Tempus Project University of Kragujevac
WBCVMnet
WBC Virtual Manufacturing Network
Fostering an Integration of the Knowledge Triangle

Steering Committee meeting

7th October 2010, Rijeka

WBC-VMnet Project

Partner presentation

Živko Babić, University of Banja Luka

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Outline

- Overall achievements, project implementation timeframe, obstacles and shortcomings
- Key project results, per Outcomes
- Workshop topics (Kragujevac, Rijeka, Podgorica) and presenters
- Proposals for vocational training schedule
- Proposals for PPP implementation (at EU and WBC)
- Proposals for IFP implementation
- Conclusions

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Overall achievements

At the University of Banja Luka the following results were achieved, in accordance with the requirements of the project:

- continued process of setting up, equipping and establishing of Collaborative Training Center Banja Luka

- particular activities in procurement of software for 3D simulation

- trainings for CTC staff in Serbia, Slovenia, Denmark and Italy

- Bring new VMnet members

- Motivational seminar "Join and Benefit" successfully completed

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- Info day about project results and about the proposed model of cooperation "WBC Regional model of university enterprise cooperation" successfully completed
- PPP programme structure completed
- development of course syllabus

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Obstacles and shortcomings

- Basically the same obstacles and shortcomings that were previously presented
- For example: procedures for the procurement of software for 3D simulation lasted more than six months
- Reconstruction of the building of Mechanical Engineering lasts from June to October 2010 (noise, dust, disturbing while working)

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Key project results, per Outcomes

In the period from April 2010 to September 2010:

OUTCOME 1: Collaborative Training Center Banja Luka (CTC) is established...

- The process of public procurement of software for 2D/3D FE bulk metal forming simulation is finished

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Trainings for CTC staff:

- In Serbia (from 24th to 28th May 2010)

Titles of training:

- Training for the use of CMM machine Werth VC-IP 250 3D CNC and Win Werth software
- Integration of virtual engineering technology
- Control and calibration of CNC machines by using of Renishaw QC10 ballbar device
- Industrial tour – SCGM, Kragujevac, Multicomponent plastic injection, practical demonstration of CNC machine testing
- Rapid prototyping
- Training for the use of RP 3D Printer ALARIS 30 and Objet Studio software
- Industrial tour – UNIOR Formingtools, Kragujevac, design and development of tools for sheet metal, steping tools
- Virtual production, training for FV modeling and simulation of production processes in Simufact.forming software
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- **In <u>Slovenia</u>** (from 7th to 11th June 2010)

Titles of training:

Introduction to FEM
Symbolic approach to FEM
Microstructural changes
Industrial tour – IMPOL
Industrial tour - TIC-LENS
Microscopy (SEM, optical)
Superplastic Al alloys

- **In <u>Denmark</u>** (from 30th August to 3rd September 2010)

Titles of training:

Metrology (dimensional)
Demo and workshop activity
Laser
Metrology (surface characterisation)
Heat transfer coefficient
Tribology
Microforming
Rapid prototyping

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- In Italy (from 13th to 17th September 2010)

Titles of training:

Metrology
Visit to Geometrical and industrial metrology lab
Reverse engineering and Rapid prototyping
Visit to Net-Shape forming laboratory
Concurrent engineering
Sheet metal forming tribolog
Micro and precision manufacturing
Injection molding

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OUTCOME 2: VMnet network is enlarged throughout the WBC region...

- Result: more new VMnet members

OUTCOME 3: Model for university-enterprise cooperation

- Completed public hearing and given comments on the draft version of the brochure **WBC Regional model of university enterprise cooperation**
- Performed the distribution of final versions of the local environment
- Distributed printed brochures

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OUTCOME 5: Programme of vocational training, industrial fellowship and student practical placement developed...

