

## Machinebuilding Industry of China and its Perspectives

At the turn of the 1980s, the Chinese government attempted to use a large-scale import of foreign engineering equipment for the modernization of the national industry engineering. However, further calculations have shown, that substitution of a significant share of imports with their own production could significantly reduce budget expenditures. Therefore, by 1990 about 60 per cent of the machinery production was produced in China<sup>1</sup>. In 1987 industry machinery was widespread throughout the country and occupied a priority position in China's economy. In almost every province and city was created an enterprise of the engineering industry. The main centers were Shanghai, Tianjin, Shenyang, Beijing, Harbin, Changchun, Taiyuan, Luoyang, Wuhan, Chongqing, Chengdu, XI'an and Lanzhou. Machinery wasn't an occasional choice as "key industry" among other industries of China<sup>2</sup>.

### Main economic indicators of machine-building industry of China

In 2011, 46 per cent of the national income of China was directed at the development of national heavy industry, particularly in metallurgy and machinebuilding. According to statistics, only these two industries bring in 20-30 per cent of the income from the whole industry of China. In 2012, China for 28th time (!) showed the world the highest growth rate of industrial production, amounted to 7.9 per cent<sup>3</sup>.

From a statistical point of view the current condition of the Chinese economy in general and machinebuilding industry in particular does not cause fears. However, the global financial crisis brings about changes in economic forecasts of experts. So, according to experts from the Focus Economics industrial production growth rate of China will slow in the next two years, and will be 9.3 per cent and 8.7 per cent in 2016 and 2017, respectively<sup>4</sup>.

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<sup>1</sup> China Machine Building URL: [www.photius.com/countries/china/economy/china\\_economy\\_machine\\_building.html](http://www.photius.com/countries/china/economy/china_economy_machine_building.html) (access date: 1.05.16)

<sup>2</sup> Ibid

<sup>3</sup> China industry sectors: URL: [www.economywatch.com/world\\_economy/china/industry-sectors.html](http://www.economywatch.com/world_economy/china/industry-sectors.html) (access date: 12.05.16)

<sup>4</sup> Focus economics. URL: <http://www.focus-economics.com/sites/default/files/FocusEconomics%20Consensus%20Forecast%20China%20-%20July%202013.pdf> (access date: 13.05.16)

Chart 1

## The growth rate of industrial production in the world as a whole, per cent

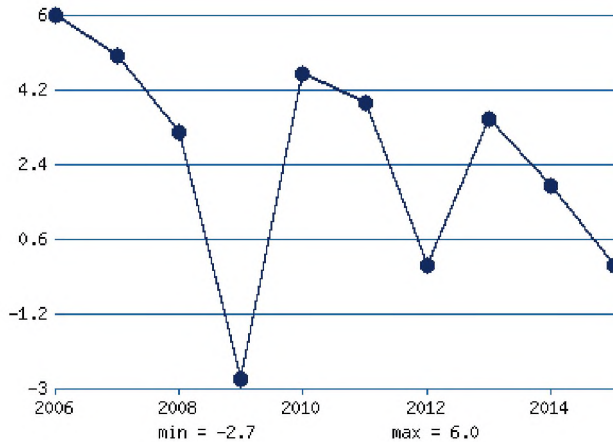
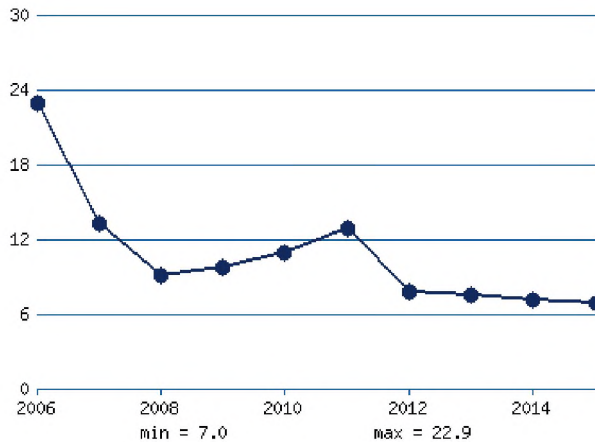


Chart 2

## The growth rate of industrial production in China, per cent



The financial crisis has negatively affected the global market of the machine-building industry. If in the period 2009-2013 it has demonstrated a compound annual growth rate of 11.4 per cent and in 2013 its total volume amounted to \$229 billion, then during 2013-2018 its growth rate reduction expected by the level of 7.4 per cent, that may bring it to the volume of \$327 billion<sup>5</sup>. In the medium term, according to experts of Goldman Sachs, positions of the developing countries, especially China, in machinebuilding

<sup>5</sup> China Machinery Industry Report 2015-2017. URL: [www.dccchina.ru](http://www.dccchina.ru) (access date: 4.05.16)

will be strengthening (table. 1). The total volume of machine-building production will increase from \$530 billion in 2010 to \$930 billion by 2025, corresponding to an annual growth of 3.8 per cent<sup>6</sup>.

