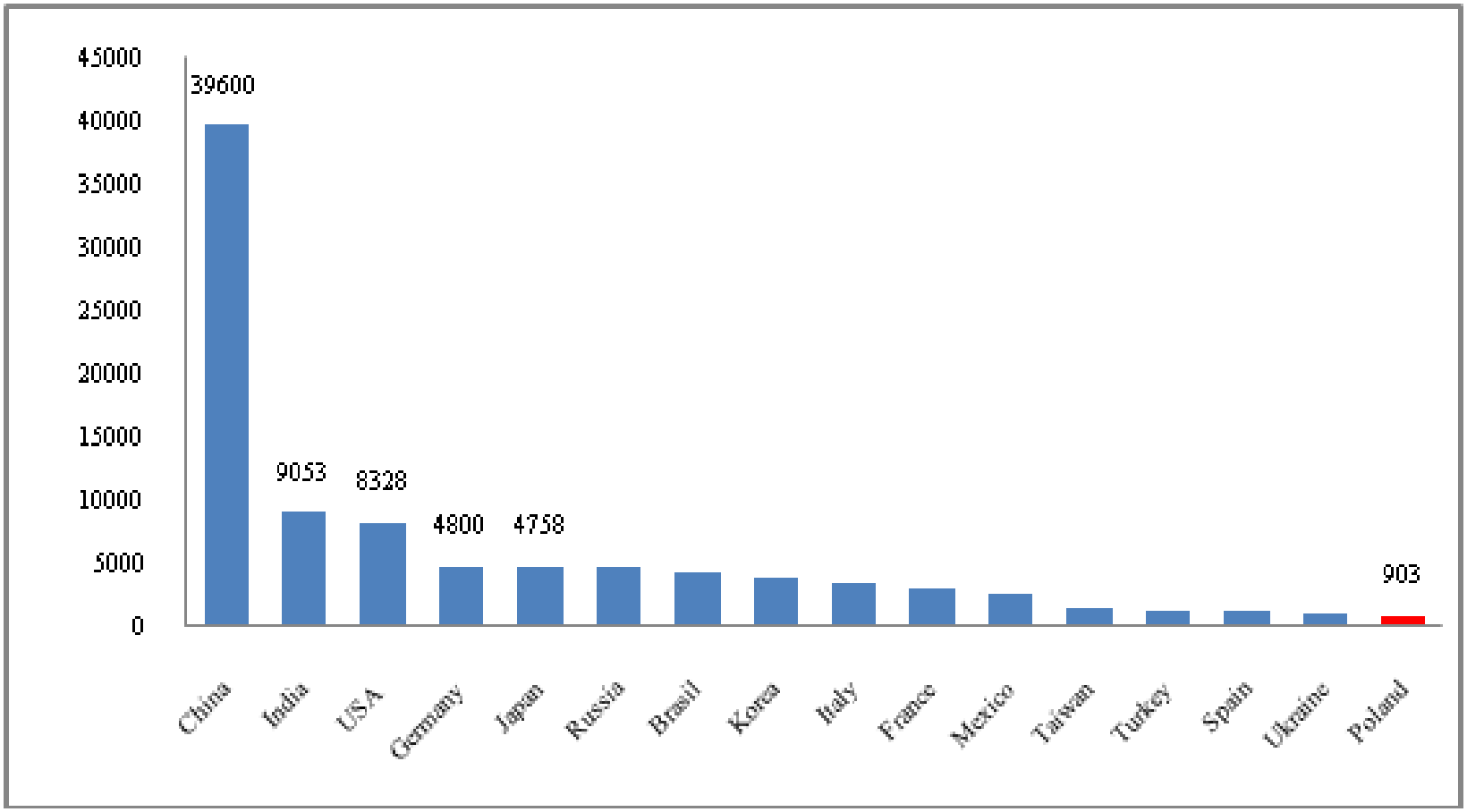
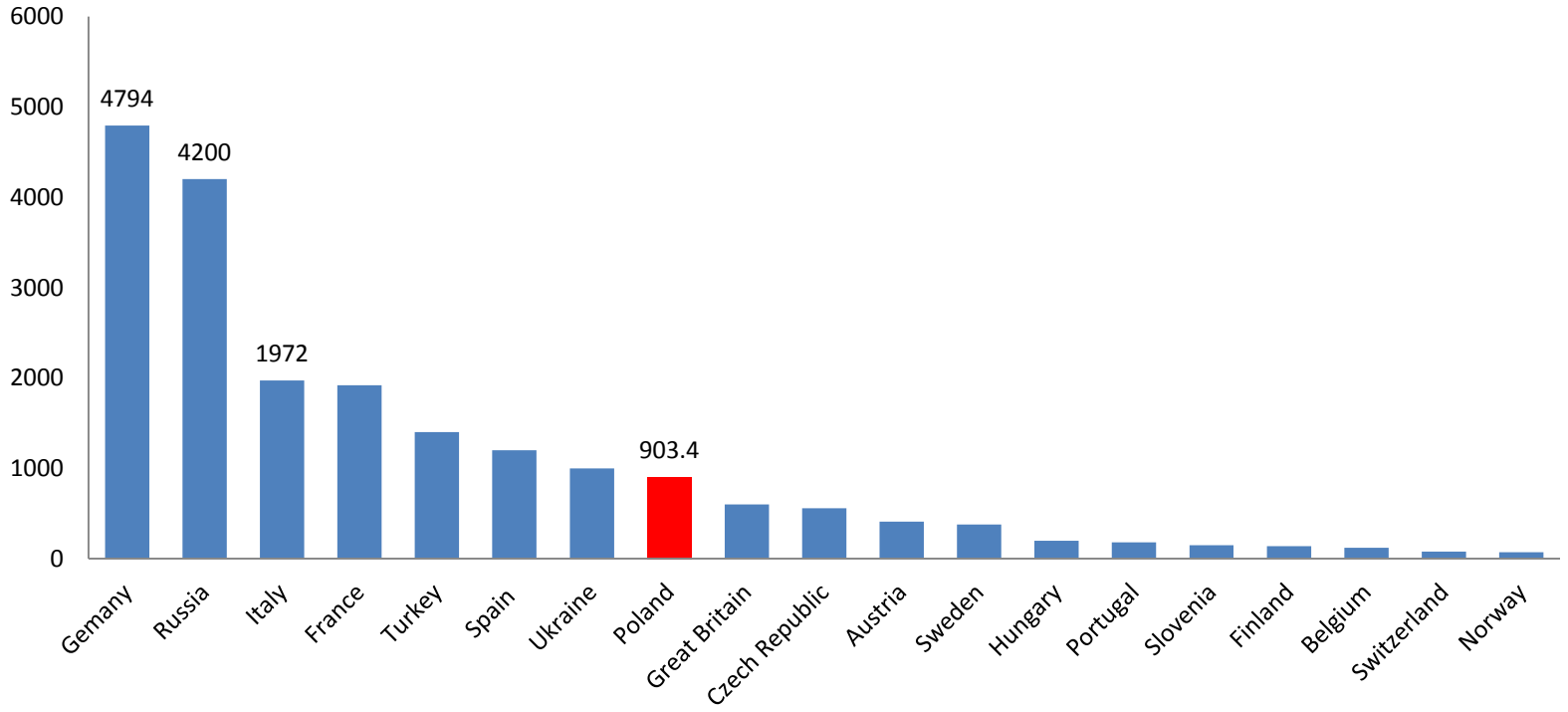
Productive potential of the Polish Foundry Practice in order to meet requirements of the innovative machine-building industry.

