HIGH TECHNICAL MECHANICAL SCHOOL OF TRSTENIK
INSTITUTE IMK "14. OCTOBER" OF KRUŠEVAC
INSTITUTE OF FACULTY OF MECHANICAL ENGINEERING OF PODGORICA

3rd INTERNATINAL CONFERENCE

RESEARCH AND DEVELOPMENT IN MECHANICAL INDUSTRY

RaDMI 2003

CONFERENCE PROGRAMME
with Company presentation

19-23. September 2003.
Herceg Novi, Hotel "Plaža"
Serbia and Montenegro

ABOUT Conference RaDMI 2003

The First Conference "Situation and perspective of research and development in chemical and mechanical industry" - RaDMI 2001 was held upon the initiative of M.Sc. Predrag Dašić and Prof. Dr Miroslav Radovanović on the occasion of 40 years of teaching at High technological-technical school in Kruševac. The First Conference was held on 22-24. october, year 2001, in Krusevac, Republic Serbia. On the Conference are presented 118 papers from which 69 were from abroad, from 13 countries of the World. Number of author and coauthor was 206, from 15 countries of the World.
Multitude of papers and participants from abroad has influence on decision to organize Second Conference on international level. The Second International Conference "Research and development in mechanical industry" RaDMI 2002 was held on 01-04. september, year 2002, in Vrnjačka Banja, Republic Serbia. On the Conference are presented 258 papers from which 191 were from abroad, from 21 countries of the World. Number of author and coauthor was 385, from 25 countries of the World.
Third International Conference "Research and development in mechanical industry" RaDMI 2003 will hold on 19-22. september, year 2003, in Herceg Novi, Republic Montenegro.
Topics of the Conference RaDMI 2003 are:

- **Session A:** Research and development of manufacturing systems, tools and technologies, new materials and product design;
- **Session A:** Tribology;
- **Session C:** Maintenance and effectiveness of technical systems;
- **Session D:** Quality management, ISO 9000, ISO 14000, TQM and management in mechanical engineering;
- **Session E:** CA technologies (CAD; CAM; CAPP; CAE) and CIM;
- **Session F:** Application of information technologies in mechanical engineering;
- **Session G:** Application of mechanical engineering in other industrial fields.

The aim of organizing the Conference is: animating scientists from the faculty and from the institute and experts from the industry and their connecting and collaboration, and changing of the experiences and knowledge's domestic and foreign scientists and experts.
Third International Conference "Research and development in mechanical industry" - RaDMI 2003 hold by occasion of 80 years of Company "IMK 14. oktobar"-Kruševac.
Sponsorship by the Ministry for science, technology and development of Republic Serbia and Ministry for education and science of Republic Montenegro is supportive of efforts to promote science and technology in the area of mechanical engineering in Serbia and Montenegro.
On behalf of the organizers, we would like to extend our thanks to all organizations and institutions that have supported the initiative to have this anniversary gathering organized. We would like to extend our thanks also to all authors and participants from abroad and from the country for contribution to this conference.

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2. Institute IMK "14. October" of Kruševac
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MINISTRY FOR SCIENCE, TECHNOLOGY AND DEVELOPMENT OF REPUBLIC SERBIA

MINISTRY FOR EDUCATION AND SCIENCE OF REPUBLIC MONTENEGRO

FINALL PROGRAMME / FINALNI PROGRAM

19.09.2003. (Friday / petak)

12^{00} - 20^{00} Registration desk / Registracija učesnika (hotel Plaža)
20^{00} - 24^{00} Welcome cocktail / Koktel dobrodošlice (hotel Plaža)

20.09.2003. (Saturday / subota)

08^{00} - 11^{00} Registration desk / Registracija učesnika (hotel Plaža)
11^{00} - 12^{00} Opening conference / Otvaranje konferencije (congress hall)
12^{00} - 14^{00} Plenary session / Plenarna predavanja (congress hall)

1. **Paro J. A., Gustafsson T. E., Koskinen J. (Espoo - Finland)**
   CHIP MORPHOLOGY IN DRILLING OF CONVENTIONAL CAST STAINLESS STEEL WITH HIPED NITI COATING
2. **Kutin A., Strekalov A. (Moscow - Russia)**
   APPLICATION OF INTEGRATED T-FLEX CAD/CAM AND NC-TRACER IN PRODUCTION ENGINEERING
3. **Petropoulos G., Pandazaras C. (Volos - Greece), Dašić P. (Kruševac - Serbia and Montenegro)**
   CHARACTERIZATION OF PROFILE SHAPES OF MACHINED SURFACES
4. **Meissner K. (Jena – Germany)**
   EVALUATION OF MEASURING PROCESSES
5. **Burya A. I., Prikhod'ko O. G., Burmistr M. V. (Dniepropetrovsk - Ukraine)**
   KINETICS OF CHANGES OF AROMATIC POLYAMIDE PHENILON'S FRICTION SURFACE
6. **Palaghian L., Ciortan S., Birsan I. (Galati - Romania)**
   ABOUT THE DAMAGE AND FATIGUE LIFE OF SPUR GEAR USED IN MACHINE TOOLS

14^{00} – 14^{30} Cocktail/Koktel
14^{30} - 16^{00} Pause for lunch / Pauza za ručak
16^{00} - 20^{00} Tourist excursion / Turistička tura

21.09.2003. (Sunday / nedelja)

08^{00} - 10^{00} Registration desk / Registracija učesnika (hotel Plaža)
10^{00} - 12^{00} Plenary session / Plenarna predavanja (congress hall)

7. **Rugglero A., Senatore A. (Fisciano - Italy)**
   SOME RECENT ADVANCES ON THE MODELLING OF THE PISTON ASSEMBLY DYNAMICS AND LUBRICATION
8. **Kauppinen V., Paro J. (Espoo - Finland)**
   HIGH-SPEED MILLING – A FEW EXAMPLES
9. **Lubnauer W., Kazimierska-Grębosz M. (Łódź - Poland)**
   DYNAMICS OF THE BOOM LOADED WITH A TIME-VARYING MASS
10. **Slavov Z. (Varna - Bulgaria), Evans C. (Norwich - USA)**
    ON A VECTOR OPTIMIZATION PROBLEM IN SYSTEMS ENGINEERING
11. **Drăgulescu D., Toth-Tașcău M., Dreucean M. (Timișoara - Romania)**
    COMPARATIVE STUDY FOR PATH PLANNING OF A MOBILE MINI-ROBOT
12. **Oprea F. (Laussanne - Switzerland), Laketić N., Gostović N. (Belgrade - Serbia and Montenegro)**
    TIME REDUCTION OF STANDSTILL OF EXCAVATOR ON THE INLAND MINE IN THE MINING AREA "KOLUBARA"

12^{00} - 13^{00} Presentation of company and sponsors / Prezentacija firmi i sponzora (congress hall)
13^{00} - 14^{00} Presentation of books and journals / Prezentacija knjiga i časopisa (congress hall)
14^{00} - 16^{00} Pause for lunch / Pauza za ručak
16^{00} - 20^{00} Tourist excursion / Turistička tura
20^{00} - 24^{00} Conference Supper / Svečana večera

22.09.2003. (Monday / ponedeljak)

09^{00} - 12^{00} Presentation of papers and round table discussion / Prezentacija radova i okrugli sto (congress hall)
(Session A and B / Sekcija A i B)
Chairman of session A / Predsedavajući za sekciju A:
Petropoulos Georgios (Volos - Greece), Kopac Janez (Ljubljana - Slovenia), Marinković Velibor (Niš - Serbia and Montenegro)
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12^{00} - 13^{00} Presentation of company and sponsors / Prezentacija firmi i sponzora (congress hall)

13^{00} - 14^{00} Presentation of books and journals / Prezentacija knjiga i časopisa (congress hall)

14^{00} - 16^{00} Pause for lunch / Pauza za ručak

16^{00} - 19^{00} Presentation of papers and round table discussion / Prezentacija radova i okrugli sto
(Session C and D - congress hall)
Chairman of session C / Predsedavajući za sekciju C:
Jovičić Svetislav (Kragujevac - Serbia and Montenegro), Adamović Živoslav (Zrenjanin - Serbia and Montenegro), Živković Dragan (Zrenjanin - Serbia and Montenegro)
Chairman of session D / Predsedavajući za sekciju D:
Tomášková Eva (Brno - Czech Republic), Kralev Todor (Skopje - Republic of Macedonia), Nikolić Slavica (Novi Sad - Serbia and Montenegro)

(Session E and F / Sekcija E i F - hall A)
Chairman of session E / Predsedavajući za sekciju E:
Toth - Tascau Mirela (Timisoara - Romania), Sladkowski Aleksander (Katowice - Poland), Velišek Karol (Bratislava - Slovakia)
Chairman of session F / Predsedavajući za sekciju F:
Sari Burak (Ankara - Turkey) , Karabegović Isak (Bihać - Bosnia and Herzegovina), Gordić Dušan (Kragujevac - Serbia and Montenegro)

23.09.2003. (Tuesday / utorak)

09^{00} - 12^{00} Presentation of papers and round table discussion / Prezentacija radova i okrugli sto (congress hall)
(Session G / Sekcija G)
Chairman of session A / Predsedavajući za sekciju A:
Senatore Adolfo (Fisciano - Italy), Kegl Breda (Maribor - Slovenia), Zrnić Nenad (Belgrade - Serbia and Montenegro)

12^{00} - 13^{00} Close of the Conference / Zatvaranje konferencije (congress hall)

Papers for Session A: / Radovi za sekciju A:
RESEARCH AND DEVELOPMENT OF MANUFACTURING SYSTEMS, TOOLS AND TECHNOLOGIES, NEW MATERIALS AND PRODUCTION DESIGN

A-1. **Alexandru P., Antonya C., Andreica G. E. (Brasov - Romania)**
MECHANICAL TESTING OF THE LOCKING AND ADJUSTING MECHANISM OF THE CAR'S SEAT-BACK HINGE

A-2. **Andreescu B., Machedon-Pisu T., Olah A. (Brasov - Romania)**
NEW TECHNOLOGIES IN LASER THERMAL PROCESSINGS

A-3. **Anđelić B. (Čačak, Serbia and Montenegro), Šiljacki-Žeravčić V., Baklć G., Đukić M. (Belgrade - Serbia and Montenegro)**
MICROSTRUCTURAL CHANGES OF W-MO-V TOOL STEEL DURING CONTINUOUS TEMPERING

A-4. **Anguelov N. P., Iliev P. L. (Sofia - Bulgaria), Simov S. S. (Rouse - Bulgaria)**
RESEARCH OF THE DAMPING CHARACTERISTICS OF ONE-TOOTH MILLING CUTTER WITH FREE PARTICLES IN ITS BODY

A-5. **Babić A., Mlodragović G., Petrović A., Zukovski A. (Kraljevo - Serbia and Montenegro)**
THE DEVELOPMENT OF PROCESSES AND MILLING TOOLS IN MILLING ROAD PAVEMENTS

A-6. **Balashev I. (Gabrovo - Bulgaria)**
KINEMATIC STUDIES ON TWO- AND THREE-CARRIER DIFFERENTIAL PLANETARY MECHANISMS

A-7. **Balashev I., Yordanov A. (Gabrovo - Bulgaria)**
STUDY OF CHAIN ELECTRIC HOIST CONTAINING A PLANETARY TRANSMISSION WITH PERIODICALLY VARIABLE GEAR RATIO

A-8. **Barzev I. T., Parashkevov S. Z. (Gabrovo - Bulgaria)**
INFLUENCE OF LASER CUTTING ON RELATIVE VALUES OF TENSILE STRENGTH

A-9. **Başıbüyük Y., Kılıç S. E., Anlağan Ö. (Ankara - Turkey)**
TOWARDS DISTRIBUTED MANUFACTURING: AN AGENT BASED CASE STUDY

A-10. **Bulea H. (Brasov - Romania)**
COMPARING STUDY: THE SURFACE RUGOSITY OF ISOSTATICAL PRESED AND BIDIMENSIONALLY PRESSED OF SYNTERIZATED ALUMINUM OXIDE CERAMIC (AL_2O_3)

A-11. **Cioară R. G. (Brasov - Romania)**
DIAMETRAL HYPOCYCLOIDAL AUTOMATIC MACHINE TOOLS FOR COLD FORMING. A SINTESIS OF TYPES AND CONSTRUCTIVE VARIANTS

A-12. **Cioară R. G., Cioară R. I. (Braşov - Romania)**
COMPACT DEVICE FOR SENSITIVE DELIVERY OF RODS. PREMISE AND SOME CONSTRUCTIVE VARIANTS