Table 1.

#### Forecast of production of net material production machinery, billion.

	2000 г.	2005 г.	2012 г.	2015 г.	2020 г.	2025 г.
Brazil	11,0	13,2	14,2	18,8	22,6	27,2
China	28,2	58,4	161,4	248,0	329,4	410,1
India	6,3	8,4	12,8	19,3	26,0	34,4
Japan	89,7	96,2	66,2	75,4	81,0	86,3
Russia	9,8	10,8	12,1	14,9	17,6	20,8
USA	123,7	124,5	103,0	115,5	129,7	144,9
EU	158,0	160,8	157,5	178,3	193,2	204,7

Source: IMF World Economic Outlook, Goldman Sachs

In these conditions the growth rates of machine-building products will decrease. The only exception will be Russia, where in recent years the emphasis is on import substitution policy (tab. 2).

Table 2

#### The annual growth rate of machine-building products

	2000-2005 гг.	2005-2012 гг.	2012-2015 гг.	2015-2020 гг.	2020-2025 гг.
Brazil	3,8	1,4	5,8	3,8	3,7
China	15,7	22,5	9,0	5,8	4,5
India	6,0	8,7	8,7	6,1	5,7
Japan	1,4	-7,2	2,6	1,4	1,3
Russia	1,9	2,2	2,3	3,4	3,4
USA	0,1	-3,7	2,3	2,4	2,2
EU	0,7	-0,4	2,5	1,6	1,2

Source: IMF: world economic Outlook, Goldman Sachs

Thus, according to the IMF (International Monetary Fund), China will actually become an indisputable leader of global machine-building market. However, detailed analysis of machine-building industry of China is of interest.

<sup>6</sup> Kondrat'ev V.B. Global'nyj rynek mashinostroeniya.

URL: <http://www.perspektivy.info/print.php?ID=235247> (access date: 2.05.16)

According to the data presented in the report of the chamber of Commerce of the PRC<sup>7</sup>, the Chinese government is focused on rapid urbanization and, accordingly, is planning a major investment in the machinery industry. In the current economic situation, the domestic demand is high, and exports of equipment abroad is increasing. In a further improvement of trade relations with Russia, Brazil and other countries will probably serve to stimulate this growth. Interstate China's trade grew by 6.9 per cent as of July 2014. Exports grew by 14.5 per cent, while imports fell 1.6 per cent. Industrial production grew by 9 per cent<sup>8</sup> as of July 2014 (compared with July 2013). The increase is due, on the one hand, to the investment in machinery industry and growth in demand for products from the developed countries. According to the Trading Economics China's economy grew 7.2 per cent in 2014 and 7.0<sup>9</sup> in 2015 (slightly below the forecast made by the IMF of 7.4 per cent and 7.1 per cent, respectively).

Over the last ten years compound annual growth rate of the China machinery industry accounted for 25 per cent. The strongest domestic demand associated with the industrialization process and key investment in machine-building industry was in industry served that China has become the largest manufacturer of machinery and industrial equipment in the world, in terms of total value of production. Recently, the industry is experiencing economic restructuring due to the slowdown in the investment. However, ongoing industrialization and urbanization in China will remain to be growth drivers in the future.

Machine-building industry is one of the largest economic sectors in Europe, where mostly concentrated small and medium enterprises. Their activities are usually connected with high technologies and formation of high value-added, largely innovative and focused on the development of individual solutions.

In the period of the eleventh five year plan (2007-2011), the Chinese government has actively supported the engineering industry, what greatly contributed to the development of this sector. In 2011 the gross output of machine-building industry amounted to 2 trillion euro, representing an increase of approximately 25 per cent (annualized). In the first five months of 2011, the total value of exports and imports of machine-building industry products reached \$24.7 billion (an increase of 29.6 per cent<sup>10</sup>). Under these conditions the import growth exceeded export growth, what led to negative trade balance and consequently to the increasing pressure on equipment manufacturers.

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<sup>7</sup> China Machinery Industry Report 2015-2017. URL: [www.dccchina.ru](http://www.dccchina.ru) (access date: 4.05.16)

<sup>8</sup> China Machinery Industry Report 2015-2017. URL: [www.dccchina.ru](http://www.dccchina.ru) (access date: 4.05.16)

<sup>9</sup> Kitaj. Tempy rosta. URL: [ru.tradingeconomics.com/china/gdp-growth-annual](http://ru.tradingeconomics.com/china/gdp-growth-annual) (access date: 4.05.16)

<sup>10</sup> China Machinery Industry Report 2015-2017. URL: [www.dccchina.ru](http://www.dccchina.ru) (access date: 7.05.16)

In general, China machinery industry of China is moving to sustainable growth stage. In the future China will continue to make efforts to develop production of high-quality machine-building equipment in order to further expand market share and competition with international players.

