Tooling in Czech Republic
2018

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WBA Tooling Academy Aachen
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Tooling in Czech Republic
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**Spotlight**

The Czech economy is characterized by a strong producing industry. 21% of the working population in the Czech Republic is employed by this industry – a level that is the highest in the world. At the heart of the Czech industry lies the international automotive and supplying industry, which has a large number of production sites in the country. In this environment, many interesting, export-oriented tool and die making companies have developed over the last few years, of which a large share comprises of injection molding tool and die making companies. German companies in particular are a strong partner of the Czech Republic. Due to relatively lower wage costs, the good technical training in the country and a high vertical range of manufacturing, the Czech tool and die making sector is increasingly being used as a procurement market for German and European companies.

From the point of view of foreign customers, a detailed market knowledge pertaining to the performance capabilities of suppliers and collaboration partners is necessary. This study provides an insight into the characteristics of the Czech economy as well as the Czech tool and die making industry.
~12 cars produced per 100 inhabitants (Germany: 7 cars per 100 inhabitants)

~50% increase in turnover of the automotive supplying industry since 2009

~€461m is the market size of the tool and die making industry (Germany: €3,008m)

~70% is the share of exported tools and dies

12 days is the difference of the average lead time of a tool compared for Germany and the Czech Republic
Executive Summary

The Czech economy is currently considered to be one of the engines of growth in the European Union. In the last few years, in a European comparison, the economy recorded above-average growth rates of the gross domestic product (GDP) of over 2% per year. With 2.9%, the Czech Republic has the lowest unemployment rate throughout the European Union.

The backbone of the Czech economy is represented by the manufacturing industry, which has a share of 38% of the total gross value added – a share that is far larger than that of Germany. The largest company in the Czech Republic is the automobile manufacturer Škoda. Besides Škoda and the other automobile manufacturers such as Hyundai and TPCA (Joint venture of Toyota, Peugeot and Citroën), a number of well-known, international automotive suppliers have built a presence in the Czech Republic. Particularly noteworthy are Bosch, Continental, and Siemens. These companies have been continuously expanding their production facilities in the Czech Republic.

With 23% of all exports, the automotive and supplying industry contribute the largest share towards an export-oriented economy. The geographical location of the country within Europe and its close proximity to Germany is an important strategic factor for the export-oriented industry. The most important trading partner of Czech companies is Germany. Over the last few years, the trade volume has continuously increased.

Approximately one third of all exported goods are sent to the German market. As a result of the good economic development of the manufacturing industry, the tool and die making industry of the Czech Republic has become exceedingly important. The local automotive and supplying industry, machine and plant building industry as well as the electrical engineering industry require the tool and die making industry to supply them with high performing and technically complex tools. The high quality of Czech tools and dies are also being increasingly used in other countries. As a result of which, the tool and die making sector has been able to develop an international focus and secure a high export share of domestic products. Czech tool and die making companies have decades of experience in working with German customers, who at the same time are the largest purchasers of Czech tools and dies. Due to the good economic situation characterised by stable growth, the Czech Republic is increasingly interesting for foreign companies. The automotive industry, in particular, along with the associated supplying industry has been able to increase its production volume continuously over the last few years. The tool and die making industry as one of the central industries and an enabler of series production has witnessed an equal gain in importance. Despite the increasing complexity of the tools and production processes, a high product quality of the Czech tool and die making industry has been realized.
The study „Tooling in Czech Republic“ describes the characteristics of Czech tool and die making companies. For this purpose, the industrial environment of the country as well as the structure of the tool and die making industry is described. In addition, the performance capabilities of Czech tool and die making companies is evaluated from the year 2013 to 2018. The performance capabilities of tool and die making companies are evaluated using the dimensions product, process, and resource. The structure of the study is well-established and has been used in numerous studies till date. The results of the study are based on data sets of Czech tool and die making companies stemming from the world’s largest database on the tool and die making industry maintained by the Laboratory for Machine Tools and Production Engineering (WZL) of RWTH Aachen University and Fraunhofer Institute for Production Technology IPT. The database contains over 1,000 data sets of German-speaking tool and die making companies and more than 2,000 data sets of international tool and die making companies. This knowledge is supplemented by company visits conducted by tool and die making experts from the Laboratory for Machine Tools and Production Engineering (WZL) of RWTH Aachen University, the Fraunhofer Institute for Production Technology IPT, and the WBA Aachener Werkzeugbau Akademie GmbH. In the last few years, additional extensive knowledge about Czech tool and die making companies through industrial and research projects in the Czech Republic has been developed. This industry knowledge is evaluated by contact to the national associations and, in particular, by an interview with Oldrich Paclík, the chairman of the Association of Engineering Technology in the Czech Republic (SST). A further part of the results of the study is obtained from published data on the national and international tool and die making industry. Sources are publicly accessible databases and portals such as Comtrade or Eurostat. The study „Tooling in Czech Republic“ focuses on the German-Czech economic relations and creates an overview of the tool and die making industry. In order to present a comparison with Germany, the study compares key performance indicators of Czech and German tool and die making companies. In this way, a qualitative and quantitative evaluation of the performance capabilities of the Czech tool and die making industry is made possible.
Tooling in Czech Republic

Industrial surroundings

[Situated in the heart of Europe, the Czech Republic has developed itself into one of the engines of the European Union.]

