



**AKADEMIA GÓRNICZO-HUTNICZA
IM. STANISŁAWA STASZICA W KRAKOWIE**

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Castings for the machine production



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Machine Industry

The machine industry is a branch of the heavy industry, it is the production of machines and devices usually for the needs of other industrial branches.

Machine industry products are applied e.g. in:

- Mining,
- Metallurgy,
- Textile industry,
- Building engineering,
- Machining,
- Shipbuilding industry.

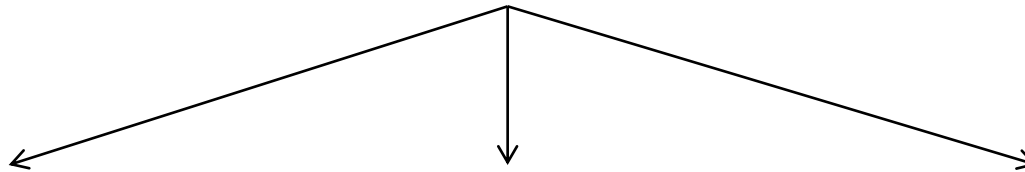


Machine Industry

Castings made for the machine industry have to meet the highly restrictive requirements concerning their quality. Castings have to be characterized by:

- Good smoothness
- Dimensional accuracy
- "sound" casting without outside defects
- Needed structure
- Required mechanical properties
- Corrosion resistance
- Aggressive agents resistance

Machine castings are produced from various foundry materials, to which the most often belong:



CAST STEEL

- Structural carbon cast steel
- Suitable for working at higher temperatures
- Corrosion resistant
- Resistant to mine waters influence
- Heat resistant, high temperature creep-resistant
- Abrasion resistant