Industry machinery is a significant part of all industry of China and the biggest industrial sector of economy with its technical standards that are constantly subjected to revision with a view to a continuous improvement. According to the China Machinery Industry Federation (CMIF<sup>11</sup>) the whole machine-building industry of China includes 12 sectors:

1. The automotive industry
2. Electrical equipment
3. Manufacture of heavy industry equipment
4. Petrochemical machine-building
5. Agricultural machine-building
6. Construction equipment
7. Production of internal combustion engines
8. Manufacturing machines and tools
9. Production of measuring devices
10. Manufacture of component parts of General machine-building
11. Equipment for environmental protection
12. Packaging equipment and food processing equipment

## Agricultural machine-building

In the last decade, thanks to a special government support, large amounts of investment in the industry, reducing the tax burden and the implementation of the results of R & D agricultural engineering in China has grown extremely rapidly. The average annual gross output of the industry during this period increased by 15.5 per cent, making China, thus, one of the main manufacturers of agricultural machinery.

Figure 3 presents the main economic indicators of agricultural machinery industry from 2006 to 2010. During this period, the number of enterprises in the sector increased by 54 per cent, from 1757 enterprises in 2006 to 2,700 enterprises in 2010. The value of total production volume increased by 2 times: from 15.916.000 euro to 35.475.000 euro<sup>12</sup>.

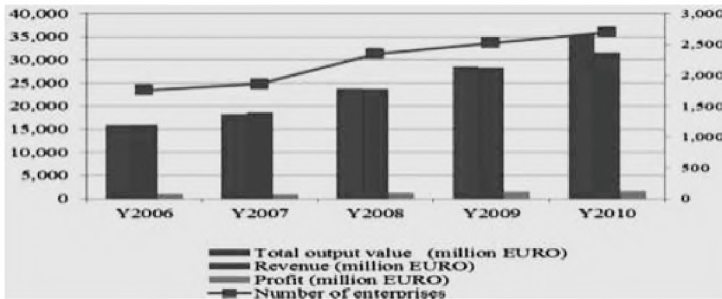
In general, state support of agricultural machine-building plays an important role, since it stimulates the potential demand and, as a consequence contributes to increase production volumes. Types of products that are subject to state subsidies such as equipment for processing agricultural products and feed-processing equipment sell well because of lower prices.

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<sup>11</sup> China Machinery Industry Federation URL: <http://jjw.mei.net.cn/english/3ind/ind.html> (access date: 4.04.16)

<sup>12</sup> China Machinery Industry Report 2015-2017. URL: [www.dccchina.ru](http://www.dccchina.ru) (access date: 7.05.16)

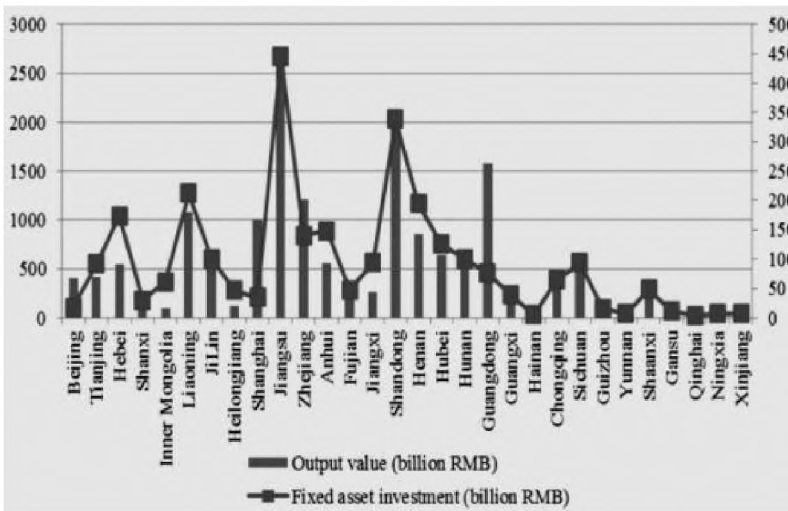
Main economic indicators of agricultural machinery industry of the PRC from 2006 to 2010



Source: 2011 China machinery industry Yearbook

Figure 4

Regional structure of machine-building industry of China in 2011



Source: 2011 China machinery industry Yearbook

In comparison with the level of development of European technology, products of Chinese agricultural machinery are less perfect. For this reason China imports large quantities of high quality equipment. For example, Chinese manufacturers mainly produce heavy tractor with power from 90 to 120 HP, while in developed countries tractors of this class have more than 500 HP.

