

**Self-evaluation Report**  
**about completing a short-term research visit to**  
**International Academy of Management and Technology (INTAMT).**  
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**Institute of Non-Ferrous Metals and Materials**

1. hosting country: The Federal Republic of Germany
2. city/town: Dusseldorf
3. Dates of staying from 06.05.2013 till 27.06.2013
4. Visit details:

The organizer of the training program was the International Academy of Management and Technology (INTAMT)

Purpose of the trip: the study of European best practices in the field of metallurgy and metal forming

Tasks Trip:

- Learning, consultation, exchange of experience, getting practical skills with the equipment, computer programs in the departments and laboratories of universities, research centers in Germany;
- Familiarity with advanced technologies for the production of metallurgical enterprises;
- Collection of material for writing sections of the experimental part of the master's thesis;
- Improve the scientific, education levels and expansion of cultural outlook ;
- Acquisition of the learning experience and communicate with experts in English;
- Establishing personal contacts with foreign specialists in the field of metal forming;

5. The initial plan included the trip:

- Receive training in the departments and laboratories of leading universities, as well as familiarity with advanced technologies in metallurgy and machine-building enterprises in Germany;
- learning new computer programs, operations research techniques of metal forming, equipment for the study of the structure and properties of metals and alloys for writing a master's thesis.

6. Results of visit:

6.1. During the internship the following modules have been studied.

The module number 1: "The organization, methods and content of training for specialists to program" Metal Forming "at the University of Duisburg-Essen.

The module number 2. "Computer-aided design tools and tooling for metal forming processes. Software for 3D - modeling "at the University of Duisburg-Essen.

The module number 3 "Combined treatments of nonferrous metals and alloys" at the University of Aachen.

Module number 4 "Innovative methods of metal forming" at the University of Aachen.

The module number 5. "Introduction to the rolling-pressing-drawing production" at the metallurgical plant of Duisburg.

The module number 6. "Familiarization with the production company SMS MEER, specializing in the manufacture of equipment for metal forming.

The module number 7. "The organization, methods and content of training programs for specialists in the field of" Technology of production of jewelry "and" Technology artistic treatment of metals.

"Familiarization with the production of jewelry. Professional College of Essen.

The module number 8. "Familiarization with exhibition display jewelry" in museums and exhibitions of various cities in Germany.

6.2. Was reviewed the new scheme of sample heating when tested in torsion to on faculty developed by of Experimental machine.

6.3. A search and analysis scientific and technical literature to write a literal review of of a thesis.

6.4. Принято участие в проектах научно-исследовательских работ, выполняемых магистрами и докторами Технического университета города Клаусталь.

## 7. Evaluation of the visit efficiency.

**International Academy of Management and Technology (INTAMT)** - developer and organizer of the training program from Germany. At the Academy INTAMT, apart from German workers, highly skilled professionals with significant luggage active work in the CIS countries and the European Union, allowing the Academy to successfully implement communication between specialists from different countries.

Designed Academy internship program is almost fully compatible with the instructions issued and held in the highest degree of efficiency.

### **Düsseldorf University of Applied Sciences (Fachhochschule Duesseldorf)**

The university is one of the largest in the German federal state of North Rhine- Westphalia and offers training in integrated and interdisciplinary courses . The university offers networking training and research in the fields of design, technology , social sector and information technology. Particular attention is paid to : engineering, process design, media, social and cultural sciences and business studies . The university has about 80 European and 30 international agreements and actively promotes the international exchange of students and teachers.

The university passed internship in the workplace to explore the software that is used in the educational process and scientific research . It was performed a specific task on the modeling and design of the stress -strain state of the metal sample subjected to tensile loading on different paths

### **University of Duisburg-Essen (Universität Duisburg-Essen)**

Included in the University Alliance UAMR (Bochum, Dortmund, Duisburg-Essen). Specialized areas include research in the field of nanotechnology, genetics, and medical biotechnology, and research in the field of education. The University includes Institute of Metallurgy and Metal Forming, which passed probation period.

### **Wieland Group**

Is one of the world leaders in production of blanks and special products in copper and copper alloys. The company manufactures copper tubes , strips , sheets , rods, finned tube heat exchangers and . Wieland products used as components for the production of a variety of industries. During familiarization with the equipment and technology of plate rolling discussed such technological and scientific aspects as : types of equipment used for rolling , heat treatment is , roll tool design features , the composition of grease used , the simulation of the rolling process on a computer , etc.

### **The Rhenish - Westphalian Technical University of Aachen (Rheinisch-Westfälische Technische Hochschule Aachen)**

Higher education institution in Aachen , Germany. RWTH technical university is a TOP 9 (Association of the nine best technical universities in Germany), IDEA League ( Association of the top five universities in Europe ), and the Association of Top Industrial Managers for Europe. RWTH technical university has 10 faculties and 260 departments (410 professors ) . The university study about 30,000 students 75 different professions . Each year, the university receives about 5,000 new students complete their studies around 2000 , about 800 receive doctoral title. In 5200 the university students - foreigners from 130 countries.

At the University of the full sets of the laboratory 's metal . It was conducted familiarization with the equipment of laboratories , both reeling mill to produce bands of steel; complex rolling equipment , equipped with strain gauge , measuring and other equipment with a display of process parameters on the computer display ,

Hydraulic press for hot forging steel forgings , etc.