Position of the Polish Foundry Practice in the world



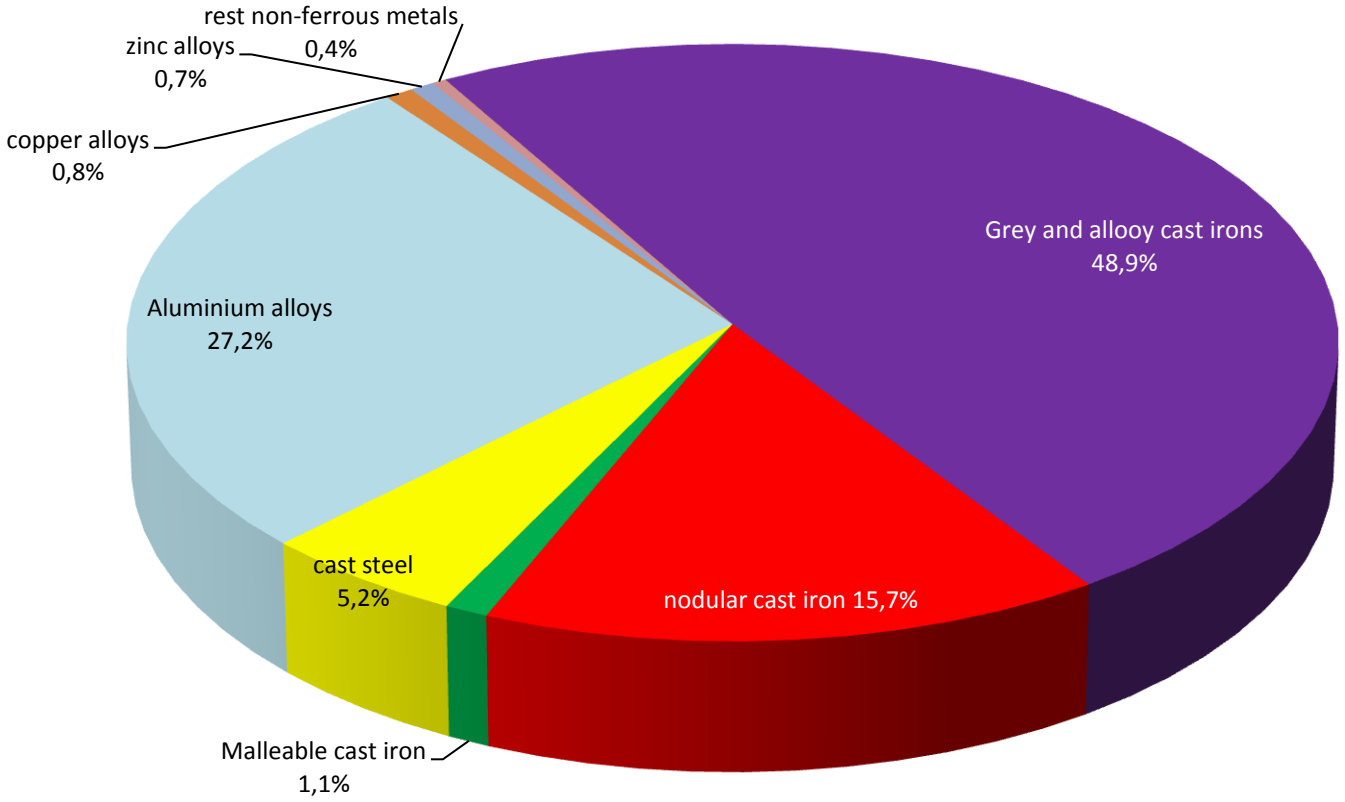
Production volume of castings in main countries of the world in 2010 year

Position of the Polish Foundry Practice in the Europe



Production volume of castings in Europen Countries in 2010 year

Structure of production in regards of materials



Share of the casting production of different sort of material in the total production of castings in Poland in 2010 year

Definition of innovation:

Innovation (has its origin from Latin, innovare means “create something new one”) and it is a process which transforms the existing possibilities in to new ideas and introduces them to practical use.