According to the decree of the Ministry of agriculture of China and the Ministry of Finance of the PRC on January 6, 2012 manufacturers of agricultural machinery in China have the right to receive state support. Thus, in the first half of 2012 a package of subsidies in total was approximately 20 billion yuan

(in 2011 for the whole year was allocated 17.5 billion yuan). The program of state support covers 12 categories, 46 sub-categories and 180 kinds of products.

Terms of payment subsidies:

- 1) 50,000 yuan per company, but not more than 30 per cent of the average sales of the last 3 years;
- 2) tractors with power more than 100 HP – 120,000 yuan;
- 3) tractors with power more than 200 HP – 200,000 yuan;
- 4) heavy cotton pickers – 300,000 yuan.<sup>13</sup>

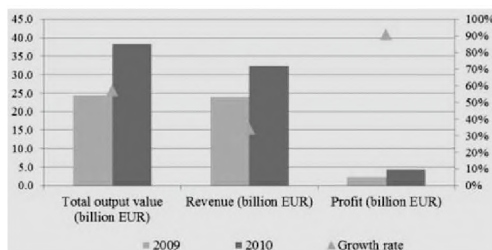
Grantees must be registered in the program of state support.

## Construction equipment

According to statistics, in the period of the 11th five-year plan, the total revenue from sales in the machine-building industry of the PRC increased from 15.7 billion euro in 2005 to 54.5 billion euro in 2010, and the total profit of the machinery industry reached 5.6 billion euro, with an average annual growth rate of 28,05 per cent. Today, the construction machinery industry of China more has than 1,400 major companies and over 330,000 employees<sup>14</sup>. Figure 5 shows the main economic indicators of the industry the construction machinery industry for the period 2009-2010, when profits nearly doubled. In this industry China occupies the leading position in the world in sales revenues.

Figure 5

### The economic indicators of the construction machinery industry in 2009-2010



Source: 2011 China machinery industry Yearbook

Demand for construction machinery in China has been rising for the recent years, attracting foreign manufacturers to the Chinese market. From 2001 to 2009, foreign investment in the industry grew by 200 per cent. Following product lines demonstrated the greatest growth: excavation equipment, paving equipment, cranes, rollers, machines for maintenance of the road surface, asphalt pavers and electric lift trucks.

<sup>13</sup> China Machinery Industry Report 2015-2017. URL: [www.dccchina.ru](http://www.dccchina.ru) (access date: 10.05.16)

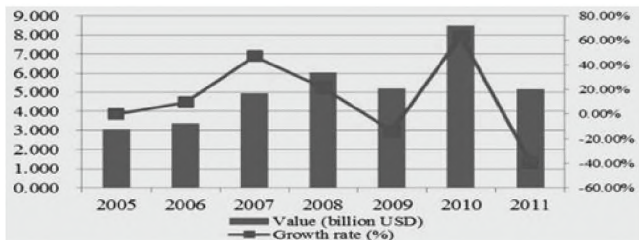
<sup>14</sup> China Machinery Industry Report 2015-2017. URL: [www.dccchina.ru](http://www.dccchina.ru) (access date: 7.05.16)

China took over a decade to become a major player not only in domestic but also in international construction machinery market. From 2009 to 2010 the total volume of exports and imports reached 14.8 billion euro (an increase of 45.7 per cent year on year). Imports amounted to 6.6 billion euro (an increase of 63.2 per cent), while export reached 8.2 billion euro (an increase of 34.2 per cent). It is also interesting to note that three of the leading Chinese construction machinery manufacturers – Intermix GmbH, SCHWING and CIFA – has acquired the status of world leaders in recent time. However, China still needs to import large quantities of construction equipment, especially hydraulic components and sophisticated excavators, due to the lack of the necessary level of technological development. But even despite this, revenue from sales of construction equipment in the 12th five-year plan reached 900 billion yuan by 2015.

Imported construction equipment. In Figure 6 we see that the growth of imports of construction equipment declined significantly in 2008 and 2009 due to the global economic crisis. By 2010, it recovered again (with an increase of 63.2 per cent compared to the same period last year) mainly due to large-scale investment undertaken by the government. Tellingly, in 2011, again saw a decline.