### **Research laboratory equipment used in the processing of metals in the Rhine- Westphalian Technical University of Aachen (Werkzeugmaschinenlabor WZL, Rheinisch-Westfälische Technische Hochschule Aachen)**

Laboratory equipment Aachen University is known around the world and is a leader in research and innovation in the field of production technology. In particular, the laboratory is engaged in the calculation and production of equipment and their parts and components , metrological examination and evaluation of manufacturing systems , process monitoring and diagnostic equipment, the principles of human-machine interaction , control and automation , etc.

### **Clausthal University of Technology (Technische Universität Clausthal)**

Key areas to be studied at university - this production, processing and preservation of resources such as materials , energy and information . This is followed by work in the fields of chemistry , physics , earth

sciences and applied sciences such as chemical engineering, materials technology, etc. It should be noted that up to one third of the total budget of the University, is a result of research activities. The Institute of Metallurgy conducted research on molding and metal forming. In particular, studying the processes of stamping steel parts with coatings, drawing copper pipes, sheet rolling, etc.

You can practice this place meets all the requirements of the training program on the study of metal forming processes.

**Professional College of Essen (Berufskolleg der Stadt Essen Ost).** All the departments have well-equipped laboratories and workshops. Training was conducted in the laboratories of jewelry manufacturing with the acquisition of practical skills

#### **Foundry Institute, Duesseldorf (Institut für Gießerei)**

Is one of the leading research and educational institutions in the world in the field of foundry technologies. This position is achieved through the implementation of three key principles: unity of research and teaching, the diversity of research topics, as well as constructive and close cooperation with partners from industry and science. The main objectives of the research institute are research projects in the field of metallurgy, crystallization, foundry materials, the casting process and applied problems of casting technology for the production of preforms used in metal forming processes.

#### **Metallurgical plant of SMS in Mönchengladbach**

Division SMS Meer in Mönchengladbach is the leader of metallurgical machinery for the production of long-length steel products, such as the production of equipment for pipes, rolled, non-ferrous metals and heating equipment. In its program, the production of press and forging equipment SMS Meer offers innovative production methods. SMS Meer also manufactures automated forging and pressing equipment. Extensive experience in the field of technology and materials accumulated over decades, forms the basis for the technological systems that control the forging equipment, and hydraulic presses, stamping presses, plate rolling and rolling mills, etc.

#### **Metallurgical company C.D. Walzholz**

Managed by a family dynasty for 150 years. The company has subsidiaries in the United States, Brazil, Germany, Switzerland, France and China. Specializes in the production of cold-rolled sheets, strips and strips of various steel grades. Production company: aerospace parts, garden tools, edging skis (company holds about 60% of the world market of the product), the details of household appliances and road transport, automotive (70% of the products manufactured by companies involved in the industry), as well as details of wind power plants. Annual output of the enterprise is 500 thousand tons, is planned to produce 800 thousand tons in 2020.

Were acquainted with the technology of production of steel sheets, which are made from various grades of steel. A demonstration of the mill Quarto, equipped with two winders, rolling sheet material with a thickness of 1 mm. Held visiting lines cutting and packaging of finished products as well as automated warehouse for storage.

#### **University of Applied Sciences in Krefeld (Hochschule Niederrhein Krefeld)**

The university is one of the largest universities of applied sciences in Germany, has a good national and international reputation. It has about 10,500 students, and the proportion of foreign students coming to the university from more than 90 countries, accounting for 16%. The University consists of 10 deans, which are located in two campuses in Krefeld and Mönchengladbach. During the program, were shown the possibility of using for metal forming processes several computer programs, demonstrate the operation of a 3-D printer and a unique milling machine equipped with a robot with five degrees of freedom. In particular, it was gleaned that a computer-controlled machine can be used for the manufacture of tools used for metal forming.

#### **University of G.Zigena (Universität Siegen)**

University of Siegen consistent with the concept of the modern institution of higher education: it provides a high level of education, contributes to the fundamental and applied research and is a center of creative development and training of qualified personnel

The university is a lot of institutions, one of which Institute of Technology modeling and scientific computing engaged in the development of algorithms and methods for the use of large parallel systems for the simulation. The objective is to cover a wide range of applications simulation enforce them to massively parallel systems.

8. Percentage of completing the initial plan of visit:

The initial plan training is made in full. Also visit was organized to further metallurgical plant of SMS.

9. During the internship according to the results of learning new computer programs were established model for the simulation of a combined rolling compression to be applied after the rheological characteristics of new aluminum alloys based on aluminum with transition metals and rare earth metals on an experimental car during hot torsion is currently under development department metal forming.

Opportunities to address new approaches to heat the samples for the study of the mechanical properties of an experimental machine projected the Department of Metal Forming of the Siberian Federal University.

Collected material to write literary and experimental part of a thesis.

10. List of documents confirming your successful completion of the research visit:

According to the results of training received a certificate of participation in the seminar "Study of the best European practices in the field of metallurgy and metal forming", a copy of which is attached.

11. Overall evaluation of the visit

11.1. Internship allowed to meet with new technologies, equipment, tools and software equipment for metal forming.

11.2. Obtained skills laboratory equipment for metal forming and acquired experience with the software ANSYS, LS Dzne.

11.3. We studied the system of organization of education in Germany, in particular, in teaching students in the steel profile.

11.4. Were established personal contacts with experts in the field of metal forming.

12. What changes would you have made if you were preparing for the next visit of a similar kind?

In preparation for the internship would be necessary to conduct a more detailed preliminary study of each of the visited organizations and attempt to establish preliminary contacts with experts in the relevant profile.

Date of report

Signature