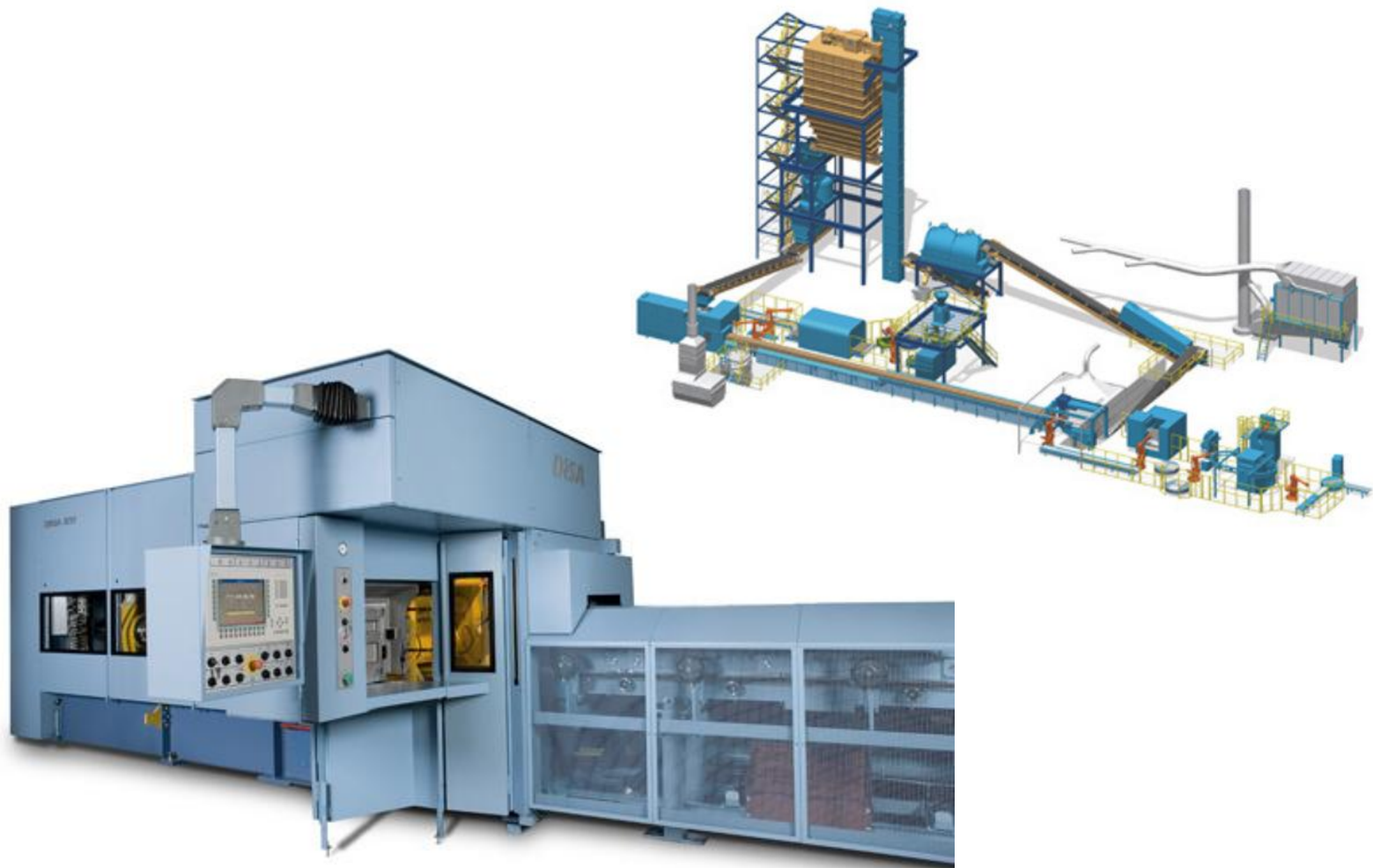
CAST IRON

- Grey cast iron
- Various spheroidal cast irons
- Ductile
- White iron

NON-FERROUS METALS ALLOYS

- Silumines
- Bronzes
- Brasses

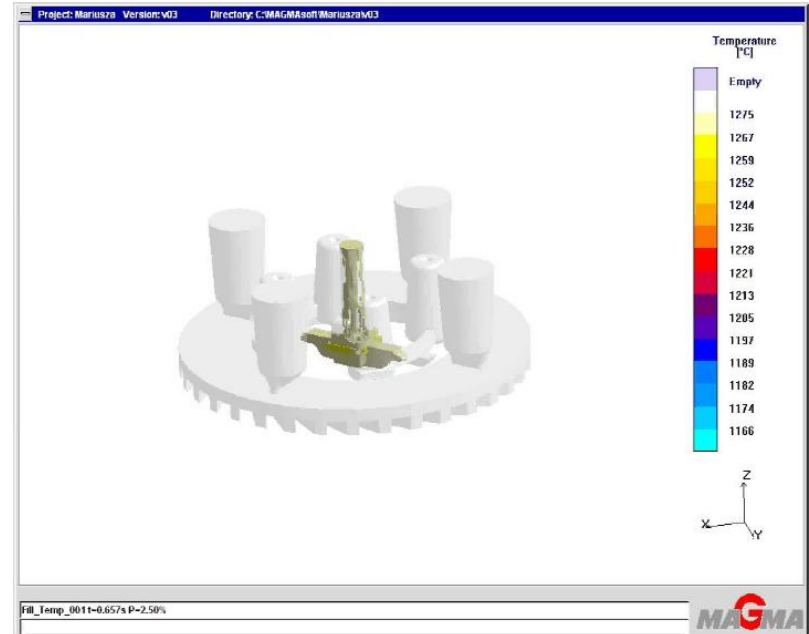
Castings of small overall dimensions



Castings of small overall dimensions



Big, Heavy Castings





Castings for Metal Machining Industry



<http://www.magnus-nord.pl>

Castings for Power Industry

crushing system



Cast steel
27000 kg/kpl



Metalodlew

Castings for Heavy Industry



Castings for Mineral Processing Industry



Castings for Ship Building Industry

Propeller screw casing

The chain wheel



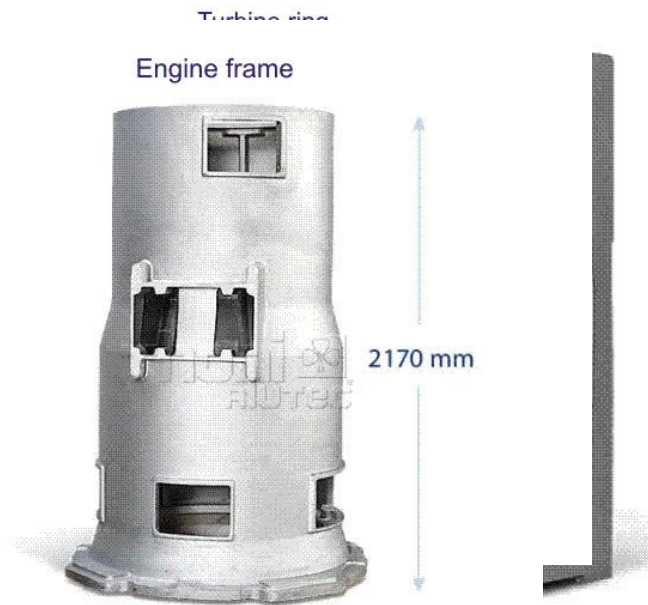
Carbon steel

10500 kg

Low-alloy cast steel

4500 kg

Machine Castings Made of Non Ferrous Alloys



<http://www.thoni-alutec.pl/>

The education of Foundry Engineers in Poland

Didactic cadre of the Faculty of Foundry Engineering AGH-UST:

- 17 Professors and Assistant Professors,
- 33 PhD holders
- 10 MSC

Scientific and didactic Departments:

- Department of Foundry Processes Engineering
- Department of Foundry Alloys and Composites
- Department of Moulding Materials, Mould Technology and Casting of Non Ferrous Alloys
- Department of Chemistry and Corosion of Metals





Virtualisation of technological processes in foundry engineering. Modelling of crystallization and feeding of castings as well as experimental tests of the solidification and crystallization processes joined with the computer simulation.

Optimisation of the technology of production and casting of alloys. Formation of casting structures, control of technological processes of melting.

Investigations of metal composites and methods of their production.

Investigations of mechanisms of binding masses with clay binders as well as on the basis of chemically hardened resins.

Moulding sands management and casting mould technology in relation to environment protection.

Strength formation of casting structures and instrumentation.

Corrosion phenomena and protection of casting against corrosion.

Casting machine structure, mechanisation and automation of casting houses.



THREE-LEVEL EDUCATIONAL SYSTEM

1st level: (6-7 semesters) permits the students to complete their education with engineer's diploma,

2nd level: (3-4 semesters) - the completion of this course gives the student a MSc diploma,

3rd level: doctoral studies – this course prepares the student to do research and didactic work on his own and ends with the doctor's degree ,



SUMMARY

A favourable and very intense introduction of modern materials - meeting the requirements of the machine industry - into the industrial practice is currently observed in the Polish foundry engineering.

Computer aided casting technologies allow more efficient production for the machine industry. A lot of attention is dedicated to computerisation, which is a factor contributing to casting structure and equipment, formation casting structures, controlling of technological processes and supervising their realisation. Designing of machines and devices, modernising processes of foundry plants, improvement working conditions and natural environment protection - are also computer assisted.

The education of cadre for foundry engineering is very well developed in Poland. This is ensured by the unique Faculty of Foundry Engineering, performing education in the whole profile of foundry specialties and some Departments of Foundry Engineering in other technological universities in the country.