Figure 6

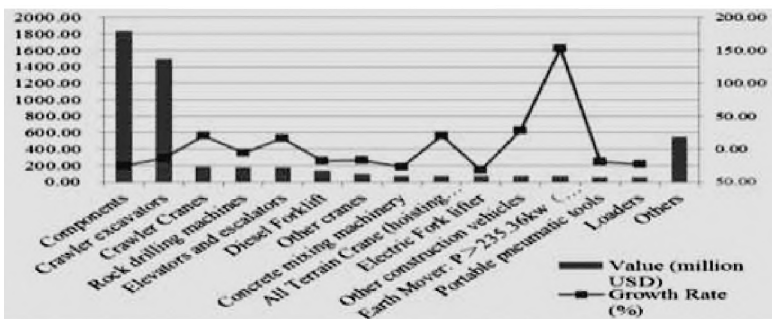
The value of imports of construction equipment



Source: 2011 China machinery industry Yearbook

Figure 7

The cost and the growth of imports of basic types of construction equipment. A large part of the total value of imports accounted for the various components of construction machinery and crawler excavators.



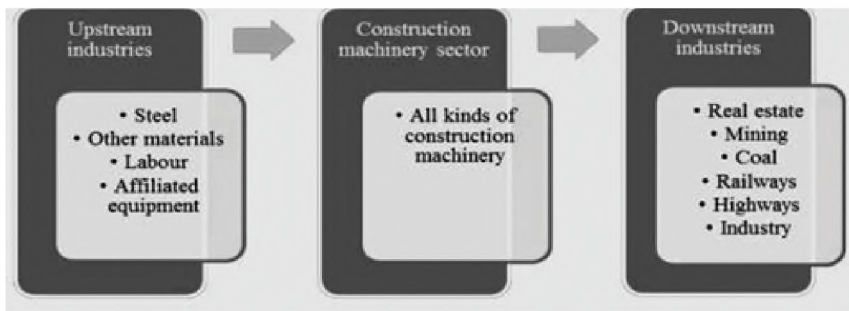
Source: 2011 China Machinery Industry Yearbook



Figure 8 represents the industrial chain, to visualize the relationship of the construction machinery industry of China with other sectors of the economy of the PRC. So, the construction machinery industry in China is highly dependent on the related industries. A significant effect have, on the one hand, such factors as the cost of resources (e.g. steel and human labor), and, on the other hand, the post-processing industry. Hence, the stagnation in the real estate construction and the decline in investment have a direct impact on the demand of the production sector of construction engineering.

Figure 8

### Industrial chain.



Source: 2011 China Machinery Industry Yearbook

### Processing equipment (machine tools)

Machine tool industry in China developed very rapidly over the last ten years. The cost of production increased from 3.7 billion euro in 2000 to 69.2 billion euro in 2010. Today, China has more than 1,000 key enterprises in the industry.

Machine tool industry is the driving force of the entire machine-building industry. The cost of all products of the cutting equipment sub-industry is about 16.3 billion euro, while punching equipment is up to 5 billion euro. The demand for CNC processing equipment is also growing. The volume of output increased from 59,000 parties in 2005 to 230,000 parties in 2010, what reflects the trend of the release of production with a higher added value. In 2010, it was released 223,000 CNC metal-cutting machine tools equipment and 12,000 pieces of CNC punching equipment. But, although Chinese manufacturers of processing equipment have made a huge leap in technology and production capacity, China still imports large volumes of machines of average and higher price categories, including CNC machining components, assembly and installation components and other punching equipment. Thus, import of the processing equipment continued to rise in 2010 and reached 12.4 billion euro (increase of 62 per cent yoy). The value of imports of metal-cutting equipment in 2010 amounted to 7.4 billion euro and 59,8 per cent respectively.

Presumably, the cost of imported equipment will continue to grow, largely due to the import of equipment from Japan, Germany, Taiwan, Korea and Italy.

According to an annual survey of the global industry processing equipment of World Machine-Tool Output & Consumption Survey 2015 conducted by Gardner Research Agency, China is the leader in the machine tool industry since 2009. However, in recent years there has been a downward trend in production volumes. So, the value of production produced in 2014 was \$23.8 billion, less than the peak in 2011, which totaled \$29.5 billion. Given the difficult situation in the global economy, it can be assumed that the production volume of machine tool industry in China will continue to decline<sup>15</sup>.

Table 3

**Production of cutting equipment in 2013-2014 in some countries (mln. \$)**

	Country	cutting equipment, %	2013	2014
1	China	59%	\$24,700.0	\$23,800.0
2	Germany	71%	15,268.7	12,957.2
3	Japan	83%	11,333.6	12,831.6
4	South Korea	74%	5,150.0	5,631.0
5	Italy	51%	5,475.9	5,074.7
6	USA	75%	4,956.1	4,900.4
7	Taiwan	82%	4,537.0	4,700.0
8	Switzerland	84%	3,242.8	3,111.7

## The major components of the engineering industry

Manufacture of major components (MCs) is less developed than other machine-building industries in China. The market especially lacks high-tech products. Today, the quality and main features of MCs is similar to that produced in the 1980th. The uneven quality and high staff turnover are the main weaknesses points of the industry. To survive in global competition, some companies are forced to import MCs from abroad. Although China itself exports a large volume of MCs, these components mainly belong to the category of labor-intensive products with low added value.