Characteristics of product for the machine – building industry

- suitable structure and satisfied requirements established by designers regarding strength and durability;
- suitable quality requirements (coherence of material, appearance);
- small machining allowance;
- limited unit mass linked with functionality;
- short lead time of a new casting;
- competitiveness on the market.

Sorts of innovations in Polish Foundries

I. Required considerable financial costs
- connected with increase of capacity or production potential
- connected with ability of further existence (environmental protection and improvement of working conditions);

II. Required not much financial costs,
- improve the functionality or quality of product and process
- decrease cost of product or process

The innovations required considerable financial costs

Exchange the stock of machine tools for:

- equipment of moulding process from the renowned companies like: HWS, DISA, GEORG FISCHER, HUNTER, LORAMENDI and others;
- melting equipment from companies like: JUNKER, INDUCTOTHERM , ABB or cupolas (more and more frequently in compaign process) equipped with the oxygen installations working in duplex system;
- moulding sand treatment stations equipped with the turbine mixers of EIRICH or TECHNICAL company;
- core shooters for cold-box process of LAEMPE, HOTTINGER, or AHB company;
- shot blasting chambers and tumbling barrels of DISA, STEM, AGTOS and TECHNICAL company;
- modern grinding units of KOYAMA or MAUS company;
- modern production-assist systems e. g. ATAS system;
  modern system for computer-aided design CAD CAM, SOLID EDGE, PROENGINIEER or CATIA, or process design MAGMA or PROCAST.

The innovations required not much financial costs

- use of the technology with application more modern materials, which make stabilization of structure and strength parameters. These materials are, among others premodifiers, improved spheroidizing master alloys and modifiers;
- use for the melting process, the materials which decrease the cost of liquid metal. Among others, there are anthracite, grey iron chips, briquetted coke mesh fractions and others;
- more frequent use the so-called “foundry waste materials” in the melting process, like cupola dust, dust from grinding process;
- activities related to modification of the casting shape affecting the improvement of functionality and appearance and reduction of machining allowance.

Foundries and Environment Protection and Quality Management Systems

- Integrated Licences;
- Quality Management Systems;
- Environmental Systems;
- Dust extraction systems;

Other factors, showing the innovativeness of Polish Foundries

- continuously observed the increase of production the ductile cast iron by 20,3% in years 2009-2010;
- larger and larger application of the elements of ADI grey iron in the machine-building industry;
- continually observed increase of export of Polish castings (increase by 11% in years 2010-2011).

Summary of the first part of our paper

The innovative Polish foundries in respect of engineering, production and casting quality, do not wander away with their standard from the best overseas producers and they are good prepared for any challenges, which are laid down for them by the more and more modern and difficult to please a building-machine and automotive industry. We have learned already and we derive profit from them. Many of the foundries, have completed already or they are in course of completion the innovative projects with the help of European funds. Every of respected foundry has ISO 9000 Quality System or ISO 9001 and the Automotive Foundries have the Certificates according to ISO TS 16949 Standard and also adequate licences regarding the environment. Naturally, it is still much to be done , particularly that the requirements still grow up and competition becomes intensified. Also, it leaves much to be desired, the decisions taken up on the scale of all country or Europe in relation to the foundry matters. Very often, the decisions related to engineering and manufacturing of castings are taken up by the people, who have less and less knowledge of metallurgy and foundry practice and of engineering and foundry practice science and of possibilities of the today's innovative foundry practice and its role in the general economy.

Nevertheless, it is worth to say, that Polish foundries should not to be ashamed in comparison with the modern world-wide foundry practice and they are prepared very well for large and difficult challenges which are laid down for them by the present-day machine-building and automotive industries.