A-13. **Ćućilović M. (Čačak - Serbia and Montenegro)**
DEVELOPMENT OF TWO-STAGE REVERSE PLANETARY MECHANISMS FOR PERIODICAL MOVEMENTS REALIZATION

A-14. **Dašić P. (Kruševac - Serbia and Montenegro)**
ANALYSIS CHOICE OF REGRESSION EQUATIONS IN FIELDS METALWORKING

A-15. **Deaconescu A., Deaconescu T. (Braşov - Romania)**
DEVICE FOR THE MAGNETO-ABRASIVE FINISHING OF ROLLER BEARING BALLS

A-16. **Dibner Yu. (Voronezh - Russia)**
THE FORECAST OF ALTITUDE ERROR OF CRANKSHAFT FORGINGS

A-17. **Dikov A., Stoev A., Dikov R. (Sofia - Bulgaria)**
ON THE MODELLING OF THE DIMENSION LINKS FOR MACHINING SYSTEMS AND PROCESSES

A-18. **Dinev G. (Sofia - Bulgaria)**
INVESTIGATION OF STEEL MECHANICAL CHARACTERISTICS IN GEARS OF TRACTIVE REDUCERS

A-62. **Pantić R., Ivanović P., Ćirić M., Miljatović M. (Trstenik - Serbia and Montenegro)**
NEW TECHNOLOGIES IN THE MANUFACTURING OF THE VITAL ASSEMBLIES OF HYDRAULIC SYSTEMS

A-63. **Parashkevov S. Z. (Gabrovo - Bulgaria)**
EFFECT OF FACTORS REDUCING THE IMPARTED ENERGY IN METAL AT LASER CUTTING

A-64. **Paskaleva K. I. (Branch-Sliven - Bulgaria)**
PROGRAMME SYSTEM FOR OPTIMUM DESIGN OF DIFFERENTIAL GEAR TRAINS WITH CONTROLLABLE OUPUTS

A-65. **Păunescu R., Păunescu T. (Braşov - Romania)**
STRUCTURAL AND FUNCTIONAL SIMILARITY OF MECHANICAL SYSTEMS: ABOUT THE METHODS FOR DETERMINATION OF THE SIMILARITY GROUPS

A-66. **Păunescu R., Păunescu T. (Braşov - Romania)**
STRUCTURAL AND FUNCTIONAL SIMILARITY OF MECHANICAL SYSTEMS: AUTOMATIC DETERMINATION OF THE SIMILARITY GROUPS

A-67. **Pavlović T. N., Pavlović D. N. (Niš - Serbia and Montenegro)**
A DESIGN OF EVANS COMPLIANT FOUR-BAR LINKAGE FOR RECTILINEAR GUIDING

A-68. **Pejović B. (Kosovska Mitrovica - Serbia and Montenegro), Đukić P. (Banja Luka - Bosnia and Herzegovina), Cvetković S. (Kosovska Mitrovica - Serbia and Montenegro)**
CONTRIBUTION TO ACCURATE DETERMINATION OF THE ERROR OF MACHINING STEMMING FROM ELASTIC DEFORMATION DURING LONGITUDINAL SCRAPING

A-69. **Petrescu M. G., Antonescu N. N., Nae I., Drumeanu A. C. (Ploiesti - Romania)**
OPTIMIZING METHOD FOR THE STEEL WELDING REGIME

A-70. **Petrescu M. G., Nae I., Drumeanu A. C. (Ploiesti - Romania)**
THE SIMULATION OF THE LARGE-SIZED SPHERICAL TANKS BEHAVIOUR IN APPLYING GLOBAL HEAT TREATMENTS

A-71. **Popova H., Smolentsev V., Shalimov Yu. (Voronezh - Russia)**
DEVELOPMENT OF TECHNOLOGY OF OBTAINING OF POROUS METAL STRUCTURES WITH USAGE OF PULSE MODES

A-72. **Popp I. O. (Sibiu - Romania)**
AUTOMATIC TOOL CHANGING SYSTEM WITH CENTRALLY RADIAL CLAMPING FORCE ACTUATION

A-73. **Poroshin V. V. (Moscow - Russia)**
NUMERICAL ANALYSIS FOR TECHNOLOGICAL CONTROL OF THE HERMETIC JOINTS

A-74. **Potashnikov M., Sinegubova S. (Voronezh - Russia)**
AUTOMATION OF PROCESSING OF THE CHANNELS OF VARIABLE SECTIONS BY THE CATHODES OF NON-STIFF DESIGN

A-75. **Radovanović M. (Niš - Serbia and Montenegro)**
CHARACTERISTICS OF ABRASIVE WATER JET CUTTING

A-76. **Radovanović M. (Niš - Serbia and Montenegro)**
COMPLEMENTARY CONTOUR CUTTING METHODS

A-77. **Radovanović M. (Niš - Serbia and Montenegro)**
FEATURES OF KERF BY LASER CUTTING

A-78. **Radovanović M. (Niš - Serbia and Montenegro)**
FEATURES OF LASER CUT SURFACE

A-79. **Rančić M. (Zrenjanin - Serbia and Montenegro)**
MODELING AND ANALYSIS OF TECHNICAL SYSTEMS BY APPLICATION OF GRAPH-ANALYTIC'S METHOD

A-80. **Rashev G. E. (Gabrovo - Bulgaria)**
CARBURIZING OF STEEL GRADE 17CRNIMO6

A-81. **Rudan M. (Pula - Croatioa), Đurić S. (Kruševac - Serbia and Montenegro)**
MIG WELDING PROCEDURE APPLICATION FOR THE ZINC COVERED SHEET METAL WELDING

A-82. **Ryabtsev S. A. (Moscow- Russia)**
DEFECT-FREE HIGH-SPEED GRINDING BY HIGHLY-POROUS ABRASIVE WHEELS ON THE BASE OF CERAMIC BINDERS

A-83. **Sekulić S. (Novi Sad - Serbia and Montenegro)**
PROJECTION OF OPTIMAL TECHNOLOGICAL PROCEDURE FOR GIVEN PRODUCTIVITY

A-84. **Shelkovoi O. M., Gutsalenko Yu. G., Krukova N. V. (Kharkov - Ukraine)**
SIMULATION OF PRODUCTION COMPLEXES IN REAL-TIME MODE

A-85. **Smolentsev E. V. (Voronezh - Russia)**
MANAGEMENT AND TECHNOLOGICAL PARAMETERS OF PROCESS OF THE COMBINED OPERATIONAL DEVELOPMENT OF GEAR TRANSFERS

A-86. **Stănăşel I. (Oradea - Romania)**
THE STUDY OF GENERATING CYLINDRICAL GEAR WITH CURVED CYCLOIDAL TEETH

A-87. **Starkov V. K., Ryabtsev S. A., Soloduhin N. N. (Moscow - Russia)**
THE REPRESENTATIVE TECHNOLOGY OF GEAR-WHEELS MANUFACTURING BY THE PROFILE CREEP FEED WORK METHOD

A-88. **Ştefan M., Sorin I. (Oradea – Romania)**
EXPERIMENTAL STUDY REGARDING THE SIMULATION PROCESS OF FILLING IN A MOULD OF INJECTED PLASTIC

A-89. **Šiljački Žeravčić V., Bakić G., Đukić M., Stamenić Z. (Belgrade - Serbia and Montenegro), Anđelić B. (Čačak - Serbia and Montenegro), Milovančević M. (Belgrade - Serbia and Montenegro)**
SHORCOMINGS OF PRESSURE VESELS REPAIR WELDING WELDED JOINTS

A-90. **Šiljački Žeravčić V., Đukić M., Bakić G. (Belgrade - Serbia and Montenegro), Anđelić B. (Čačak - Serbia and Montenegro)**
DETECTION OF DAMAGES IN FOSSIL FUEL STEAM BOILER TUBING SYSTEM WITH NEW CORROSION NDT UNIT EMF3-MI

A-91. **Teodor P. M., Petru U., Teodor M., Ioan L., Traian B. (Oradea - Romania)**
THE INFLUENCE OF CAPILLARY GAP SURFACE MICROGEOMETRY ON THE MINIMUM THICKNESS OF THE LIQUID METAL ALLOY FILM

A-92. **Trumbulović Lj. (Užice - Serbia and Montenegro), Aćimović-Pavlović Z. (Belgrade - Serbia and Montenegro), Panić S., Đuričić M., Aćimović Z. (Užice - Serbia and Montenegro)**
DEVELOPMENT OF THE PROCESS AND EQUIPMENT FOR THE EPC PROCESS

A-93. **Udrolu R. (Brasov - Romania)**
ASPECTS CONCERNING OF THE MACHINING STRATEGIES IN MILLING PROCESS

A-94. **Udrolu R. (Brasov - Romania)**
DETERMINATION OF THE MACHINING STRATEGIES IN INTEGRATED DESIGN OF THE MOULDS

A-95. **Ungur P., Pop M. T., Maghiar T., Lucaciu I., Moga I. (Oradea - Romania)**
AN APPLICATION OF THE UPWARD EFFECT GENERATED BY SURFACE STRESS FOR VERTICAL CAPILLARY SOLDERING OF ASSOCIATED METALLIC ELEMENTS

A-96. **Vodolazskaya E., Iskrizkiyl V. (Kramatorsk - Ukraine), Vodolazskaya N. (Donetsk - Ukraine)**
THE ANALYSIS OF INFLUENCING OF MODES OF IMPACT OF MEMBERS RARELY PERCUSSIVE A BOX WRENCH ON ITS POWER CHARACTERISTICS

A-97. **Vodolazskaya N. (Donetsk - Ukraine)**
COMPACTNESS SPATIALLY - ORIENTED OF TECHNOLOGICAL SYSTEM FOR ASSEMBLY OF THREADED CONNECTIONS

A-98. **Wasilkowska A. (München - Germany), Huckert D. (Lyon - France), Pichler A., Traint S. (Linz - Austria), E. Werner (München - Germany)**
EXPERIMENTAL DETERMINATION OF RETAINED AUSTENITE STABILITY IN LOW ALLOYED TRIP-STEELS

A-99. **Zaimović-Uzunović N., Ćurić D., Mulabdić J., Hadžiahmetović A., Lemeš S. (Zenica - Bosnia and Herzegovina)**
APPLICATION OF RAPID PROTOTYPING IN PROCESS OF MAKING TOOLS FOR METAL CASTING

A-100. **Zhachkin S. Y., Smolentsev V. P. (Voronezh - Russia)**
QUALITY IMPROVEMENT OF PARTS RESTORED BY GALVANIC CONTACT PLATING (GCP)

A-101. **Zhelezarova D. I., Angelov I. A. (Gabrovo - Bulgaria)**
FATIGUE TESTING OF SMOOTH SPECIMENS MADE OF 23G2SAF STEEL AND DETERMINING THE CRITICAL CRACKING RESISTANCE IMPACT ON LIMITED LIFE

A-102. **Živković M. (Trstenik - Serbia and Montenegro)**
CONSTRUCTION FORMS OF BEARING STRUCTURES OF DEVICES FOR STATICALLY PROGRAMS STRAINS

Papers for Session B: / Radovi za sekciju B:
TRIBOLOGY

Papers for Session C: / Radovi za sekciju C:
MAINTENANCE AND EFFECTIVENESS OF TECHNICAL SYSTEMS

C-1. **Adamović Ž., Petrović Lj. (Zrenjanin - Serbia and Montenegro)**
ACTUAL APPROACHES TO THE SYSTEM MAINTENANCE

C-2. **Adamović Ž., Petrović Lj. (Zrenjanin - Serbia and Montenegro)**
EFFECTIVE SYSTEMS FOR VIBRATION ANALISY AND PREDICTIVE MAINTENANCE APPLICATIONS

C-3. **Čatić D., Jovičić S. (Kragujevac - Serbia and Montenegro)**
FAULT TREE ANALYSIS OF THE LIGHT INDUSTRIAL VEHICLE STEERING SYSTEM

C-4. **Dašić P., Veselinović S., Marić A. (Kruševac - Serbia and Montenegro)**
ANALYSIS OF THE EXPONENTIAL MODELS FOR THE RELIABILITY OF POWER SYSTEM FOR ECCENTRIC PRESS INN 1500

C-5. **David S., Teodor S. (Reşiţa - Romania)**
STRATEGY OF S.C. U.C.M. REŞIŢA S.A. CONCERNING MAINTENANCE OF MANUFACTURED HYDRO-ELECTRICAL EQUIPMENT