Table 4 shows sales of the MCs of the machine-building industry of China in 2010, including sub-industries of fasteners, dies and molds. Sales of metallurgical powder, chains and springs has grown by about 35 per cent, transmission by 20 per cent, the dynamic couplings by 19 per cent and the fasteners by 15 per cent.

<sup>15</sup> World Machine-Tool Output & Consumption Survey 2015

URL: <http://www.gardnerweb.com/cdn/cms/GR-2015-WMTS.pdf> (access date: 1.03.16)

Table 4

**Sale, export and import key components for machine building industry of China in 2010**

Items	Sales revenue (million EUR)	Growth rate	Import value of product (million EUR)	Growth rate	Export value of product (million EUR)	Growth rate
Gears	18,125	20%	8,413.73	46%	2,156.96	58%
Fasteners	7,000	15%	2,267.98	25%	2,894.45	46%
Chains	1,850	35%	182.39	14%	563.03	25%
Springs	1,812	34%	428.22	39%	150.67	50%
Metallurgical powder	1,037	36%	–	–	63.44	0%
Dynamic couplings	1,325	19%	277.55	-33%	222.04	44%
Total	31,150	21%	11,569.87	36%	6,050.59	41%

Source: 2011 China machinery industry Yearbook

China is one of the largest producers and consumers of the MCs of engineering, but the majority of the equipment belongs to the low-cost category. High quality products mostly imported from abroad. In 2010, the total output value amounted to 31 billion euro (21 per cent annual growth). The value of combined exports and imports reached 17.6 billion euro (38 per cent annual growth). The value of imports as a result of continued growth reached 11.5 billion in 2010, with the greatest relative growth of transmissions (72.7 per cent). Exports amounted to 6 billion euro, where the highest volume was that of fasteners.

### Hydro-pneumatic components

In 2012, China had more than 3,000 enterprises producing hydro-pneumatic components. In 2010, the total amount reached 7,966.25 million euro. The total value of exports and imports amounted to 3,739,7 million euro.

China represents the world's largest market for hydraulic products and ranks second in pneumatic products, mainly due to efforts to improve the infrastructure of the machine-building industry. China still lacks advanced technologies for manufacturing advanced hydro-pneumatic components, that's why the demand for imported products from developed countries is still high. The import volume of the hydro pneumatic products is 38,86 per cent.

### Molds

According to the National Bureau of statistics of China, the performance of enterprises in this industry has improved mainly due to the stimulating plan of the government, which helped to boost domestic demand. Today sales and profits continue to grow. Table 5 shows the revenues of these enterprises in 2009 and 2010 and a small increase in the number of enterprises as well.

Table 5

**Main economic indicators of the industry for the production of molds in 2009-2010**

Indicator	Number of enterprises	Total output value (million EUR)	Sales revenue (million EUR)	Profit (million EUR)
Y2010	2,884	20,384.50	19,995.12	1,175
Y2009	2,797	15,826.50	15,474.12	954
Growth rate	3.11%	28.8%	29.22%	23.1%

Source: 2011 China machinery industry Yearbook

Plastic molds became the most growing group of products with a 45 per cent share of the total production in 2010. At the same time, the share of the stamping forms was 37 per cent, and molds and other forms accounted for 9 per cent. According to the statistics of China customs, the total value of exports and imports of the molds in 2010 amounted to 3.3 billion euro, which was 11.85 per cent more than the previous year (including imports amounted to 1.6 billion or 4.99 per cent more than the previous year). Plastic molds was the largest product group, with 55.74 per cent of imports and 68,96 per cent of exports. Stamping shape was the market challenger with 38,17 per cent and 22.9 per cent respectively. Leaders from the point of view of the country of origin are Japan, Korea, Taiwan and Germany. In General, the market of molds of low and middle price categories is suffering from oversupply at the time, as the need for high-quality products can be satisfied mainly by foreign manufacturers.

### **Bearings**

According to the National Bureau of statistics of China, today the country has about 1,850 large enterprises producing bearings. In 2010, the income of these subsidiaries amounted to 15.75 billion euro (an increase of 36.96 per cent), 1.5 times greater than the volume achieved during the 11th five-year plan. The volume of production amounted to 15 billion units (increase of 36,36 per cent). Economic efficiency has improved significantly with the profit of 937,5 billion (increase of 66.67 per cent).