Practical Placement Programme (PPP) structure completed
- completed in English and local languages
- presented at the Faculty and University

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Development of course syllabus

Two courses developed:

- CAD modeling using Solid Works
- NC programming and basics of CAM modeling

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Name	CAD modeling using Solid Works
Code	CTC-BL-01
ECTS	4
Location	KTC Banja Luka, University of Bana Luca Faculty of Mechanical Engineers, Stepe Stepanovica 71, 78000 Banja Luka, BIH
Trainers	PhD Zivko Babic, Assistant Branislav Sredanovic
Purpose	New market demands in terms of pricing and product quality call for the implementation of more efficient ways to design products and tools, which includes the implementation of new CAD technology, modeling and FE simulation. Modeling and analysis of structures using the software is tested way to increase the efficiency of design and improve the quality of the finished product. Participants of this training will have the opportunity to learn and train for using of innovative CAD technology in product development.
Recommended entry level	At least IV level of professional qualification, mechanical engineering, or recommended VII level of professional qualification, mechanical engineering
Specials requires	Computer skills and and knowing roules of tehnical drawings
Duration	30 classes
General objectives	Attendents who acquire this training will be able to: • explain the importance of modeling in the design of products • use modern CAD software and modules for modeling • model complex mechanical parts and assemblies • analyze the work function of modeled machine components • automatically generate and manage technical documentation • use a module to simulate the load and optimize the product
Topics	1. Modules of modern programming systems for product modeling 2. Basics of the software SolidWorks 3. Basic commands of module PartDesign in SolidWorks 4. Advanced commands of module PartDesign in SolidWorks 5. Basic commands of module Assembly in SolidWorks 6. Advanced commands of module Assembly in SolidWorks 7. Basic commands of module Drawing in SolidWorks 8. Advanced commands of module Drawing SolidWorks 9. Application-oriented modules of software SolidWorks 10. Load simulation and optimization of structures by applying FEM
Specific learning	Topic 1: Modules of modern programming systems for product modeling — No. of classes: 1 Attendents will be able to: • list the modern software systems for products modeling and their modules • explain and list the advantages and disadvantages of the same • list the its capabilities Topic 2: Basics of the software SolidWorks — No. of classes: 1 Attendents will be able to: • know the basic terms used in the field of product modeling

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Name	NC programming and basics of CAM modeling
Code	CTC-BL-02
ECTS	4
Location	KTC Banja Luka, University in Banjaluka Faculty of Mechanical Engineering, Stepe Stepanovića 71, 78000 Banja Luka, B&H
Trainer/s	PhD. Gordana Lakić-Globočki, Assistants: Stevo Borojević and Branislav Sredanović
Purpose	Education of staff from economy for programming on NC and CNC machines through theoretical and practical training. Achieved knowledge will enable attendants to perform programming of manufacturing operations of turning, milling, drilling and machining of complex contours at work pieces.
Recommended entry level	Minimal IV level of professional classification e.g. mechanical technicians, VI and VII level of professional classification of mechanical engineering
Special requirements	
Duration	40 classes
General objectives	Attendants which overcome this training, will be in possibility to: • Precisely define instruction of machine movement, • Perform of tool compensation, • Independently programming cycles of turning, milling and drilling, • Accept knowledge about possibilities of CAM modeling
Topics	1. Introduction of NC programming; 2. Programming of NC machines; 3. Preparation for programming; 4. Instruction of movement 1; 5. Instruction of movement 2; 6. Instruction of movement 3; 7. Tool compensation; 8. Drilling cycles; 9. Milling cycles; 10. Turning cycles; 11. Possibilities of CAM modeling for turning/milling;
Specific learning outcomes in	Topic 1: Introduction of NC programming; — Nb. of classes: 2 Trainees should be able to: • Accept basic knowledge about CNC controlling

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OUTCOME 6: Dissemination

- Motivational seminar

- The third motivational seminar titled "Join and Benefit", was held on April 21th 2010, at the Faculty of Mechanical Engineering, University of Banja Luka with 39 participants

- On the motivational seminar the representatives from universities, businesses, local institutions, representatives of partner institutions in project and students were invited

- The goal of motivational seminar was introducing the aims of the project, the results achieved in the first year, and future activities that are expected full contribution to academic, regional and local institutions and business entities

- The results achieved with TSNA analysis, which included 19 enterprises and was carried out in cooperation with the Employment Agency were presented