C-6. **Dzhanakhmedov A. Kh., Aliyev A. M., Janahmadov E. A. (Baku - Azerbaijan)**
MAINTENANCE OF TIGHTNESS OF CONIC VALVES OF X-MAS TREES

C-7. **Ghita E., Ţucu D. (Timişoara - Romania)**
THE STATE OF RESIDUAL STRESSES AND CRACKS IN RAILROADS-A CRITERION FOR THE MAINTENANCE INSPECTION

C-8. **Grujić N. (Požarevac - Serbia and Montenegro), Soldat D. (Zrenjanin - Serbia and Montenegro)**
DETERMINATION OF RELIABILITY OF ENGINEERING SYSTEMS

C-9. **Ivanović N. (Belgrade - Serbia and Montenegro), Ivanović P., Pantić R., Mijatović M. (Trstenik - Serbia and Montenegro)**
NEW ACCESS OF MAINTENANCE OPTIMAL SELECTION STRATEGY OF HYDRAULIC SYSTEMS BY ASPECT OF EFFECTIVENESS AND RELIABILITY

C-10. **Marić A., Đurić S. (Kruševac - Serbia and Montenegro)**
THE ANALYSIS OF CONSTRUCTION THE EFFICIENCY OF MAINTENANCE DURING THE EXPLOATATION

C-11. **Nikolić D. (Vranje - Serbia and Montenegro), Adamović Ž. (Zrenjanin - Serbia and Montenegro), Stefanović S. (Niš - Serbia and Montenegro), Jevremović V. (Trstenik - Serbia and Montenegro)**
THE EXAMINATION OF THE HYDRAULIC DRIVE OF THE ROTATING TABLE BY MEANS OF A MATHEMATICAL MODEL

C-12. **Petrović Lj. Z. (Zrenjanin - Serbia and Montenegro)**
COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEMS (CMMS) AND EFFECTIVE MAINTENANCE

C-13. **Petrović Lj. Z. (Zrenjanin - Serbia and Montenegro), Radovanović S. V. (Novi Sad - Serbia and Montenegro)**
THE MAINTENANCE STRATEGIES OF AGRICULTURAL MACHINES

C-14. **Soldat D. (Zrenjanin - Serbia and Montenegro), Grujić N. (Požarevac - Serbia and Montenegro)**
THE STRATEGY OF MAINTENANCE OF INDUSTRIAL OBJECTS

C-15. **Şimon A. E., Morariu C. O., Iovănaş M. D. (Brasov - Romania)**
ANALYSES OF THE CORRELATION BETWEEN CAPABILITY AND RELIABILITY OF THE TECHNOLOGICAL PROCESS

C-16. **Stefanović S. (Niš - Serbia and Montenegro), Rančić M. (Zrenjanin - Serbia and Montenegro), Jevremović V. (Trstenik - Serbia and Montenegro)**
DIAGNOSTIC PARAMETERS IN MAINTAINING OIL-HYDRAULIC PUMPS AND MOTORS

C-17. **Tanasijević S., Jovičić S. (Kragujevac - Serbia and Montenegro), Ćirić-Kostić S. (Kraljevo - Serbia and Montenegro), Marković S. (Čačak - Serbia and Montenegro)**
IMPLEMENTATION NECESSITY OF DAMAGED MACHINE ELEMENTS REGENERATION

C-18. **Živković D. (Zrenjanin - Serbia and Montenegro),Veljić M. (Belgrade - Serbia and Montenegro)**
A SYSTEM OF QUALITATIVE MAINTENANCE OF PLOUGHS AND SOWING MACHINES

C-19. **Živković D. (Zrenjanin - Serbia and Montenegro), Veljović A. (Čačak - Serbia and Montenegro)**
EFFECTS OF IMPLEMENTING A INFORMATION SYSTEM IN MAINTENANCE OF MANUFACTURING EQUIPMENT AT A COMBINE FACTORY

Papers for Session D: / Radovi za sekciju D:
QUALITY MANAGEMENT, ISO 9000, ISO 14000, TQM AND MANAGEMENT IN MECHANICAL ENGINEERING

D-1. **Banović A., Stefanović D. (Novi Sad -Serbia and Montenegro)**
DEFINING OF THE PROCESS FLOW OF THE CONSTRUCTION OF OBJECTS IN NIS-NAFTAGAS PROMET ACCORDING TO JUS ISO 9001:2000 SERIES

D-2. **Barac N., Milovanović G. (Niš - Serbia and Montenegro), Cvetković S. (Kosovska Mitrovica - Serbia and Montenegro)**
LOGISTIC QUALITY AND QUALITY ANALYSIS TECHNIQUES

D-3. **Bârsan-Pipu N., Şimon A. E. (Brasov - Romania)**
USING THE PRINCIPAL COMPONENT ANALYSIS FOR MULTIVARIATE PROCESS MONITORING

D-4. **Bločanin R. (Belgrade - Serbia and Montenegro), Božović-Simić S. (Kruševac - Serbia and Montenegro)**
ENVIRONMENT PROTECTION BASED ON THE CHEMICAL ACCIDENTS CONSEQUENCES PROGNOSES

D-5. **Brković M. (Novi Bečej - Serbia and Montenegro), Desnica E., Nikolić M. (Zrenjanin - Serbia and Montenegro)**
REVIEW OF THE QUALITY CONTROL PROCEDURE FOR THE PROCESS OF ROOF TILE SHAPING

D-6. **Bulatović M. (Podgorica - Serbia and Montenegro)**
REENGINEERING OF DESIGN AND MANAGEMENT IN FUNCTION OF TQM AND BUSINESS EXCELLENCE

D-7. **Cioca L. I., Breaz R. E. (Sibiu - Romania)**
MANAGERIAL DECISION MAKING SYSTEMS FOR REENGINEERING THE PRODUCTION SYSTEMS

D-8. **Cîrciu M. R. (Codlea - Romania), Cîrciu R. (Brasov - Romania)**
STUDY ON THE VARIABILITY OF THE MEASURING PROCESS AND ITS INFLUENCE ON THE METROLOGICAL RELIABILITY

D-9. **Cîrciu R. (Brasov - Romania), Cîrciu M. R. (Codlea - Romania)**
METROLOGICAL RELIABILITY – A FUNCTION OF THE PARAMETER DEVIATION. STUDY ON SIMULATED AND EXPERIMENTAL DATA

D-10. **Cvetković S. (Kosovska Mitrovica - Serbia and Montenegro), Barac N., Milovanović G. (Niš - Serbia and Montenegro)**
DEVELOPMENT OF MANUFACTURING CONTROL

D-11. **Ćurčić S., Ječmenica R. (Čačak - Serbia and Montenegro)**
REENGINERING PREFABRICATED SYSTEMS IN FUNCTION FLEXIBILITY AND PRODUCTIVITY

D-12. **Đorđević Lj. (Kraljevo - Serbia and Montenegro), Novaković-Rajčić B. (Belgrade - Serbia and Montenegro), Đurić S., Veselinović S. (Kruševac - Serbia and Montenegro)**
JUSTIFICATION FOR NATURAL GAS APPLICATION INSTEAD OF OTHER ENERGY SOURCES

D-13. **Đorđević V., Janković-Milić V. (Niš - Serbia and Montenegro)**
TOTAL QUALITY MANAGEMENT

D-14. **Đuričić M. (Užice - Serbia and Montenegro), Đuričić M. (Belgrade - Serbia and Montenegro), Milutinović I., Drndarević D., Sokić M. (Užice - Serbia and Montenegro)**
QMS ESTABLISHMENT IN THE DEVELOPING COUNTRIES; ABILITIES FOR BUSINESS SYSTEM EXCELLENCE

D-15. **Gherasimov A., Mihai P., Mnerie D., Tucu D. (Timisoara - Romania)**
STUDY ABOUT TRACEABILITY IN FORCE MEASUREMENT IN ROMANIA

D-16. **Hristov H. K. (Gabrovo - Bulgaria)**
MEASUREMENT ERRORS OF LINEAR DIMENSIONS WITH MEASURABLE WHEEL

D-17. **Iancu A., Mangra M. (Turnu Severin - Romania)**
SEVERAL OBSERVATIONS ON THE TOTAL QUALITY MANAGEMENT

D-18. **Ječmenica R. (Čačak - Serbia and Montenegro), Dašić P., Marić A. (Kruševac - Serbia and Montenegro)**
RATIONALIZATION OF PRODUCT EQUIPMENT FOR TECHNOLOGICAL PROCESS OF BREAD PRODUCTION BY MEANS OF PARETO METHOD

D-19. **Jermann R., Sereş P. (Reşiţa - Romania)**
GUIDANCE OF QUALITY MANAGEMENT SYSTEM BY MEANS OF OBJECT VES

D-20. **Jovanović Đ. (Novi Sad - Serbia and Montenegro), Milojković-Leković B. (Belgrade - Serbia and Montenegro), Vujković I., Matavulj M. (Novi Sad - Serbia and Montenegro)**
INTRODUCTION OF NEW ISO-14000 STANDARDS IN SERBIA AND EXPECTED ENVIRONMENTAL CONSEQUENCES

D-21. **Koleňák J., Nývltová R., Polák D., Chybová L. (Brno - Czech Republic)**
GROWING COMPETITIVENESS OF INDUSTRIAL FIRMS BY COLLABORAT VE ARRANGEMENTS

D-22. **Kralev T., Kraleva N., Polenakovik R. (Skopje - Republic of Macedonia)**
OPERATIONS MANAGEMENT STUDIES PRODUCTION OF PRODUCTS AND/OR SERVICES

D-23. **Lukić V. (Kruševac - Serbia and Montenegro)**
LIMITATIONS OF EFFICIENT CONTROL OF PROTECTION OF NATURE ENVIRONMENT AND STANDARDS OF SERIES JUS ISO 14000

D-24. **Lumnitzer E., Králiková R. (Košice - Slovakia)**
SIMULATION UTILIZE FOR INCREASING EFFECTIVENESS OF THE INTEGRATED PRODUCTION

D-25. **Matoušková D., Sýkorová L. (Zlin - Czech Republic)**
THE STATISTICAL METHODS APPLICATION AT INJECTION MOULDING PRODUCTION

D-26. **Militaru C., Militaru R. (Timişoara - Romania)**
MODERN TOOLS AND TECHNIQUES OF QUALITY MANAGEMENT

D-27. **Militaru R. (Timişoara - Romania)**
IDENTIFYING THE ENVIRONMENTAL ASPECTS AND ASSESSING THEIR ASSOCIATED IMPACTS IN AN ENVIRONMENTAL MANAGEMENT SYSTEM IN CONFORMITY TO ISO 14000

D-28. **Mitić D. (Niš - Serbia and Montenegro), Đurić S., Marić A. (Kruševac - Serbia and Montenegro)**
TECHNO-ECONOMIC ADEQUACY FOR THE SELF-SHIELDING CORED WIRE WELDING APPLICATION

D-29. **Nikolić M., Sajfert Z., Nikolić B. (Zrenjanin - Serbia and Montenegro)**
SELECTION OF IDEAS FOR NEW PRODUCTS IN A FURNITURE MANUFACTURING COMPANY

D-30. **Nikolić S. (Novi Sad - Serbia and Montenegro)**
MECHANICAL ENGINEERING IN THE LIGHT CONTROVERSIES IN MANAGEMENT (EAGLES DO NOT FLY IN FLOCKS OR MAYBE THEY DO)

D-31. **Polenakovik R., Kralev T., Polenakovik L. (Skopje - Republic of Macedonia)**
RELATIONSHIP BETWEEN TYPE OF TECHNOLOGY AND SPAN OF MANAGEMENT

D-32. **Popescu N. (Bucharest - Romania)**
TAGUCHI'S "QUALITY LOSS FUNCTION" (*QLF*) APPLICABILITY IN THE DIMENSIONAL ACCURACY AND ISO FITTINGS THEORETICAL FIELD

D-33. **Romić L. (Subotica - Serbia and Montenegro)**
THE IMPORTANCE OF TECHNOLOGICAL INNOVATIONS IN SMALL AND MEDIUM FIRMS

D-34. **Sajfert Z., Nikolić M., Desnica E. (Zrenjanin - Serbia and Montenegro)**
MODERN CONCEPTS OF INDUSTRIAL PRODUCTION

D-35. **Slavov Z. D. (Varna - Bulgaria)**
A HIERARCHICAL METHOD FOR DECISION MAKING UNDER MULTIPLE CRITERIA IN THE MANAGEMENT OF MECHANICAL ENGINEERING

D-36. **Stojanović S. (Kruševac - Serbia and Montenegro)**
PREPARATION OF SERBIA AND MONTENEGRO FOR EUROPEAN INTEGRATION - LIMITATION FOR ACCULTURATION OF MACHINE MANUFACTURE

D-37. **Subeska V., Kralev T., Polenakovik R., Todorovski N. (Skopje - Republic of Macedonia)**
HOW TO MANAGE FREQUENT CHANGES IN PRODUCTION/SERVICE ORDERS?