China consumes and exports large volumes of products which include bearing mechanisms. In 2010 the country exported 4.1 billion units of bearing products, more than 50 per cent more than in 2009. The value of exports of this product amounted to 2.6 billion euro (63,63 per cent annual increase). Ball bearings, tapered roller bearings, spherical roller bearings and bearing parts are the main part of exports of these goods. In 2010, was imported 1.7 billion units, that is 30,97 per cent more than the year before. The value of imports reached 3 billion euro (increase of 34.4 per cent yoy). The number of imported ball bearings increased by 66,91 per cent (1.1 billion units), and its import value increased by 33,88 per cent (1 billion euro). Bearings are imported mainly from Japan (898 million euro or 29,74 per cent of the total amount,

55,01 per cent of the annual increase), Germany (€765 million or 25.34 per cent of the total amount, 21,73 per cent of the annual increase), Italy (111 million euro, or 3,69 per cent of the total amount, 38.07 per cent of the annual increase).

Table 6

### Main manufacturers of components, hydro-pneumatic elements, seals, molds, bearings in China

<b>General components</b>	CN Power Gearbox Co., Ltd Shaanxi Fast Group, Shaanxi Fast Gear Co., Ltd.
<b>Hydro pneumatics</b>	Shanghai Electric Hydraulic & Pneumatics Co., Ltd. Shanghai Camozzi Pneumatic Control Components Co., Ltd.
<b>Seals</b>	Anhui Zhongding Sealing Parts Co., Ltd.
<b>Moulds</b>	Qingdao Haier Mold Ningbo Hei Mould Technology Co., Ltd.
<b>Bearings</b>	Wafangdian Bearing Group Corporation Wanxiang Group

Source: 2011 China Machinery Industry Yearbook

### Heavy machinery

Since 2000 there has been a steady growth of heavy industry of China. The total volume of production and sales continue to beat your own records. In 2010, total production of the industry amounted to 88,898.5 million euro, which is 11 times(!) exceeded the same indicator for the year 2000 and equivalent to about 27.5 per cent annual growth over the 10 years. Today, China has about 1000 key enterprises of heavy machine-building industry. Table 7 presents the main indicators of the industry for 2010.

Table 7

### Key indicators of the heavy engineering industry of China in 2010

Name	Number of enterprises	Growth rate	Total output value (million EUR)	Growth rate	Profit (million EUR)	Growth rate
Total	4,686	6.79%	88,898.50	22.88%	6,915.12	35.62%
Metallurgical and mining machinery industry	2,384	6.52%	40,094.75	24.33%	3,121.25	48.75%
Lifting and transport machinery industry	2,302	7.07%	48,803.75	21.70%	3,793.87	26.44%

Source: 2011 China machinery industry Yearbook

Heavy machinery includes 2 categories: metallurgical/mining machinery and lifting machinery. In 2010, total production for the metal smelting in China amounted to 695,000 tons and the volume of production of mining and shaft equipment amounted to 4.19 million tons and sheet metal equipment 526,000 tons. In lifting machinery, the production of taps made up 5.77 million, and forklift trucks – 151,000 units. In 2010, export value of the mining industry production amounted to 1.8 billion euro, while the value of imports was 1.6 billion euro. The top five imported goods were: metal rolling machines parts of metal-rolling equipment, crushing/grinding equipment, filters and rock drills. From the point of view of the country of origin, China metallurgical mining industry imported from Germany production for 479 million euro, from USA – 350 million euro, from Japan – 209 million euro, from Italy – 182 million euro. The same year the value export of mechanical handling equipment was 6.9 billion euro and import reached 3 billion euro. Import and export of taps has declined to 523 million euro and 2.3 billion euro respectively. Import of lifting and handling equipment from Germany amounted to 881 million euro, from Japan – 498 million euro, from Korea – 241 million euro and the USA – 187 million euro.

### **Power equipment**

The demand for power equipment mainly depends on the level of development of the energy sector. In 2010, the industry of power generating equipment recovered from the impact of the financial crisis and the cumulative income has continued to grow. By the end of November 2010, the installed capacity of power equipment in China reached 902,57 million kW (10.80 per cent more than in 2009). The share of local manufacturers of power generating equipment has increased, intensifying their competition with local players. In recent years, the market of power generating equipment can be characterized as a competitive playing field.

## **FORECAST 2016-2017**

### **Current trends in the machinery industry of China:**

- Local companies usually produce low - or medium-tech equipment. Technological level of products lags behind the equipment produced in developed countries (European countries, USA, Japan) according to parameters such as quality, performance, energy efficiency, brand reputation, etc. Even the products of several leading Chinese players, usually, does not reach the advanced level of quality. R & D investments remain low, often not reaching 1 per cent of the sales companies, so that Chinese manufacturers remain in the low price segment.
- Fierce competition among manufacturers of low and medium price ranges.