Gwarant Capital Group
Foundry plants

- Steelworks Małapanew - Ozimek - Cast steel
- & Cast iron
- Cast Iron Foundry - Zawiercie - Cast iron

- Chofum - Chocianów - Cast iron

- Andoria-Mot Foundry - Andrychów - Cast iron

Foundry in Andrychów – profile of production

- grey iron casting of EN-GJL-200, EN-GJL-250 grade;
- ductile cast iron castings of EN-GJS-400-18ULT, EN-GJS-400-15, EN-GJS-500-7, EN-GJS-600-3 grade.

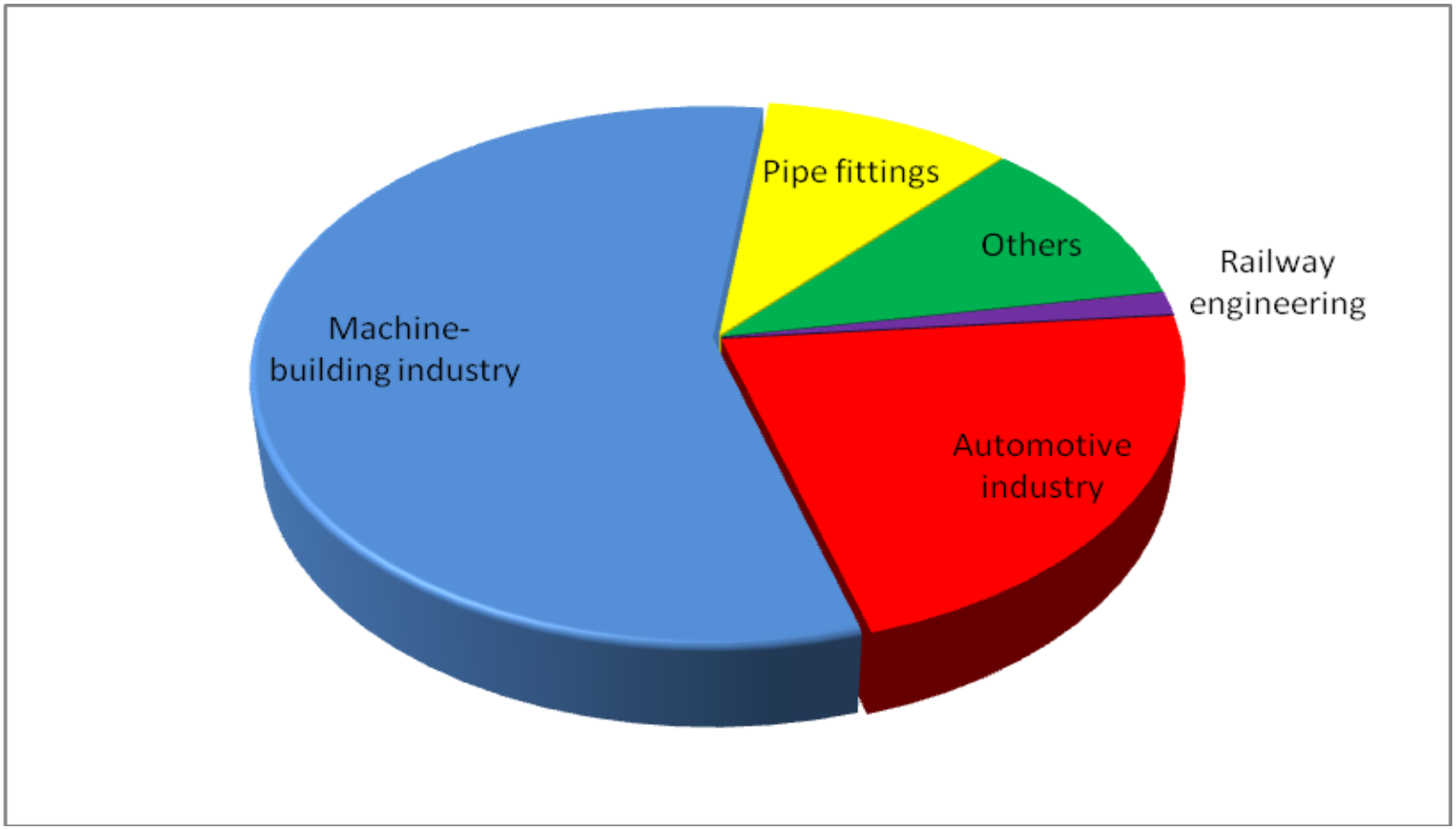
Production process in the foundry in Andrychów