D-38. **Štefánek M., Janáč A., Mihál A. (Trnava - Slovakia)**
ASSEMBLABILITY FROM ASPECT OF METROLOGY

D-39. **Tomášková E., Sýkorová S. (Brno - Czech Republic)**
THE IMPORTANCE OF MARKETING FOR MANAGEMENT IN MECHANICAL ENGINEERING

D-40. **Trifunović S. (Kraljevo - Serbia and Montenegro), Babović D. (Kruševac - Serbia and Montenegro)**
TIME AS THE FACTOR OF WORK HARMS IN THE INDUSTRIAL CONDITIONS OF MINTAGE – RESULTS OF RESEARCH

D-41. **Văcărescu V. (Timişoara - Romania), Golovatai-Schmidt E. (Herzogenaurauch - Germany)**
IMPLICATIONS OF TAGUCHI'S QUALITY LOSS FUNCTION ON DEVELOPMENT AND DESIGN FOR BULK GOODS IN THE AUTOMOTIVE FIELD

D-42. **Vachev B., Ilieva K. (Sofia - Bulgaria), Pulov D. (Gabrovo - Bulgaria)**
SYSTEM ANALYSIS OF QUALITY MANAGEMENT SYSTEM - DECISION MAKING APPROACH. MEASUREMENT, ANALYSIS AND IMPROVEMENT

D-43. **Zalmović-Uzunović N., Lemeš S., Hadžikadunić F., Vukojević N. (Zenica - Bosnia and Herzegovina)**
STEAM BOILER DISPLACEMENTS AS INDICATORS FOR CORRECT PROCESS CONDUCTING

D-44. **Zhelezarov I. S., Hristov H. K. (Gabrovo - Bulgaria)**
QUALITY MANAGEMENT SYSTEM – FACTOR FOR SUCCESSFUL ACCREDITATION OF HIGHER TECHNICAL INSTITUTE

D-45. **Živković D. (Zrenjanin - Serbia and Montenegro)**
PRODUCTIVITY AS ONE OF THE CRITERIA FOR SELECTION OF AUTOMATIZATION LEVEL OF PRODUCTION EQUIPMENT

Papers for Session E: / Radovi za sekciju E:
CA TECHNOLOGIES (CAD, CAM, CAPP, CAE, ...) AND CIM

E-1. **Alexandru C., Vişa I. (Braşov - Romania)**
DYNAMIC ANALYSIS OF A FULL VIRTUAL VEHICLE IN PASSING OVER BUMPS REGIME

E-2. **Alexandru C., Vişa I. (Braşov - Romania)**
REALIZATION OF A DIGITAL CAR USING FUNCTIONAL VIRTUAL PROTOTYPING TECHNOLOGY

E-3. **Andreica G. E., Talabă D. (Brasov - Romania)**
A COMPARATIVE ANALISYS OF CAR'S DOUBLE WISH-BONE SUB-TYPES SUSPENSIONS COMBINATIONS REGARDING THE ROLL MOTION

E-4. **Argeşanu V., Popa A. (Timişoara - Romania)**
INTERFACE CONTACT PRESSURE DISTRIBUTION IN DYNAMIC CONTACT FACE SEALS, ANALYZED BY FEM

E-5. **Borsan A., Borsan L. (Brasov - Romania)**
CONSIDERATIONS CONCERNING GENEVA MECHANISM DRIVEN BY A CAM MECHANISM

E-6. **Barsan L., Barsan A., Neagoe M. (Brasov – Romania)**
CONSIDERATIONS CONCERNING SOME REPRESENTATIVE CORRELATIONS OPTIMIZATION IN CAM MECHANISMS SYNTHESIS

E-7. **Batog I., Lihtetchi I. (Brasov - Romania)**
SIMULATION AND DYNAMIC ANALYSIS OF VIBRATING MACHINES USING CAE

E-8. **Bogomolov D. G., Poroshin V. V. (Moscow - Russia)**
PROGRAM COMPLEX FOR ESTIMATING AND DESIGN OF THE HERMETICAL JOINTS

E-9. **Bondrea I., Avrigean E. (Sibiu - Romania)**
MODELLING AND OPTIMISATION OF THE COMPONENTS OF THE CARDAN TRANSMISSION BY MEANS OF CAD SOFTWARE AND DATABASES

E-10. **Botea T., Pamintas E. (Timisoara - Romania)**
CAE FOR CAM ACTUATED LATHES

E-11. **Botea T., Pamintas E. (Timisoara - Romania)**
CASE STUDY ABOUT ECONOMIC EFFICIENCY OF COMPUTER AIDED DESIGN OF TECHNOLOGICAL PROCESS ON CAM-ACTUATED LATHES

E-12. **Butnariu S., Jula A. (Brasov - Romania)**
ASPECTS OF FINITE ELEMENT ANALYSIS OF THE BELTS TOOTH DEFORMATION

E-13. **Cătană D., Trif N. (Braşov - Romania)**
THE SIMULATION OF DEFORMATION AT TRACTION OF SPOTS WELDED JOINTS

E-14. **Ciofoala V., Sche I., Podoreanu A., Curtu I., Dogaru F. (Brasov - Romania)**
A STUDY OF SAFTY BELT DOUBLE BELT GUIDE ASPECTS UNDER TENSION

E-15. **Clinciu R. (Brasov - Romania), Clinciu M. R. (Codlea - Romania)**
AUTOLISP ROUTINE FOR QUICK REPRESENTATION AND INTERSECTION OF SOLIDS

E-16. **Cvetković D., Kostić I., Mitrović Č., Bengin A., Bekrić D. (Belgrade - Serbia and Montenegro)**
POWER STATION'S COOLING TOWER COMPOSITE FAN BLADE

E-17. **Damjanović B. (Kruševac - Serbia and Montenegro)**
CNC TOOLPATH SIMULATION AND CONTROL SOFTWARE BASED ON BRESENHAMS ALGORITM

E-18. **Davidescu A., Sticlaru C. (Timişoara - Romania)**
THE DYNAMIC ANALYSIS OF A FOUR-BAR LINKAGE BY FINITE ELEMENT METHOD

E-19. **Deaconescu A. (Braşov - Romania)**
COMPUTER AIDED DETERMINATION OF THE CAPABILITY INDICES OF WORKING MACHINES

E-20. **Dibner Yu., Kruk A. (Voronezh - Russia)**
PROJECTION OF THE DESIGNER HOT-PRESS DATABASE

E-21. **Dikov A., Guergov S., Dikov R. (Sofia - Bulgaria)**
GENERALIZED TOPOLOGICAL MODEL OF THE DIMENSIONAL CHARACTERISTICS OF MANIPULATIONAL SUBSYSTEMS OF INDUSTRIAL ROBOTS WITH OPEN KINEMATIC STRUCTURE

E-22. **Dolga L. (Timisoara - Romania), Stefanescu D. M. (Bucharest - Romania)**
ABOUT THE PARAMETRIC AND FEATURE-BASED DESIGN MODELS FOR THE ELASTIC ELEMENTS OF FORCE TRANSDUCERS

E-23. **Dolga V. (Timisoara - Romania)**
ABOUT THE COMPUTER AIDED DESIGN OF THE TORQUE SENSORS

E-24. **Drăgulescu D., Toth-Taşcău M., Dreucean M. (Timişoara - Romania)**
IMPROVING THE PATH PLANNING PROCESS USING POTENTIAL FIELD METHOD

E-25. **Dreucean M., Drăgulescu D., Toth-Taşcău M. (Timişoara - Romania)**
ADAPTIVE CONTROL OF MOBILE TRANSFER SYSTEMS BASED ON THE THEORY OF SUBJECTIVE PROBABILITIES

E-26. **Dumitrache C. (Constanta - Romania), Comandar C. (Iasi - Romania), Sabău A. (Constanta - Romania), Amariei N. (Iasi - Romania)**
COMPUTATIONAL MODEL OF OPTIMIZATION THERMAL STRESS-RELIEF PROCESSES AT CARBON STEEL

E-27. **Dumitru N., Duta A., Sass L. (Craiova - Romania)**
THE FINITE ELEMENT MODELING OF THE STRUCTURES IN STATICAL MODE

E-28. **Duncheva G. V. (Gabrovo - Bulgaria)**
INVESTIGATION OF THE IMPACT OF A DEVIATION IN A REGULAR GEOMETRICAL FORM IN LONGITUDINAL DIRECTION ON THE STRESSED STATE AND THE LOAD CARRYING CAPACITY OF MOULDED TAPER JOINTS

E-29. **Eftimie E. (Braşov - Romania)**
GEOMETRIC MODELLING OF THE 3D CURVES UNIFORM B-SPLINE CURVES

E-30. **Eftimie E., Jula A. (Braşov - Romania)**
SIMPLE CLUTCHES WITH MULTIPLE FUNCTIONS ELASTIC AND SAFETY CLUTCHES

E-31. **Eftimie N. (Braşov - Romania)**
GEOMETRIC MODELLING OF THE 3D CURVES CUBIC BETA SPLINES

E-32. **Eftimie N. (Braşov - Romania)**
PROGRAMMES FOR THE 3D REPRESENTATIONS OF OBJECTS AND SURFACES

E-33. **Erić D. (Čačak - Serbia and Montenegro)**
DEFINITION KNOWLEDGE BASE WITH ELEMENTS ARTIFICIAL INTELLIGENCE AS SEGMENT CAPP SYSTEM FOR EDM-TECHNOLOGY

E-34. **Gecevska V., Pavlovski V. (Skopje - Republic of Macedonia), Popovska-Vasilevska S. (Bitola - Republic of Macedonia), Rosomanov Z. (Skopje - Republic of Macedonia)**
COMPUTER AIDED MANUFACTURING AS AN INFORMATION TECHNOLOGY IN PRESS PRODUCTION

E-35. **Gordić D., Babić M., Jovičić N., Šušteršič V. (Kragujevac - Serbia and Montenegro)**
VARIOUS ASPECTS OF COMPUTER APPLICATIONS IN FLUID POWER

E-36. **Ivan M. C., Ivan C., Lancea C., Ivan N. V. (Brasov - Romania)**
THE USE OF 3D CONSTRUCTIVE TECHNOLOGICAL ENTITIES IN PRODUCT DEVELOPMENT

E-37. **Ivanov G. I., Naydenov A. P. (Gabrovo - Bulgaria)**
DEFINING THE PROFILE OF A DISK CAM AND MACROPROGRAMMING WHILE MILLING IT ON *CM 040* MACHINING CENTRE WITH *TCY600M* CNC SYSTEM

E-38. **Jaliu C., Neagoe M., Săulescu R. (Braşov - Romania)**
ON THE DYNAMIC MODELING OF A VERTEBRATE ROBOT WITH GEARS. NUMERICAL SIMULATION

E-39. **Jianu S. (Reşita - Romania)**
APPLICATIONS OF COMPUTER AIDED TECHNIQUES IN RESEARCH ACTIVITY IN THE DOMAIN OF HYDRAULIC TURBINE AT S.C. U.C.M.REŞITA S.A.

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E-43. **Lihtetchi I., Batog I. (Brasov - Romania)**
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Number of papers by countries

No.	Country	Number of papers	No.	Country	Number of papers
1.	Azerbaijan	1	12.	Macedonia	5
2.	Bosnia and Herzegovina	6	13.	Poland	4
3.	Bulgaria	52	14.	Romania	168
4.	Croatia	1	15.	Russia	21
5.	Czech Republic	7	16.	Serbia and Montenegro	88
6.	Finland	2	17.	Slovakia	6
7.	France	1	18.	Slovenia	4
8.	Germany	2	19.	Switzerland	1
9.	Greece	1	20.	Turkey	3
10.	Italy	2	21.	Ukraine	9
11.	Lithuania	6	22.	USA	1
				Totally:	**391**

GENERAL INFORMATION

Place of keeping: **Herceg Novi**

Herceg Novi is situated at the entrance of the Boka Kotorska Gulf in Mediterenian, cuddling among numerous species of tropical and subtropical plants. This is the film festival and carnival metropolis! For almost three decades there has been a festival on glorifying the flower mimosa.
Like nature, history has also left the rich heritage with the seals of different epochs and the important art treasures.
Since it was the latest town founded on the Adriatic coast it was named Novi, meaning "the latest". Its present name dates back from time when the town was run by Hertzeg Stjepan Vukcic Kosace when town flourished. These days it is well-known as the center of health tourism, with the famous spa resort Igalo.
Herceg Novi is 120 km westward from Podgorica, 100 km westward from Bar, 20 km westward from Tivat, 600 km southward from Belgrad, 630 km southwestward from Niš and 25 km eastward from Dubrovnik.