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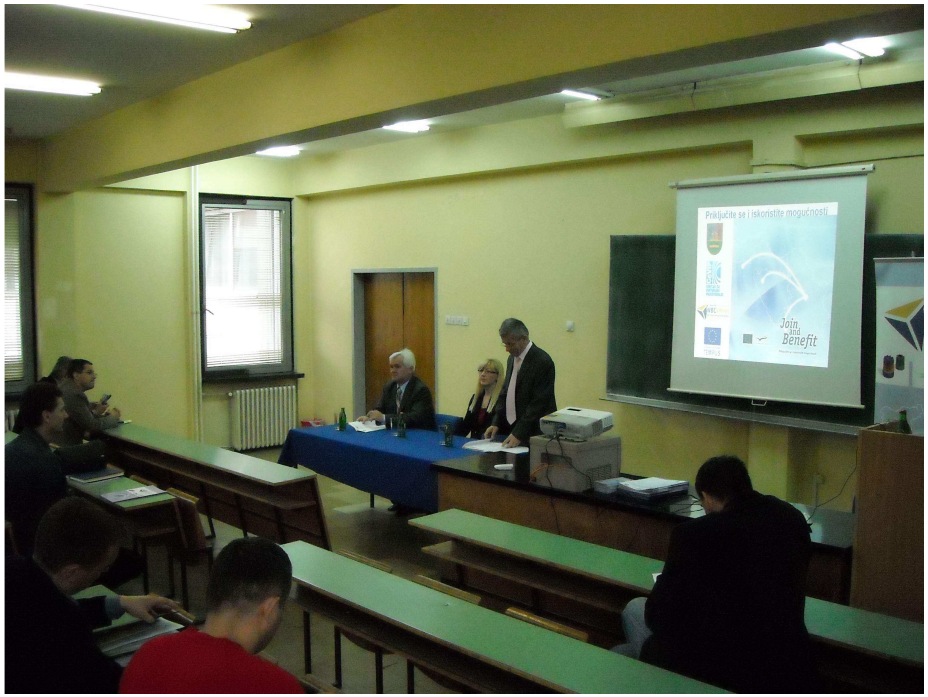

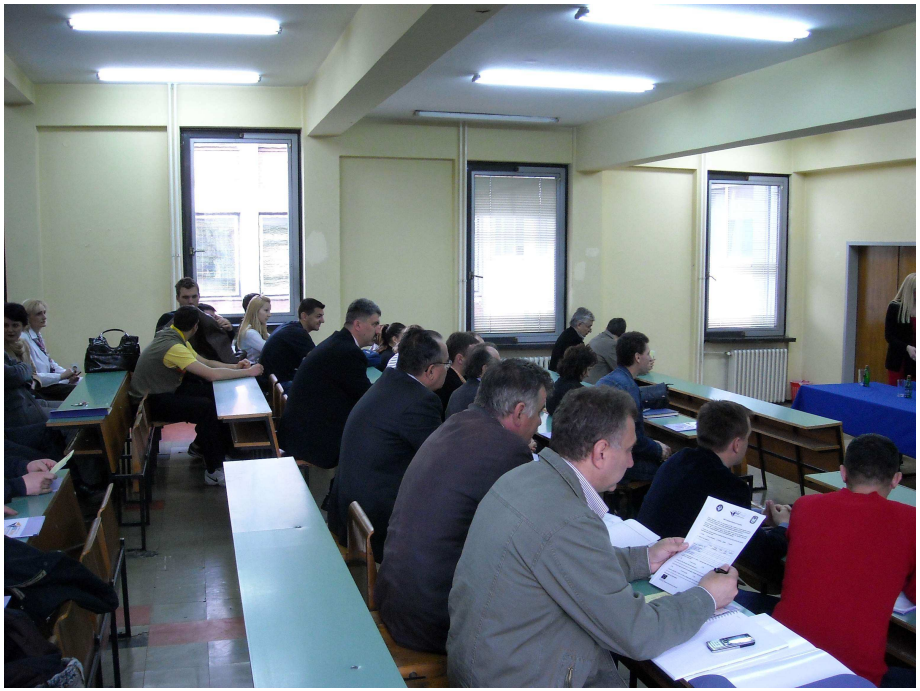

Pictures of the Motivational seminar

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- Info day

The third Info day within the Tempus project WBC-VMnet, was held on 18 May, 2010 at the Faculty of Mechanical Engineering in Banja Luka
Info day in Banja Luka was aimed at:

- The presentation the **results project** achieved in the first year
- The presentation of the proposed model of cooperation "**WBC Regional model of university enterprise cooperation**" that leads to the modernization of the University and faculties, on one hand, and the transformation of enterprises, on the other hand
- Discussion with the participants of the Info day, where all the updates and possible improvements of the proposed model of cooperation between University and enterprises, as well as further steps towards its implementation in the region were examined

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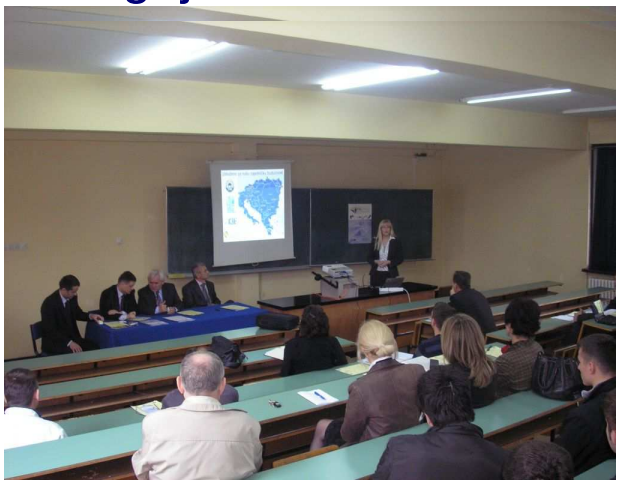
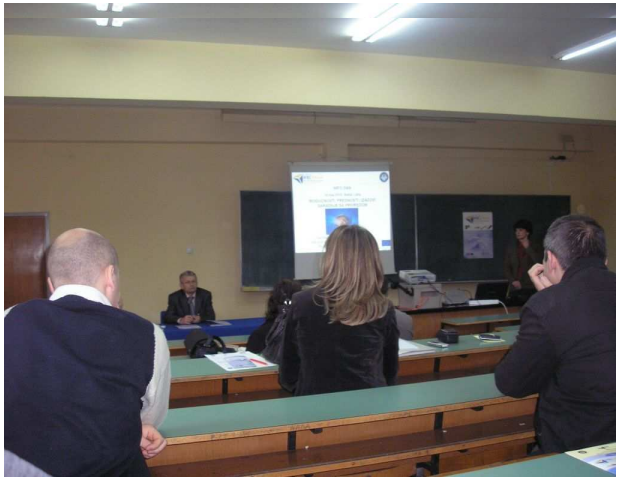
Display of possibilities for the application of innovative development of products and process through the presentation of equipment and software at the Faculty of Mechanical Engineering in Banja Luka:

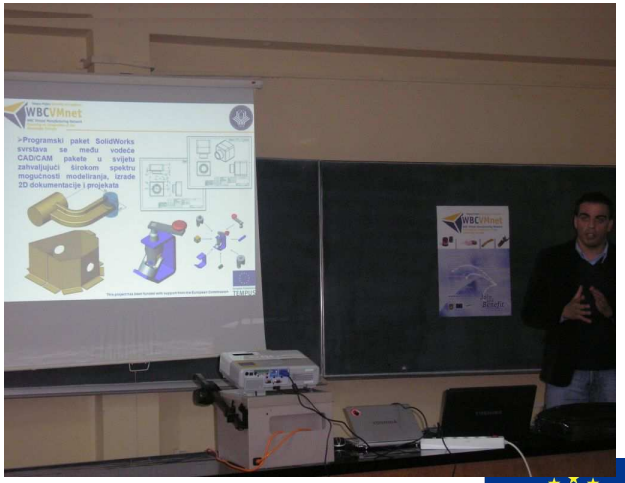
Modal analysis and modal testing

Laboratory for machining and machining systems

Display of possibilities for the application of development activities and new **equipment for rapid prototyping**, **virtual manufacturing and quality control Virtual Manufacturing** of Faculty of Mechanical Engineering in Kragujevac







Pictures of the Info day

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OUTCOME 8: Quality control and monitoring

- Monitoring realized by the Project Coordinator
- Monitoring realized by the National Tempus Office in Bosnia and Herzegovina on May 17th, 2010
- The second Partner report (Technical, Financial report and Cash flow tables)

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Conclusions

- Activities of the University of Banja Luka on the WBC-Vmnet project were performed mainly in accordance with the requirements of the project

- All requirements of the project are mainly carried out in accordance with the plan implementation

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Thank you for Your attention!

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