- Grey iron – Duplex method;
- Ductile cast iron – induction crucible furnace;
- Moulding process:
  - automatic moulding line,
  - machine moulding,
  - manually.

Structure of production in Foundry Andrychów

- Grey cast iron - 91.5 %
- Ductile cast iron - 8,0 %
- Low alloy cast iron - 0,5 %

Structure of production in foundry in Andrychów dependent of customers



Structure of production in Foundry in Andrychów in 2011 year

Foundry’s products in Andrychów

Housing
782 x 732 x 160

2-cylinder block
325 x 280 x 480

Front Frame
510 x 460 x 270

4-cylinder block
500 x 275 x 275

Foundry’s products in Andrychów

Bracket+Bed Plate
410 x 210 x 120
320 x 130 x 200

Transmission Case
590 x 450 x 460

4-cylinderer head
430 x 250 x 120

The innovations in foundry in Andrychów required considerable financial costs

Modernization of fettling plant and painting plant:

- installation of modern shot blasting machines of STEM company;
- manufacture of new working stands for grinding of castings both light and heavy - weight ;
- change of painting station, both the immersion and the spraying methods;
- change of dedusting system from wet to dry one.

The effects of introduction of innovations required considerable financial costs

- increase of fettling capacity by 100 %;
- adequate ecological effect in the field of limited dustiness and effect in the field of ethylbenzene and styrene as a result of introduction of water diluted primer;
- improvement of casting finish quality;
- improvement of ergonomics and work's environment.

The innovations being realized in the Foundry of Andrychów

- modernization of moulding line of light weight castings-installation of HWS automatic moulding line with moulding machine HSP-1D (capability of production of light weight castings, with high precision and complicated shape);
- construction of new melting plant based on2 induction furnaces with total capacity 3 t/h (increase of production of ductile cast iron)

The innovations introduced in the foundry in Andrychów at low financial costs

- of grey iron chips from machining process for melting process;
- utilization of the use of heat emitted by air compressors from dryinng and heating of painting plant;
- increase of HWS automatic moulding line's capacity by insignificant modification and introduced piece rate system;
- multiple modifications of the casting shape which have an effect on improvement of useability or decrease of machining allowance.

The results of foundry in Andrychów, achieved thanks to introduced innovations

- double growth of production of ductile iron castings within 5 years;
- growth of production capacity from 40,7 t to 51,2 t per year, per one employee;
- increase of production for export totally up to do 83%;
- production of castings with high quality, confirmed by adequate certificates and quality standards:

- ISO/TS 16949:2009,
- TÜF NORD acc. to Dir. 97/23/WE regarding pressure appliances,
- AD 2000-Mbl.WO,
- Certificate Burea Veritas BV MODE II SCHEME.

Summary

The above mentioned projects and innovative activities introduced and being put into practice in Foundry in Andrychów confirm the earlier submitted thesis, that foundries in Poland are doing excellent on the difficult to please foundry market and having multi years experience and very good prepared skilled staffs, can effectively compete in the casting production for innovative machine-building industry with such foundry powers like China, India or United States of America.

-We invite you very kindly to our stand No.25 in Pavillion No. 3 Ground floor;

- We ask you cordially to sending us your inquiries to our foundry in Andrychów;

- Also, we invite you to visit beautiful countryside of Beskid Mały near Andrychów

THE END