Arrival in Herceg Novi:

By car
From Belgrad by relation: Belgrad - Ljig - Gornji Milanovac - Čačak - Požega - Užice - Nova Varoš - Prijepolje - Bijelo Polje - Mojkovac - Kolašin - Podgorica - Cetinje - Budva - Lepetane - Kamenari - Herceg Novi.
From Niš by relation: Niš - Kruševac - Kraljevo - Čačak - Požega - Užice - Nova Varoš - Prijepolje - Bijelo Polje - Mojkovac - Kolašin - Podgorica - Cetinje - Budva - Lepetane - Kamenari - Herceg Novi or
Niš - Kruševac - Kraljevo - Raška – Novi Pazar - Ribariće - Rožaje - Berane - Mojkovac - Kolašin - Podgorica - Cetinje - Budva - Lepetane - Kamenari - Herceg Novi
Hotel has car parking.

By plane
Airport is in the Belgrade, Podgorica, Tivat and Dubrovnik. From Belgrade to Podgorica and Tivat it has normal air-line.
Price of return air-ticket Beograd - Tivat - Beograd is: **155,- EUR**
In price are implied: return air-ticket, airport's

OPŠTE INFORMACIJE

Mesto održavaanja: **Herceg Novi**

Herceg Novi je smešten na ulazu u Bokokotorski zaliv, raskošno ispunjen tropskim i suptropskim rastinjem. To je grad filmskog festivala i karnevala. Već tri decenije se održava festival mimoza.
Poput prirodnog nasleđja, grad ima i ono istorijsko, jer su različite epohe ostavile svoj pečat i značajno umetničko blago.
Grad je nazvan Novi kao poslednji osnovan grad na jadranskoj obali. Njegovo današnje ime Herceg Novi datira iz vremena procvata tokom vladavine hercega Stjepan Vukčića Kosače.
Danas je grad poznat i kao centar zdravstvenog turizma sa poznatom banjom Igalo.

Herceg Novi je 120 km zapadno od Podgorice, 100 km zapadno od Bara, 20 km zapadno od Tivta, 600 km južno od Beograda, 630 km jugo-zapadno od Niša i 25 km istočno od Dubrovnika.

Dolazak u Herceg Novi:

Kolima
Iz Beograda relacijom: Beograd - Ljig - Gornji Milanovac - Čačak - Požega - Užice - Nova Varoš - Prijepolje - Bijelo Polje - Mojkovac - Kolašin - Podgorica - Cetinje - Budva - Lepetane - Kamenari - Herceg Novi.
Iz Niša relacijom: Niš - Kruševac - Kraljevo - Čačak - Požega - Užice - Nova Varoš - Prijepolje - Bijelo Polje - Mojkovac - Kolašin - Podgorica - Cetinje - Budva - Lepetane - Kamenari - Herceg Novi ili
Niš - Kruševac - Kraljevo - Raška – Novi Pazar - Ribariće - Rožaje - Berane - Mojkovac - Kolašin - Podgorica - Cetinje - Budva - Lepetane - Kamenari - Herceg Novi
Hotel ima parking.

Avionom
Aerodrom je u Beogradu, Podgorici, Tivtu i Dubrovniku. Od Beograda do Podgorice i Tivta ima redovna avio linija.
Cena povratne avio karte Beograd - Tivat - Beograd je: **155,- EUR**
U cenu su uračunate povratna avionska karta,

and security's tariff, bus transportation from air-port Tivat to hotel and vice versa.

Reservation and sale of air-tickets you can do by tourist agency "SKY PASS" - Belgrade.

By bus

- From Belgrade to Herceg Novi bus go in:
  16.00 17.30 19.00 20.00
  21.20 22.00

Price of return bus-ticket Belgrade – Herceg Novi - Belgrade is: **od 24,- to 32,5 EUR**, depending from carrier.

- from Niš to Herceg Novi bus go in:
  19.00

Price of return bus-ticket Niš – Herceg Novi - Niš is: **27,- EUR.**
From bus station to Hotel **"Plaža"** is ~ 200 m.

Upon arrival accommodate first. If there is time go to the Conference Office and register (on reception desk in hotel **"Plaža"**). If you are late please go directly to Conference Opening Ceremony. You can register later.

Participation fee:

For first autor participation is free.
Participation fee for another authors and participants is: **50,- EUR.**
Participation fee comprise: participation in Conference, Proceedings, CD-ROM, other materials and coctails.

Registration and fees:

Proceedings, CD-ROM and other materials will give to participants on registration desk in hotel **"Plaža"**.
The registration desk will be open on Friday September 19, 2003, from 12 ^{00} to 20 ^{00} at Hotel **"Plaža"**.
The Secretariat will also operate during the Conference.
For foreign participants payment of registration fee is in cash on registration desk. Credit cards are not accepted.

aerodromska i bezbedonosna taksa, organizovan autobuski prevoz od tivatskog aerodroma do hotela i obratno.
Rezervacija i prodaja avio karata vrši se kod turističke agencije: "SKY PASS" - Beograd.

Autobusom:

- Iz Beograda za Herceg Novi autobus polazi u:
  16.00 17.30 19.00 20.00
  21.20 22.00

Cena povratne autobuske karte Beograd – Herceg Novi - Beograd je: **od 1600, do 2150,** din, zavisno od prevoznika.

- Iz Niša za Herceg Novi autobus polazi u:
  19.00

Cena povratne autobuske karte Niš – Herceg Novi - Niš je: **1800,00** din.
Od Autobuske stanice do Hotela "Plaža" je ~200 m.

Po dolasku u Herceg Novi prvo se smestite. Ako imate vremena prijavite se na Registracionom mestu Konferencije (do recepcije u hotelu **"Plaža"**). Ako kasnite molimo Vas da odete direktno na Ceremoniju otvaranja konferencije. Možete i kasnije da se prijavite.

Kotizacija:

Prvi autori su oslobođeni plaćanja kotizacije.
Kotizacija za ostale autore i učesnike konferencije iznosi: **3.000,00 din.**
Kotizacija obuhvata: prisustvo konferenciji, zbornik radova, CD-ROM, ostali štampani materijal i koktele.

Registracija i plaćanje:

Zbornici radova, CD-ROM i ostali štampani materijal će biti uručeni učesnicima na registracionom mestu u hotelu **"Plaža"**.
Registraciono mesto će biti otvoreno u petak 19. septembra 2003, od 12^{00} do 20^{00} u Hotelu **"Plaža"**.
Organizacioni sekretarijat će raditi tokom cele Konferencije.
Za domaće učesnike kotizacija se može platiti preko žiro računa Više tehničke mašinske škole Trstenik: 840-81-8660-91 kod Uprave za javna plaćanja sa naznakom **"kotizacija za RaDMI 2003"** ili direktno pri evidentiranju na registracionom mestu na dan dolaska.

Accommodation:

Accommodation capacities have been reserved both in Hotel **"Plaža"** of Herceg Novi.
Hotel Plaža (A category: ********) is situated downtown, on the very shoreline, on the Pet Danica Promenade.
Each room has balcony looking onto the sea, bathroom, toilet, telephone and radio. All appartments have color TV set in addition. The hotel has summer garden restaurant, private beach, indoor swimming pool with warm sea-water and outdoor childrens' one, sauna, congress and concert hall, pizzeria, beer cellar, bowling hall, hairdresser's and barbershops, firs-aid station, numereous boutiques, disco club. Central heating and air conditioning.

Capacities will be reserved from 19. to 23. September 2003.
Daily room prices with full pansion for one person in Hotel **"Plaža"** are:

- Single room **30,- EUR**
- Double room **25,- EUR**

Accommodation reservation has to be made by tourist agency "SKY PASS" - Belgrad (tel: 011/324-8437, 011/322-8640, 011/334-5600; fax: 011/324-8891 and e-mail: skypass@eunet.yu).

Honour diner and picnics:

Organizers are planed for participants of Conference:

- ❖ Honour diner with musical programme
  - Price for participants situated in hotel "Plaža" by person is **15,- EUR**
  - Price for participants not situated in hotel "Plaža" by person is **20,- EUR**
- ❖ Picnic to:
  - Kotor (by bus) **8,- EUR**
  - Peraške otoke (by boat) **10,- EUR**

Sale of tickets for honour diner and picnics you can do by tourist agency "SKY PASS" – Belgrade.

Smeštaj:

Smeštajni kapaciteti su rezervisani u Hotelu **"Plaža"** Herceg Novi.

Hotel Plaža (A kategorije: ********) se nalazi uz samu obalu na šetalištu Pet Danica.
Sve sobe su sa balkonom i pogledom na more, kupatilom, telefonom i radiom. Svi apartmani su opremljeni kolor TV-om. Hotel ima letnju baštu, sopstvenu plažu, zatvoreni bazen sa toplom vodom, otvoreni bazen za decu, saunu, kongresnu i koncertnu dvoranu, piceriju, pivnicu, kuglanu, frizerski salon, ambulantu, više butika, diskoteku. Opremljen je sistemom klimatizacije.

Kapaciteti su rezervisani od 19. do 23. septembra 2003.
Cene dnevnog smeštaja sa polu pansionom po osobi u Hotelu **"Plaža"** su u:

- Jednokrevetnoj sobi **30,- EUR**
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Rezervacija i prodaja soba vrši se kod turističke agencije: "SKY PASS" - Beograd (tel: 011/324-8437, 011/322-8640, 011/334-5600; fax: 011/324-8891 i e-mail: skypass@eunet.yu).

Svečana večera i izleti:

Organizatori su pripremili za učesnike konferencije:

- ❖ Svečanu večeru sa muzičkim programom
  - cena za učesnike koji su smešteni u hotelu "Plaža" po osobi je **15,- EUR**
  - cena za učesnike koji nisu smešteni u hotelu "Plaža" po osobi je **20,- EUR**
- ❖ Izlete za:
  - Kotor (izlet autobusom) **8,- EUR**
  - Peraške otoke (izlet brodom) **10,- EUR**

Prodaja vaučera za svečanu večeru i izlete vrši se kod turističke agencije: "SKY PASS" – Beograd.

Currency

All payments in the Serbia are in Serbian dinar. Exchange rate depends on current exchange rate. On 30 July the following rates could be gained: for 1 EUR approx. 66 din, for 1 USD approx. 59 din.
All payments in the Montenegro are in EUR and USD.

Herceg Novi
RaDMI 2003
Serbia and Montenegro

3rd International Conference
"Research and development in mechanical industry"
RaDMI 2003
19 - 23. September 2003, Herceg Novi, Serbia and Montenegro

VARIOUS ASPECTS OF COMPUTER APPLICATIONS IN FLUID POWER

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Abstract: Over the last decade fluid power was exposed to strong competition from other means of transmitting power (electrical and mechanical). To retain current position in the market, fluid power technology must use its specific advantages and to utilize advantages of other technologies. One of these technologies is associated with computer application. This paper shows how computers are today applied in fluid power technology. They are used in control and data analysis, design & modelling of components and systems, and even marketing & e-commerce. With computer applications the future of fluid power technology is magnificent.

Keywords: *fluid power, computers, control,* ***design & modelling, marketing & e-commerce***

1. INTRODUCTION

The expression *fluid power* may be used to describe any process, device, or system that converts, distributes, or controls power through the use of a pressurized liquid or gas [1]. In the present days fluid power industry has relatively substantial and stable position in the world market. USA, as the one of the richest and the most prosperous economies in the world, is a global leader in manufacturing and selling of the fluid power products (over the 40 %). In USA alone, sales of fluid power equipment grew from a meagre $ 1 million at the end of World War II to over $ 12 billion in 2000 [1], [2]. The fluid power industry had two remarkable periods of growth in the last 20 years. The average annual growth rate between 1987 and 1990 was 9.5%. Between 1993 and 1995, annual growth averaged 11.7%. These high rates resulted primarily from growth in existing markets, but the introduction of electrohydraulic and electropneumatic technologies opened up new markets, such as active suspensions on automobiles, and re-established the industry in older markets, such as robotics, that had been lost to exclusively electronic technology in the early 1980s. Similar trends can be noticed in other developed countries.