- Most sectors of the machine-building industry is highly desintegrated. Official statistics has roughly 34,000 companies in the engineering industry with an annual turnover of \$600,000 each, but there are also a lot of small companies, dealing mainly in components of the low price segment.
- Price pressure from the consumer industries is increasing, due to increased competition (for example, in struggle for the local markets), although investment in the consumer goods' production in China was significant. So, given the disposable income per capita and the first signs of saturation of urban markets, manufacturers are increasingly turning its attention to local markets. As the income of local markets remain very low, we can expect an increase in demand for low price equipment, increasing the scope of activities Chinese engineering.
- Local companies are increasing production capacity. The quickest way for Chinese companies to respond to market capacity and pressure from competitors is the use of the scale effect. Supported by good sales, high saving rates, and generous lending to state enterprises, there are enough funds to expand production.
- Foreign companies continue to invest in China – Foreign investments in machinebuilding industry of China has reached a significant level thanks to the many European companies that host their production facilities. The cost of production of enterprises with foreign investment will grow by about 40 per cent in the period from 2011 to 2017. Since these private enterprises have access to foreign technology and knowledge, they probably will be ready to compete with imported equipment.
- Chinese manufacturers are constantly improving their technology, trying to produce products with high added value, to reduce pressure from competitors.
- Despite the fact that imports has been growing on average by 27 per cent per year, starting from 2011, the market share of imported machinery will fall from 40 per cent in 2011 to 32 per cent in 2017 (according to analysts).
- Excesses of the machine-building equipment in China are exported. The volume of exports will grow more rapidly than imports from 2011 to 2017, with an annual growth rate of 35 per cent and 28 per cent, respectively. The value of exports, however, still accounts for 50-60 per cent of the value of imports. Export markets are more attractive due to higher profitability and willingness to pay from customers. If the current tendency continues, it is possible that by 2020 China will turn its trade deficit in machine-building equipment to the surplus, in particular due to energy-generating equipment.

However, there are several opposing trends:

- The cost of doing business in China is rising. First, the cost of unskilled labor, which remained virtually unchanged in the last decade begins to grow; in particular due to the establishment of a minimum wage by the government in 2005. Second, it is expected that in the coming years, the Chinese Central government will begin to reform the housing sector, which would entail higher prices for oil, gas, water and electricity. The industrial development land prices may continue to rise further. In addition, if the Chinese government will seriously pay attention to the protection of the environment, as noted in the development plan for the next 5 years (12th five-year plan), this will result in an increased operational costs for the manufacturers.
- The imported foreign technology may become more competitive compared to the Chinese. But in long-term perspective the situation will stabilize.
- China as a manufacturing base may become less attractive to foreign investors: If the two main incentives to produce in China – local demand and cost of production – will lose attractiveness, foreign direct investment is expected to decline. This will lead to a general decrease in the production of Chinese machine-building industry and will take off the pressure from the local producers involved in exporting products.
- Chinese machine-building industry is likely to be consolidated: costs of production – from raw materials to wages in China are rising. Profit margins and return on assets (ROI) increased from 2012 to 2015, but the selling prices of products did not increase accordingly. Therefore, the increase of profitability should be based on growth in production volumes and cost of sales. Both of these factors, ultimately, must come to the same level, but the further price increase may cause decline in profit and profitability. In 2014, 15 per cent of companies in China were loss-making, and in the first quarter of 2015, this number had risen to 23 per cent. Ultimately, it is not unexpected that the market "squeezed" the unprofitable producers, both local and invested from abroad. The number of competitors in the market has dropped, but remained the most viable.

### **Main trends machine-building industry of China**

A growing number machine-building factories industry moved to the mainland of China. They include manufacturers from Hong Kong who are actively exploring other regions. That served for a sharp intensification of competition between producers from Hong Kong. In addition, they have to compete with other Asian producers.

Growing application of plastic materials in electronic and telecommunication equipment, medicine and spare parts has increased demand for more precise and sophisticated technologies of plastic molding. Since most of the customers of the machine-building industry need to remain competitive,



the demand for high quality continues to grow. This trend translates into greater use of computer technology in the design and manufacture. For example, computer-aided design, manufacturing and engineering (CAD/CAM/CAE) of the machine structure can be applied to lines for plastics processing for the best design of high-precision equipment to eliminate vibration and improve rigidity.

For the purposes of settling in foreign markets, there is a growing need for manufacturers to develop distribution network of products and provide after-sales service. The main strategy for producers is to improve quality. Some large manufacturers are also working to improve production efficiency. So, in the case of metal-working equipment to control the tool feed and materials were used electronic tuners. The equipment for molding plastics, for example, was equipped with programmable controllers and closed designs that allow you to track the position of the moving elements, the feed rate of raw materials and also temperature and pressure to reduce the number of defect products. measures to ensure security were also enhanced. For example, was introduced a device to control the connector of the mold.

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