



ANALYSES OFFERED TO IMPROVE CORPORATE PROCESSES

- Customer analysis (by company management) of the respective corporate process in terms of subject matter, time, cost, quality, personnel requirements, and follow-up proposal for changes to the process to improve it
- Analysis of corporate logistics processes in order to improve them
- Designing grinding wheels for specific materials and requested surface quality. Analysis of changes in surface layers under loading
- Solutions to technological problems and technology optimization in the field of processing aluminium materials
- Research, solutions to problems and property optimization of aluminium materials in melting, casting, forming, cutting, corrosion properties and material surface protection
- Optimization of grinding, design of cutting conditions, testing of cutting liquids for grinding
- Research, evaluation and optimization of heating processes in aluminium materials

GENERAL COURSES

- Basics in CNC programming and CAM technology
- Training in handling dangerous chemical substances and preparations
- Basic legal regulations for metrology
- Business English (focused on technology)
- Communication Theory and Practice
- CAD software SOLIDWORKS
- CAD software CATIA

COURSES FOCUSED ON MATERIALS AND TECHNOLOGY

- Metallography and fractography – instruments for resolving problems in production and technology
- Qualitative and quantitative methods for the evaluation of structures of Al materials
- Aluminium and its alloys – properties, use and technology
- New technologies and trends in materials
- Practical material testing
- Technical materials
- Technical chemistry
- Foundry technology
- Metalworking
- New information on metalworking
- Grinding

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**SCIENCE AND TECHNOLOGY PARK
ÚSTÍ NAD LABEM**
ADVANCED TECHNOLOGY, MATERIALS AND DESIGN PARK

ACTIVITIES OFFERED BY STP

ANALYSES, TESTING, MEASUREMENT

NON-DESTRUCTIVE MEASUREMENT

Determination of surface profile, geometric tolerances generated in production, establishment of defects in materials, control of difficult-to-access areas, monitoring of high-speed processes, determination of corrosion resistance, control of coating layer and surface layer thickness after material treatment

- Measurement of surface roughness parameters
- Roundness
- Thermovision measurement
- Ultrasound measurement
- Measurement by videoscope, digital macro-recordings
- Option of high-speed recording using a high-speed camera (150,000 fps)
- Detection of surface defects using a capillary test
- Evaluation of corrosion attack – quantification (depth of attack, depth after corrosion, etc.), testing in corrosion test chamber with result evaluation, material resistance testing for intergranular corrosion, etc.
- Precise metallographic measurement of thickness of surface layers - coatings, elox layer, passive layers, metallic coatings, measurement of nitride and cement layer, etc.
- Total evaluation of macro- and microstructure – grain size, recrystallization, size of dendritic cells, metallurgical quality of material, porosity, inclusions, quantitative measurement of individual structural components using image analysis in 2D and 3D, etc.
- Fractographic analysis of fractured surfaces, EDX and material analyses
- External analysis of chemical components in materials – portable spectrometer
- Gas compound composition, determination of gases

High-tech equipment:

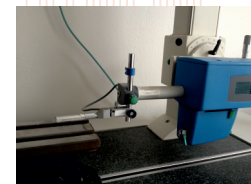
- Electron microscope
- Agilent 7820 gas chromatograph
- Q4 Tasman spectrometer
- Handheld ED-XRF spectrometer
- Universal testing machine (tearing machine) Inspekt 100 kN, etc.

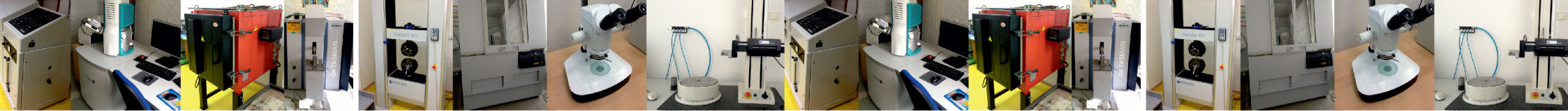
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DESTRUCTIVE MEASUREMENT

Determination of mechanical properties of materials, residual stress in materials, determination of chemical composition in input and output materials from production

- Strength Rm, yield stress Rp, Elongation A, Contraction Z and others
- Brinell, Vickers, Knoop and Rockwell hardness, measurement of micro-hardness
- Residual stress measurement
- Testing of physical parameters of textile carcass conveyors
- Measurement of material chemical composition (Cu alloys, Al and steel alloys)
- Determination of substance content in solid materials and liquids

SPECIAL TESTS

- Fluidity testing
- Alloying, inoculation, modifying, melting process yield, metallurgical purity, etc.
- Measurement of cutting stiffness of rail sole-plate
- Quantitative measurement of individual structural components using image analysis (size and number of intermetallic phases, % porosity, size of inclusions)
- Thermodynamic analysis
- Testing of character and shape of chips
- Determination of soft and medium-hard material hardness (rubber, resin)
- Identification of gas composition in evaporation and remelting, composition of organic compounds, volatile substances

CHEMICAL TESTS

- Chemical etching of metals and alloys for monitoring of micro- and macro-structures
- Electrolytic etching of Al alloys
- Electropolishing of various metal surfaces
- Determination of conductivity
- pH determination
- Determination of dissolved oxygen
- Spectrophotometric determination of iron
- Spectrophotometric determination of copper
- Spectrophotometric determination of manganese
- Determination of hydrogen peroxide
- Determination of ammonium chloride in aqueous solution
- Determination of copper in aqueous solutions and metal materials
- Determination of acid number in diesel oil
- Spectrophotometric determination of ammonium ions
- Preparation of solutions with precise concentrations, buffer solutions and agents

MANAGEMENT AND BUSINESS ADMINISTRATION COURSES

- Setting off on the entrepreneurial journey
- Economic minimum for non-accountants
- Marketing
- Production supervisor – production manager
- Productivity and how to increase it
- Introduction to corporate logistics – basic tasks of a logistician
- Personnel and competitiveness of an organisation

COURSES TO ENCOURAGE STUDYING AT UNIVERSITY

- Technical Physics I
- Mathematics

CONTRACTUAL RESEARCH

DEPARTMENT OF TECHNOLOGY AND MATERIAL ENGINEERING

- Development of new materials and alloys
- Surface treatment using nanotechnologies
- Studying stress-deformation states in materials under static or dynamic stress using evaluation of surface structures after working
- Studying mechanical properties of metallic and non-metallic materials
- Analysis of process development impacts on surface properties in grinding
- Process liquid impacts and reducing them in grinding
- Research into grinding of ceramic materials
- Relation between surface integrity and process conditions and its meaning in dynamic stress

DEPARTMENT OF MACHINERY AND MECHANICS

- Dynamic analysis and optimization of passive and semi-active systems of vehicle suspension (rail and road vehicles) and machinery
- Mathematic modelling of mechatronic systems
- Gas , liquid flow
- Heat transfer
- Mathematic modelling and prediction of heat energy consumption

DEPARTMENT OF ECONOMICS AND ENTERPRISE MANAGEMENT

- Customer analysis (by the company management) of the specific corporate process in terms of the subject matter, time, cost, quality, personnel requirements, and subsequent proposal for changes to the process in order to improve it
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