In the beginning of this century, fluid power must achieve some goals in order to ensure its continued progress and growth, preserve current position in the market and compete efficiently with other energy transfer technologies (mechanical and, especially, electrical). These goals can be categorized in seven areas of activities as follows:

- Energy Conservation,
- Leakage Control,
- Fluid Stability Control,
- Proactive Maintenance,
- Contamination Control,
- Microcomputer Control,
- Computer Aided Engineering [3].

In a specific way, all these activities imply computer application, and the last two directly include computers in their performance. So, in the next chapters of this text, some examples of computer applications in contemporary fluid power technology will be discussed.

2. MICROCOMPUTERS IN CONTROL AND IN DATA ANALYSIS

One of the most magnificent contributions of microcomputer's applications in fluid power technology is the opportunity it offers to implement sophisticated control and data analysis algorithms on the computer.

Since the latest 1940's, fluid power researchers have tried to create technology that should integrate the electronic "brain" with fluid power "muscles". In order to achieve this task different control strategies were developed and implemented in fluid power system [3] (Fig 1.). As can be seen in this figure, control strategy trends reveal that the open loop control system is rapidly giving way to the many types of closed loop control. The use of PID control has begun to decline, as is the optimal control strategy. The new sophisticated control system follows the adaptive and advanced expert knowledge strategy based on fuzzy logic, neural nets and genetic algorithms [4]. The trend to a smarter and more responsive control strategy will continue long into the future.

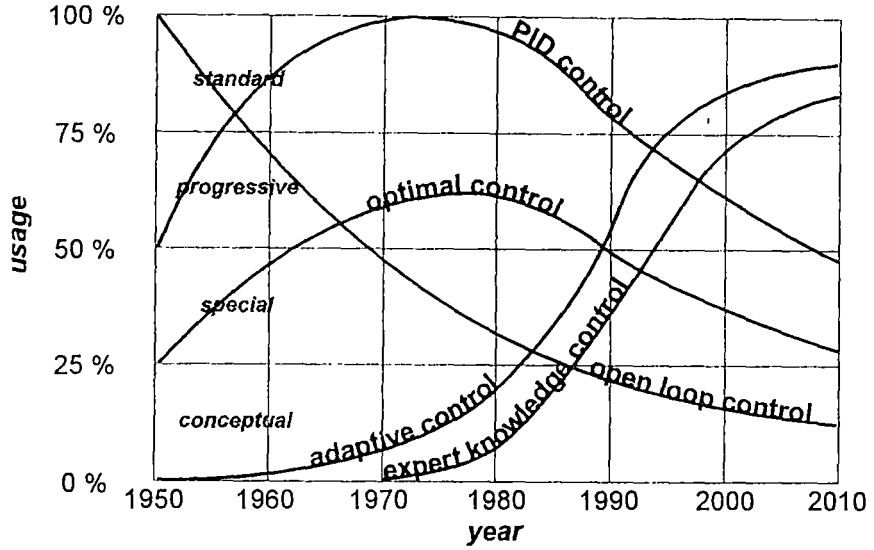

Figure 1 Control strategy trends

There are a lot of examples of application of new-sophisticated fluid power control systems. Here are briefly specified some of them: for knowledge based systems – intelligent control of mechatronic fluid power systems [4], for neural nets – position control system using servovalve controlled cylinder and a neural network in the feedback loop [5], [6], for fuzzy logic – application of fuzzy logic controller to control proportional valve in the hydraulic luffing system of the self-propelled crane jib [7], application of fuzzy logic controller to control servovalve in hydraulic pressure control system for rolling mill [8], for new neuro-fuzzy - paper [9], and many more others. It also should be mentioned that these artificial intelligence control techniques are still not robust enough to provide the required level of safety, thus there are not many implementations of these control techniques in industrial applications in which the safety is critical.

The use of microcomputers for data acquisition has been overwhelming in most fluid power laboratories. The major function of the microcomputer tends to be nothing but a monitor for multiple sensors and a data logger. Very popular software for such purpose is LabView. The current trend is in extending microcomputers use to do diagnosis and troubleshooting which are parts of real time condition control. The kernel of diagnosis and troubleshooting is to have an inference engine, which can analyse and interpret data acquired from the system. Researchers are concentrating on the development of an inference engine, which combines the analytical models, statistical data and/or expert opinions. The direction is advancing from a deterministic decision making process to an experimental/statistical forecasting approach and now to more realistic knowledge based failure prediction technology. The increasing amount of commercial software available for aiding in maintenance management is a major trend and is needed in this area. It has been found that the use of neural network principles for sensing and interpreting non-definable parameters along with fuzzy logic for processing expert knowledge is an important new trend offering great promise [10].

3. PERSONAL COMPUTERS IN DESIGN

Two different design approaches in fluid power technology are distinguished. The first is associated to design of fluid power components and the second to design of fluid power systems. Although these two design approaches are basically different they are strongly correlated.

3.1. FLUID POWER COMPONENT DESIGN

For a simple component, the designer may be able to accomplish this task using a trial and error approach or his experience. However, if it is a relatively complex one such as pump, compressor, motor, cylinder, etc., the task becomes more difficult. To tackle today's highly demanding applications the engineer must have more powerful tools. It is totally unacceptable from a cost standpoint to permit the design factors of a hydraulic component to be estimated and then fabricate the component to see if it works. The best tool available is the personal computer with an effective software packages.

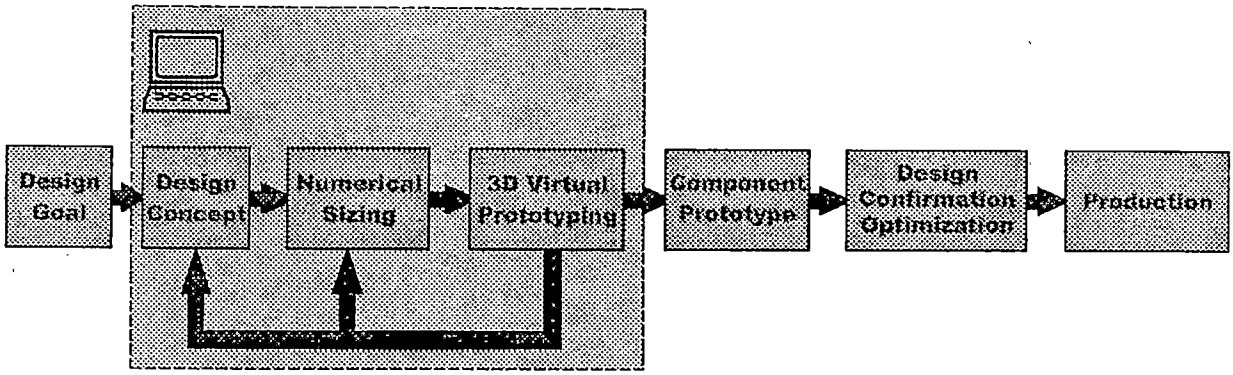

Figure 2. Fluid Power Component Design Process

A contemporary approach to computer-aided design of fluid power component should pursue procedure of 3D virtual prototyping shown in Fig. 2. Using the parameters defined in design goal, component designer choose design concept and implement fluid power design principles onto the PC, in order to develop appropriate numerical model for calculating component dimensions. She/he writes original software using one of common program languages (C, C++, Fortran, Visual Basic, Pascal, Java, etc.) or uses a design software package (like MathCAD, Maple, Mathematica, etc. or even spreadsheet program like Microsoft Excel). Results of numerical sizing calculations are often exported to external database file which format is recognizable by some CAD software, such as (CATIA, Solid Works, Mechanical Desktop, Inventor, PRO/Engineer, etc.). Previously, design engineer drew parametric 3D presentation of designed fluid power component in CAD software. The software interprets data of numerical calculation and then generates 3D virtual prototype of fluid power component. It is easy to obtain complete design documentation from this virtual prototype or even complete technological procedure for manufacturing segments or even whole component. Results of 3D virtual prototyping performed at Department of Energetic and process engineering - Faculty of Mechanical Engineering Kragujevac, for several fluid power components are shown in the picture 3. Correct virtual prototype enables manufacturer to construct physical component prototype that can go to production, after the positive evaluation period through laboratory tests.

Application of CFD (Computational Fluid Dynamics) method can significantly improve component design because it creates possibilities for extensive exploration. It offers the effortless, but also inexpensive way of estimation and examination of relevant flow performance of an arbitrary fluid power component. It eliminates the requirement for expensive experiments that often have uncertain results. With systematic interpretation of CFD results, we obtain more precise values of parameters that we use in the component design. Many commercial software for CFD exists on the market and the most predominant are Fluent, Star-CD, CFX, Phoenix, etc. Examples of CFD applications in fluid power are numerous and some of them can be found in references [11] – [15].

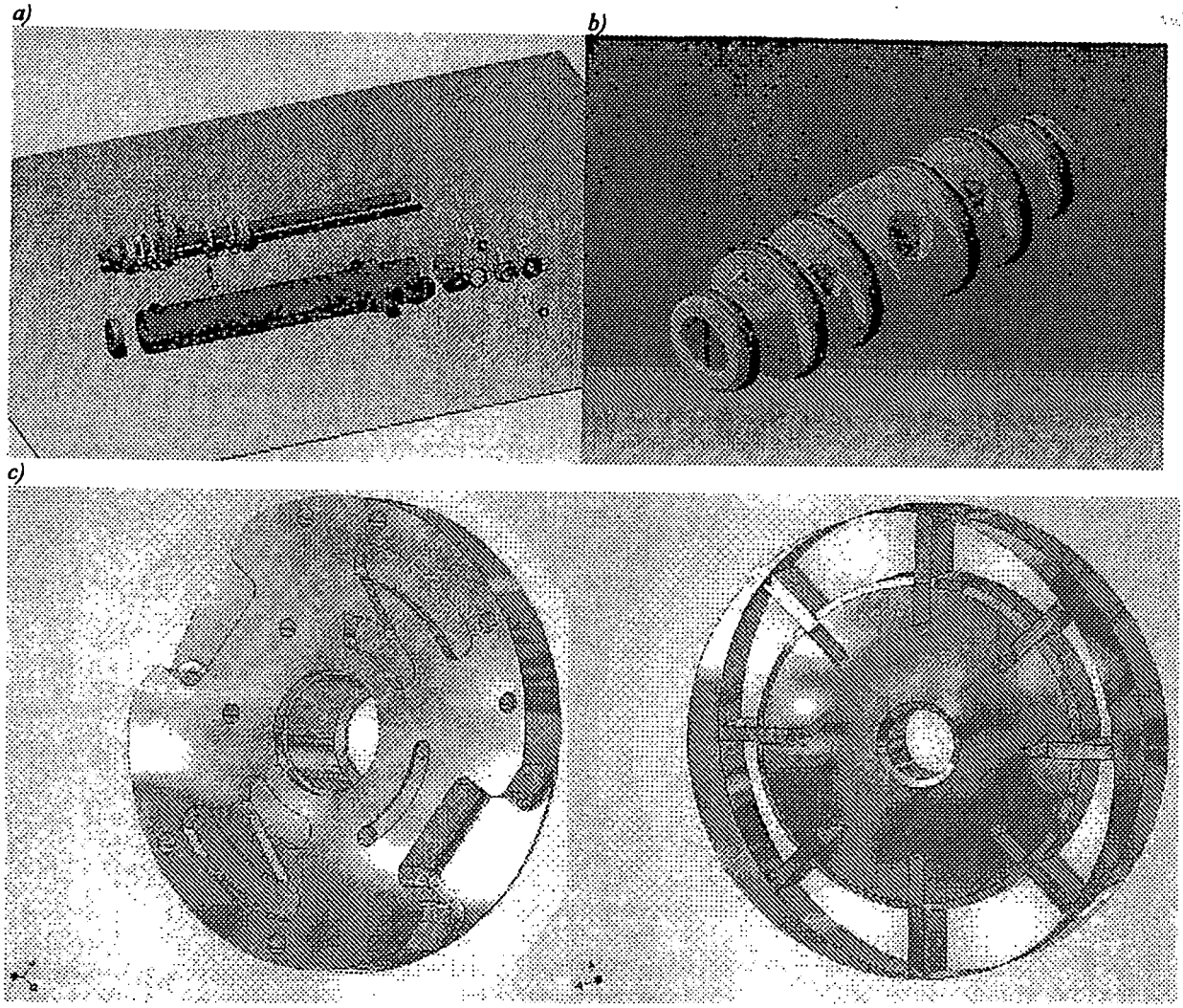

Figure 3. Examples of 3D virtual prototyping performed with different CAD software
a) disassembled pneumatic cylinder – Mechanical Desktop,
b) spool and sleeve – CATIA, c) parts of vane pump - Inventor

