Trends in Russian Foundry Industry
Revision 2012

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General data:

1. Territory – 17,100,000 km$^2$
4. Total number of foundries – about 1,350
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GDP in Trillions of Dollars (incl. inflation)
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GDP and oil price

- GDP in Trillions of Dollars (incl. inflation)
- Average annual price of Brent oil
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Structure of GDP

- Services and Financing: 27%
- Industry: 19%
- Trade: 18%
- Natural resources: 9%
- Construction: 6%
- Agriculture: 5%
- Others: 16%

Automobile industry – main consumer of castings is 0.8% of GDP
The biggest volume of production was in 1985 – Russia produced 18.5 mln. tons.

In 2011 total 1240 foundries produced 4.3 mln. tonn of castings, Export only about 2%
Import of foundry equipment

Mln. USD

2003 2004 2005 2006 2007 2008 2009 2010 2011

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Production of castings by sectors in 2011.

- Cars, trucks and tractors: 60%
- Electrotechnical industry: 12%
- Heavy and Energy machine-building: 12%
- Chemical and oil industry: 7%
- Construction industry: 5%
- Machine-Tool building: 2%
- Others: 2%
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Production of cars, thousands pcs

- **Russian brands**
- **Foreign brands**

Yearly production for the years 2006 to 2010.
Areas with high quality casting demand:

1. Railway - boogie
2. Oil & gas transport – steel valves
3. Mining – wear parts, Mn steel
4. Defence/military – large steel castings and AL and Mg castings

Main need is in steel castings!
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Distribution of castings by alloys in 2011

- Cast iron: 72%
- Steel: 17%
- Non-ferrous: 11%
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Distribution of castings by alloys in 2011

**Cast iron - 72%**
- Grey iron 60%
- Ductile iron 29%
- Special 11%

**Steel – 17%**
- Carbon steel 60%
- Alloyed steel 40%

**Non-ferrous - 11%**
- AL 79%
- Mg 7%
- Cu 12%
- Zn 2%
- Others 0%
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Non-ferrous castings production

Non-ferrous -11% from total

Aluminium - 79% from total non-ferrous

- Aluminium (79%)
- Mg (7%)
- Cu (12%)
- Others (28%)

- High-pressure (48%)
- Low-pressure (32%)
- Die cast (8%)
- Green sand (12%)
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Distribution of foundries by capacity, 1000 t/year

- <1 t/year: 40%
- 1 - 5 t/year: 35%
- 5 - 10 t/year: 16%
- 10 - 50 t/year: 7%
- 50 - 100 t/year: 2%
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Level of foundries automatization by q-ty of castings produced on:

- Automatic lines: 32%
- Semi-automatic lines: 14%
- Single machines: 30%
- Manually: 24%
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Melting of cast iron (by q-ty of castings)

- Cupola: 54%
- Arc furnaces: 44%
- Induction furnaces: 2%
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Trends in melting for cast iron (by quantity of castings)

- Cupolas
- Induction furnaces
- Arc furnaces

- 2005
- 2011
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Composition of the melting charge

<table>
<thead>
<tr>
<th>Material</th>
<th>2004</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pig iron</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>Iron scrap</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Steel scrap</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

Deficit of high quality scrap

Pig iron, Iron scrap, Steel scrap
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No-bake and green sand moulding

- Green sand
  - 2005: 70%
  - 2011: 50%
- No-bake
  - 2005: 10%
  - 2011: 30%
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Structure of workers in foundry industry

- Workers: 90.0%
- Engineers: 9.9%
- R&D: 0.1%

Need in new technologies and equipment from abroad
Most perspective directions of development:

- Production of No-Bake / Core moulds
- Production of cold-box cores
- Melting in medium frequency induction furnaces and DC arc furnaces
- Growth in production of ductile iron and Al alloys as replacement of malleable iron and steel
- Building of new foundries and reconstruction of existing, more big corporations
Main conclusions:

- Internal market has big enough value and tendency to grow, Russia continues to import castings
- Low level of export – will not change soon
- Growth of expenses for environmental protection
- Lack of skilled workers and engineers – high cost of castings
- Reduction of number of foundries (only in 2009 – minus 300 foundries)
THANK YOU!