therefore decision for production of new designed equalizer beams was made. Finite Element Analysis was used to find out global stress distribution, the local stress concentration at critical points of new designed equalizer beam as well as former one. That analysis confirmed hypothesis of inappropriate design of former equalizer beams.
Production, assembly and testing of equalizer beams under QA and QC have been in brief described.

Kumar P., Chaturvedi S.K. {k_piyush@hotmail.com}

Govt of India, Min of Defence IND

Design of a Man-Machine Interface for a Pneumo-Hydraulic Control Console for an Underwater Platform

The paper essentially focuses on developing a man-machine interface, which encompasses human engineering and ergonomics details such as functional & operational requirements, allocation, information flow and task analysis. The result is a synthesis of new functionalities, practicability and whole academic exploration. An effort is made to address the various problems faced by the user in defense forces during tactical situations. The paper aims towards an exercise evolving and testing a methodology that would be consistent with such design problems. The ultimate purpose of this paper is to create a body of knowledge, which shall serve as an initiator for discussion of issues that concern design.

Lovrin N., Križan B. {lovrin@riteh.hr}

Faculty of Engineering, Rijeka HRV

Analysis of the Tooth Root Stress in High Transverse Contact Ratio Involute Gearing

This paper deals with the analysis of the tooth root stress in high transverse contact ratio (HCR) gearing. Based on the realistic load distribution on tooth pairs in mesh the tooth root stresses along the path of contact have been calculated for a series of HCR-gears pairs. The presented results can be accepted as reliable because the method used has been previously verified by experiments. HCR-gearboxes designed by the use of the presented improved calculation will not be oversized.

Moravec J., Hrabovsky M., Matas R. {jan_moravec@email.cz}

University of West Bohemia CZE

Design and Modification of Water-Stabilized Plasma Generator

Plasma torches with water-stabilized arcs provide an alternative to commonly used sources of thermal plasmas based on gas stabilised arcs or RF discharges. Such plasma torches with water-stabilized arc provide special performance characteristics in some plasma processing applications like plasma spraying or waste treatment.
The research and development of the plasma generator is providing in collaboration with the Institute of Plasma Physics AS CZ. The goal of the described works is the optimisation of the arc chamber geometry by using of new methods for innovative engineering design and the finding of optimal geometry and flow conditions by numerical computations of the two-phase flow.

Niezgoda T., Malachowski J., Kowalski W. {malachow@wme.wat.waw.pl}

Military University of Technology POL

Selection of Dynamics Characteristics for Landing Gear with the Use of Numerical Model

Each type of aircraft needs a unique landing gear with a specific structural system, which can complete demands described by unique characteristics associated with each aircraft. During landing of such a plain at first main gear touchdowns on two points and then, after several seconds, tire of the nose gear touches ground. The ground reaction acting on the landing gear is transmitted on the structure. When the aircraft lands, the force of impact is transmitted from the tyre to the axle. The paper discusses the methods used to the static analysis and presents model, which allow determining the dynamics characteristics of the landing gear. The dynamic analysis is important due to the shimmy vibration during the take off, which can cause collapse of the aircraft.
The numerical model of landing gear proposed by authors bases on mathematical model which was applied to obtain dynamic characteristic of chosen parts of the unit.

Otto S., Mupende I., Dietz P. {otto@imw.tu-clausthal.de}

Technical University Clausthal DEU

Influence of the Hoisting Drum Winding System on the End Plate Loads

Experiments and FEA-Simulations on hoisting drums with winding system according to LeBus show that conventional calculation methods, which are based on the assumption of an symmetrical axial load distributed equally over the circumference of the end plate, unsatisfactorily mirror end plate stresses of these types of hoisting drums. Brought about through the winding process in this winding system, an asymmetric pressure distribution arises over the contact areas of the separate layers which has to take into account for developing multilayered light-weight rope drums.

Palaghian L., Bucsa M., Barsan I. {liviu.palaghian@ugal.ro}

University "Dunarea De Jos", Galati ROM

Energy Losses Due to Friction in Gears

This paper presents some theoretical and experimental results regarding the influence of the friction coefficient upon the energy losses in spur gears and worm gears. Tests have been made on medium carbon steel cylindrical specimens for the first case and FcA2 antifriction cast iron - OLC 45 steel and CuSn12T bronze - OLC 45 steel for the second case.
They had a pure rolling relative motion and then rolling with sliding motion having different specific sliding degrees. The experimental results showed new aspects of the variation mode of the frictional coefficient in different conditions. This, in its turn, influences the energetic performances of gears.

Pandilov Z., Dukovski V. {panzo@ereb1.mf.ukim.edu.mk}

Faculty of Mechanical Engineering, Skopje   MKD

Computer Aided Design of Feed Drives for CNC Machine Tools

Generally feed drives for CNC machine tools have a very simple kinematic structure. But the optimal feed drives design is a problem which consists of an appropriate selection of AC or DC motors and mechanical transmission elements, which must satisfy some conditions as a system. Because of the extensive calculations and optimization algorithms, original computer programs are developed

Pehan S., Kegl B. {stanislav.pehan@uni-mb.si}

University of Maribor   SVN

Aerodynamics Aspects of Formula S Racing Car

The new open wheeler racing car is developed. The car are build with a student team afford over a period of one year. The article is focused on the design procedure of front and rear wings. The eight point plan to a approximation of wings set up is presented. In addition to improved cornering speeds the provided aerodynamic devices dramatically improved the vehicle stability.

Ulaga S., Tašner B., Belšak A., Flašker J. {ulaga@uni-mb.si}

University of Maribor   SVN

Maintenance Awareness in Gear-Box Design

Consideration of maintainability and reliability in the gearbox design process is explained and some examples are presented. Gearboxes are divided into three categories: maintenance-free, minor allowed maintenance, maintainable gearboxes. Categorisation is grounded on the price and lifecycle price of the gearbox, maintainability of the system where the particular gearbox is employed and the downtime price-per-unit for the process where the gearbox is applied. Some specialities in the gearbox design oriented to improve reliability and maintainability are explained. Consideration of features like modularisation, standardisation, … in the gearbox design phase is discussed.