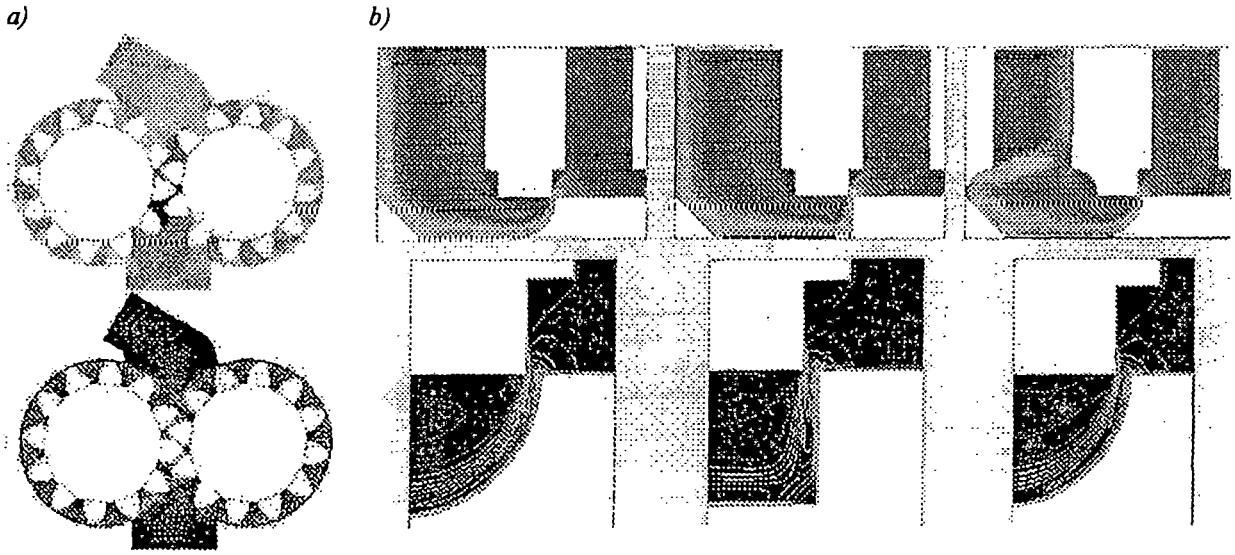

Figure 4. Examples of CFD application in fluid power - Fluent
a) simulation of fluid flow in external gear pump [11],
b) velocity distribution in different compensated spool valves [12]

3.2. FLUID POWER SYSTEM DESIGN

The generalized fluid power system design process is illustrated in Fig. 5 [16]. From the design goals, the design concept to be integrated into the fluid power system must be established and a system schematic must be developed along with the operational specifications for the system. Once these tasks are completed, the designer will enter into the component sizing and selection process. One of the interesting characteristics of fluid power technology is the common belief that it is "easy" and hence one does not need to be a specialist to apply it. Thus anyone with an elementary knowledge of mechanical engineering feels that she/he can design and build a system using off the shelf components selected from catalogues provided by manufacturers and only some elementary calculations of powers, flows and pressures. In most cases simple system, designed this way, will perform in some fashion, not necessarily optimally. In the past when the sizing and selection phase was completed, the components would be purchased and a prototype system constructed. The system performance was not simulated and the success of a particular system was mainly a result of the experience of the designer and luck. The actual performance characteristics were evaluated through laboratory and field tests using the system prototype. Optimisation was a function of a process, which was normally called "cut and try".

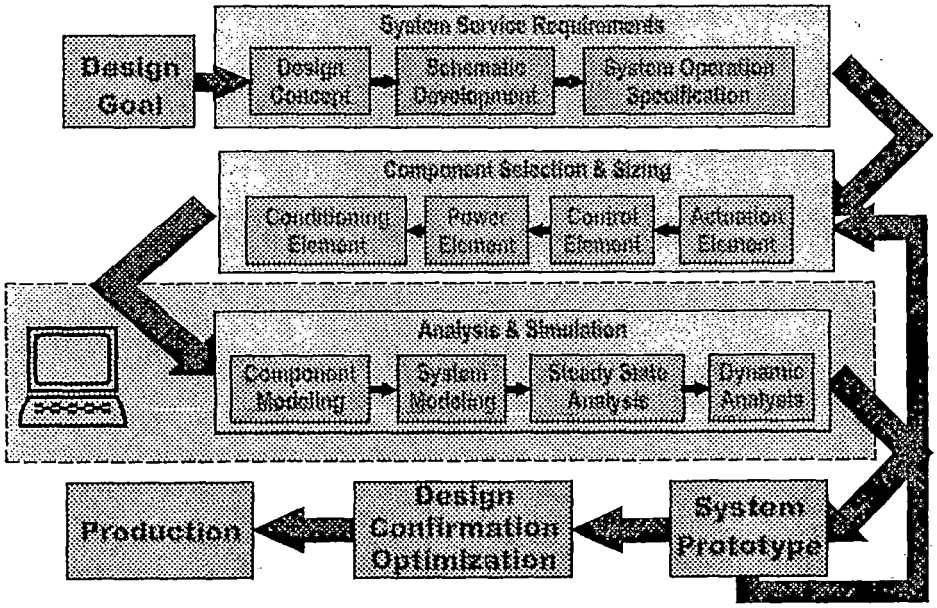

Figure 5. Fluid Power System Design Process

The engineering world has long known that the analysis and simulation phase of fluid power system development is very important in producing a successful fluid power system with minimum time and cost. To tackle this, at present time, highly demanding phase, engineer must have powerful tools. It is totally unacceptable from a cost standpoint to permit the design factors of a fluid power system to be estimated and then fabricate the system to see if it works. The best tool available, and one which is becoming more useful every day, is personal computer. Digital computer analysis and simulation of fluid power systems is now widely used and accepted as a desirable, and sometime essential, element of the design stage of major fluid power project. Design engineer, with access to a personal computer, may adopt one of three possible strategies, when considering its application to numerical analysis and simulation [17].

The first procedure treats the mathematical equations that describe the behaviour of the fluid power system as any other system of differential equations (for dynamic analysis) i.e. algebraic equations (for stationary analysis). This system of equations is being numerically solved using any of the established numerical methods by writing the software code in one of the already mentioned programming languages. Although there are relatively lots of public or commercial libraries with FORTRAN/C codes for solving differential/algebraic equations (public: GELTA, ATOMFT, Deuflhard's Fortran codes, Netlib, etc, and commercial: IMSL, NAG, Numerical Recipes, etc. [18]), an fluid power engineer must be mathematical "genius" and computer expert to accomplish this task due to high inherent nonlinearities in components (especially in valves), and hence in systems. One more fact that goes against this procedure is that the written computer program may be of limited use with respect to other simulations of the system that may appear. It also demands more time but less financial resources to solve the problem comparing to other procedures.

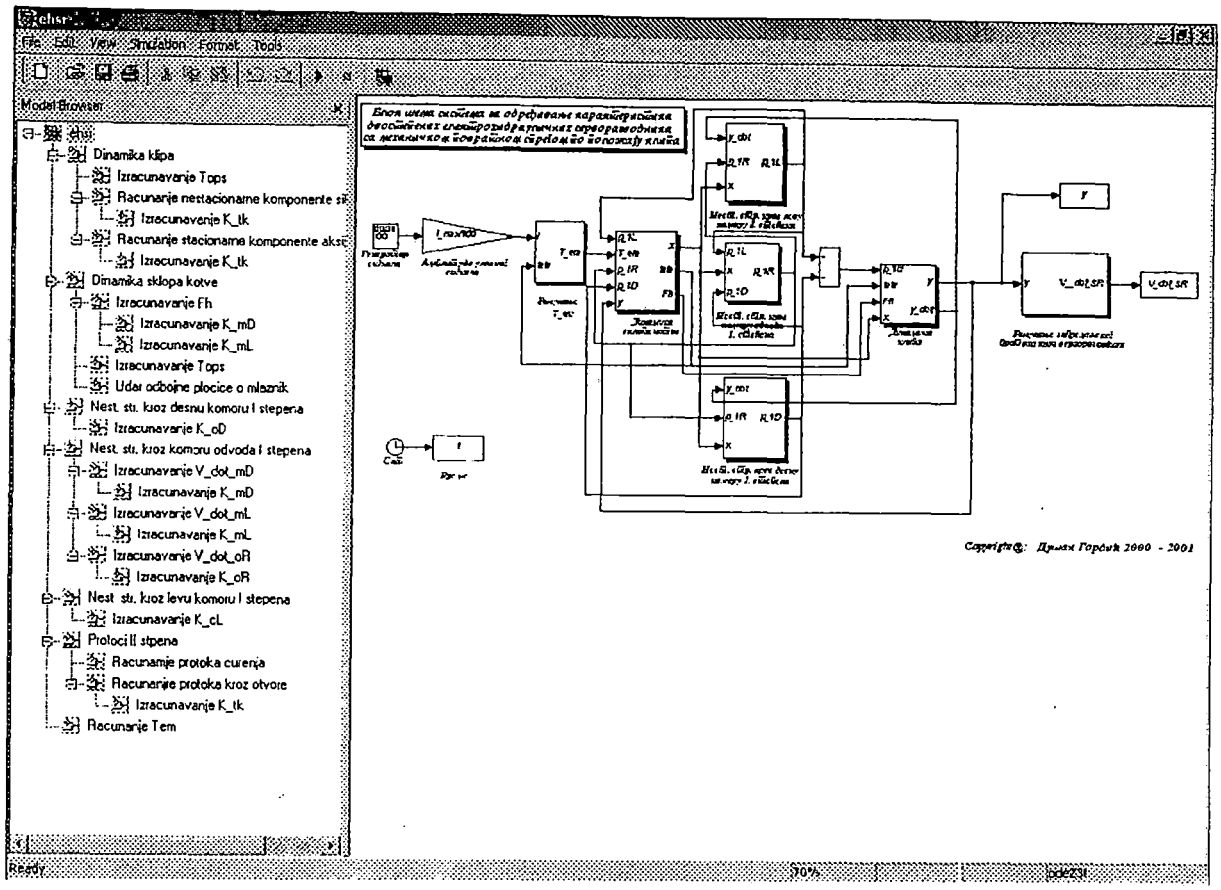

Figure 6. SIMULINK model of electrohydraulic servovalve [22]

The second approach considers the use of any of standard simulation packages easily adaptable to fluid power application. At the Fluid Power Net web cite [19], it can be found about twenty general-purpose packages for modelling the behaviour of fluid power components and systems. The most prevalent are: MATLAB with SIMULINK, ASCL, VisSim, 20-Sim, BuildSim, MATRIXx, MathModelica, etc. These packages are very flexible, simple and they do not demand big time consumption for model development. Many of these packages have optional (commercial and non-commercial) fluid power oriented toolboxes, like Hydraulic Block Set Toolbox for MATLAB [20] and HyLib for Modelica [21]. In addition, these packages have the ability to simulate operation of artificial intelligence (AI) controls like fuzzy logic, neural nets, etc., and can be used in hardware-in-loop applications. A very important feature of some of these packages (like VisSim) is that we can develop a control system by simulation, and after translating the code into C++ language embed it on a chip [4].

From 1984 until today MATLAB has evolved into an interactive system and programming language for general scientific and technical computation and visualization, and became one of the most popular general-purpose package in higher education as well as industry. According to its producer - The Mathworks, MATLAB has more than 500.000 users today and is used in a wide variety of industrial areas, making it a first choice tool for many engineering problems. The MATLAB's features include [20]:

- Numerical computation routines for calculations with scalars, vectors and matrices,
- Routings for solving ordinary differential equations numerically,
- 2D and 3D Graphic routines for data visualization,
- Interactive language and programming environ-mint,
- Tools for building custom GUIs,
- Interface to external languages, like C, Fortran and Java (allows also interaction with e.g. multi-body-simulation environments like ADAMS),
- Support for data acquisition and real time control via external toolboxes.

MATLAB includes hundreds of built-in-functions and several tenths of toolboxes of functions for specific purposes. The most significant toolbox is SIMULINK for the simulation of linear and nonlinear dynamic systems. SIMULINK is a graphical, inter-active program that allows dynamic systems of almost any kind to be modelled by simply drawing a block diagram on the screen. It can handle linear, nonlinear, continuous-time, discrete-time and multivariable systems as well as hybrid systems and conditionally execution. The user has the

choice of different integration methods, optimised for different kinds of problems, e.g. stiff systems. SIMULINK is a very powerful tool to model even large-scaled systems for dynamic simulations. Complex simulation models, like complete aircraft hydraulic systems, including actuators, aerodynamic forces and controllers or other hydraulic systems found in mobile machines, excavator, wheel loaders etc. can be simulated at very reasonable effort and simulation time. The obvious example is modelling of dynamic of the one of the most complex and highly nonlinear standard fluid power component - electrohydraulic servovalve – Fig. 6. [22]

The third procedure involves the use of general hydraulic simulation packages. More then thirty general hydraulic simulation packages can be found at the market [19], such as: BathFP, DSHPlus [23], AMESim, HyPneu [16], Flowmaster, Hopsan, HydroAnalyst, ITI Sym, PneuCAD [24]. The foundation of the analysis approach used in the most of these packages is visual modelling that relies upon the fact that all components are composed of several basic elements (e.g., mass, damper, spring, friction, orifices, etc.). These software packages include a large number of so called generic components stored in component libraries for use in any number of hydraulic/pneumatic systems. The component library in program contains all of the basic elements of design in the form of icons, models, and data sheets. Special components, which are manufactured for unique applications, can be modelled and put into the component library, but there is no such flexibility as in general-purpose packages. The user simply joins the correct icons together to form a complete system. A hydraulic system is composed of interacting elements and components. Therefore, once the element and component models are developed, the system model becomes a mathematical description of the way these elements and components interact. Examples of these packages are shown in Fig 7. They do not demand high mathematical and computer knowledge from design engineers to be applied in fluid power system design. They are relatively expensive and require many years and effort in their development.

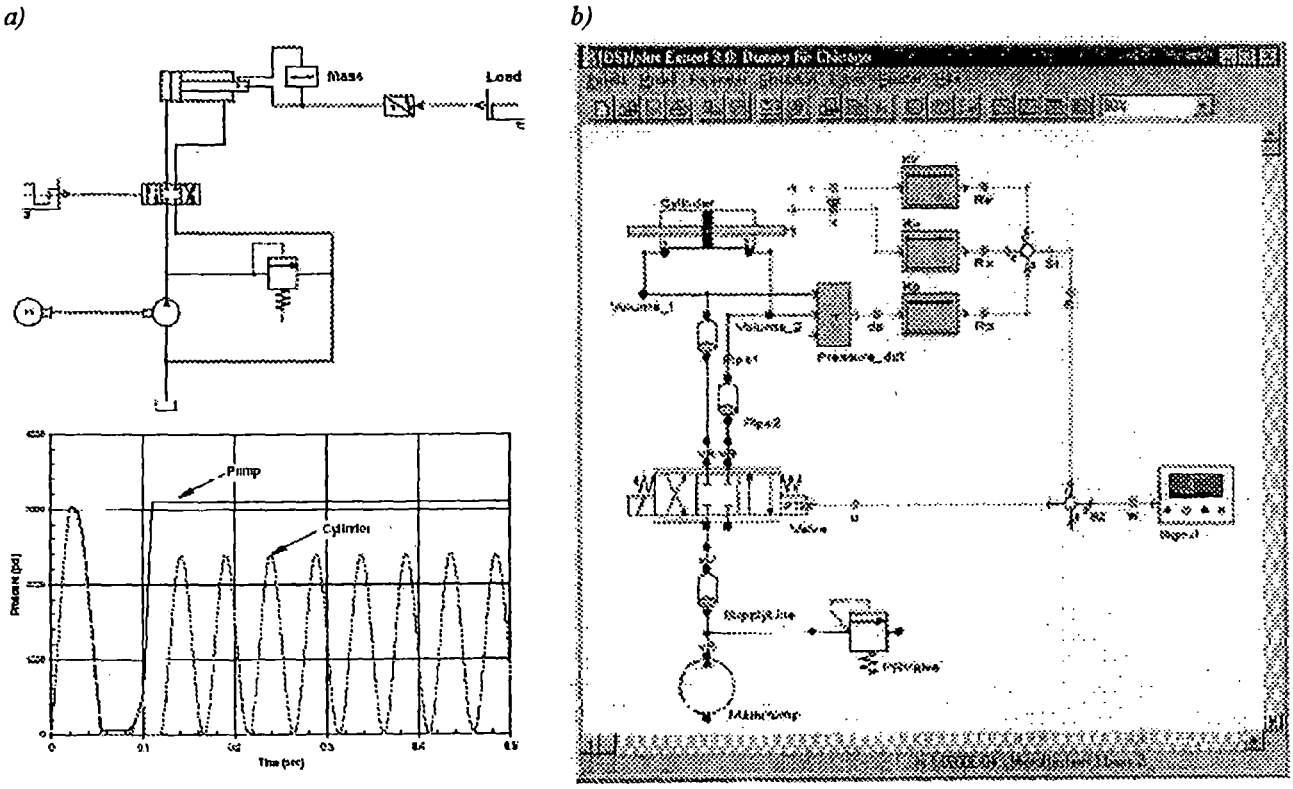

Figure 7. Simple cylinder control system modelled:
a) in HyPneu, with modelling results [16], b) in DSHplus [23]

4. COMPUTERS IN MARKETING AND E-COMMERCE

The basic aim of every manufacturer is to give the proper and useful information to the potential customer about his products in order to incite him to buy his goods. The Internet, who evolved into global business application, is ideal medium for such an action. It provides a direct link from the end user to the manufacturer with access to important product information 24 hours a day, 365 days a year, worldwide.

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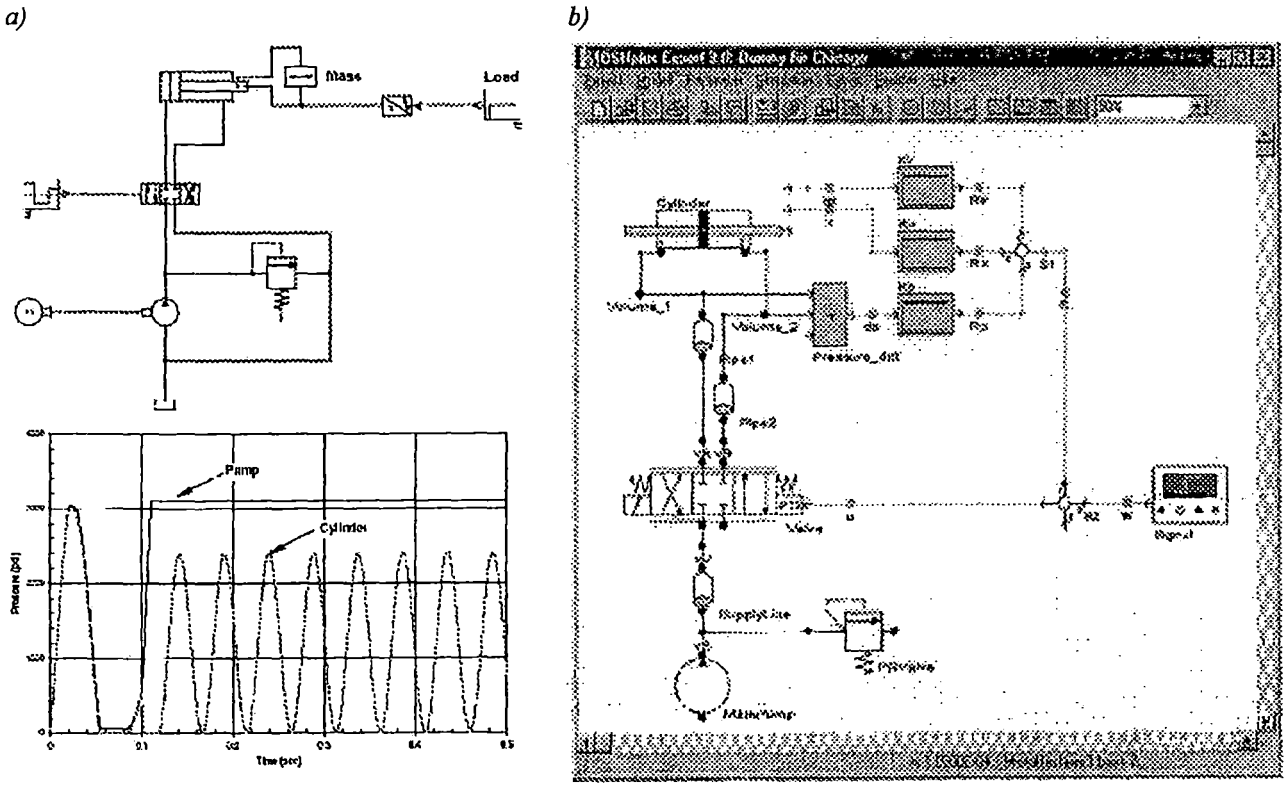

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included in the request contains the product model number, the window sticker (Fig. 10), (a break down of the model number into the listed components including options and accessories) and a copy of the CAD file drawings.

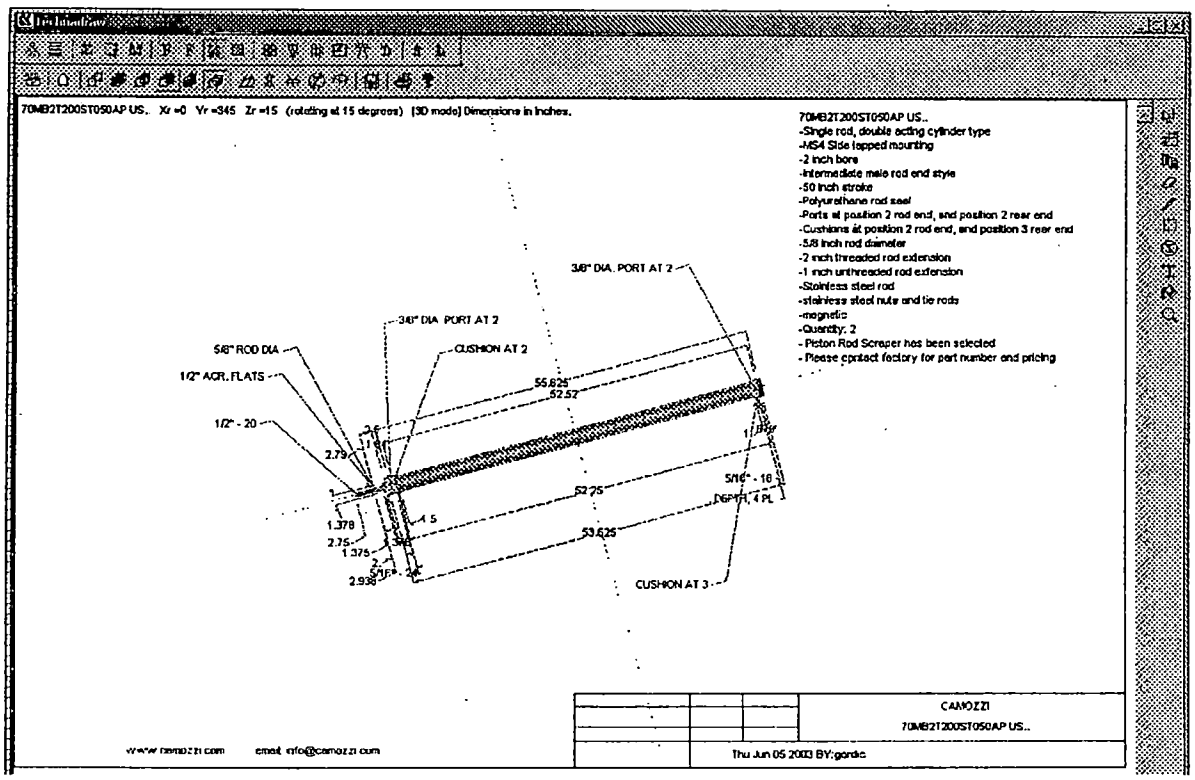

Figure 10 On-line CAD engine - Technodraw

5. CONCLUSION

In order to prevail over existing concurrency from other technologies for power transfer and control, fluid power must make full use of its specific advantages and to utilize other technologies that can improve its characteristics. One of this is computer technology. This paper gives the insight in few different aspects of present computer applications in fluid power technology (for control, design & modelling, marketing & e-commerce). Enhancement of computer literacy in the world of fluid power engineers associated with further improvement in computer technology will improve current applications and promote non-standard applications such as internet – enabled virtual prototyping [27], concurrent engineering design [28], artificial intelligence control etc. With computer applications the perspective of fluid power technology is glorious.

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