The Czech Republic was founded in 1993 from the country Czechoslovakia and is now the forty-seventh largest economy of the world and has 10.7m inhabitants. Located in the heart of Europe, the country is a member of the European Union since 2004.

Macroeconomic development

The Czech economic strength is based on the GDP and is below average when compared to that of Germany and the European Union. The GDP per capita in the Czech Republic is €18,100. In Germany, the GDP per capita is more than twice as high. Despite the below-average level of the GDP, the Czech Republic recorded robust economic growth since 2014 with a growth rate above that of the European average. In 2016, the economy grew by 2.4 %, while it recorded a growth rate of 4.2 % in 2015. In comparison, the European growth rates for these years were 2 % and 2.3 % respectively. Besides the financial services sector, the manufacturing industry was responsible for increasing the economic strength of the country in 2017 by 3 %.

Despite the positive economic development, the Czech economy must prepare itself to overcome challenges lying in the future. The Economic Chamber of the Czech Republic estimates that the country had a deficit of around 300,000 employees in the beginning of 2018. Therefore, the Czech Government is currently attempting to increase manpower by encouraging foreigners, especially those from Ukraine to work in the Czech Republic. Thereby, a shortage of skilled workers may be avoided, and the growth rates of the economy might be maintained at a constant level. The increasing shortage of skilled workers in the manufacturing industry in the year 2017 led to a nominal wage increase of wages by 7 %. A further increase is also expected for year 2018. Although the labour costs in manufacturing with 9.75 €/h in 2017 are significantly lower as compared to Germany (38.99 €/h), future wages will increase further and the advantage over Germany will become smaller. In 2017, expenditure on education amounted to 4.2 % of the GDP.

Education expenses

4.2 %

Gross domestic product

€192.0b (2017)

Development of the gross domestic product

2016

2.4 %

2015

4.2 %

2014

2.0 %
**Foreign trade**

In recent years, the Czech economy has been able to achieve continuous foreign trade surpluses. In 2017, Czech companies exported goods worth a total of €160b Compared with imports worth €143b, this results in a 12 % foreign trade surplus. This represents an increase of one percentage point compared to 2015. However, compared with 2016, this represents a decrease of two percentage points. A strong Czech Krone recently caused imports to rise more strongly than exports. In 2017, import growth of €14b was offset by export growth of only €13b. A further decline in export growth could also be caused by increasing protectionism in overseas trade as well as uncertainties arising from Brexit in the fifth-largest sales market, Great Britain. This is reported by Czech trade associations. This would particularly affect strongly export-oriented branches of the economy, such as the Czech automotive and supplying industries. By far, the most important trading partner of the Czech economy is Germany. In 2017, around one third of all exported goods were delivered to Germany (32 %).

By comparison, Czech companies exported around 8 % of their goods to Slovakia, their second most important trading partner. Over the past three years, the volume of exports to Germany has risen continuously by an average of 8 % per year. The country thus occupies the seventh place in the trade value of goods exported to Germany worldwide.

Half of the Czech goods exported to Germany were products from the automotive and supplying, mechanical and plant engineering as well as electrical engineering industries. Products from the automotive and supplying industries account for 23 % of exports to Germany. 13 % of the exported goods can be attributed to mechanical and plant engineering while 10 % to electrical engineering products. Imports from Germany are evenly distributed. Machinery and plant equipment (15 %), products of the automotive and supplying industries (13 %) and electrical engineering products (10 %) are the top 3 imports of goods from Germany in roughly equal proportions.

**Development of imports and exports from 2015 to 2017**

![Graph showing development of imports and exports from 2015 to 2017.](image-url)
**Regional structure**
The Czech economy is characterised by an even distribution of economic power among the regions of the country. Although the capital city of Prague accounts for a quarter of total GDP, this share is mainly due to a strong administrative, service, and tourism sector. Among the remaining 13 regions of the country, the difference in GDP per capita between the strongest region (South Moravia, €15,577 per capita) and the weakest region (Karlov Vary, €10,677 per capita) was only €4,900 per capita. The regions of Central Bohemia and Moravian-Silesia in the east, which are located around Prague, are a centre for the automotive industry dominated by the car manufacturers Škoda, TPCA, and Hyundai. However, the regional concentration of the automobile manufacturers’ production plants cannot be transferred to the supplying industry. Due to the short distances, this industry has established itself throughout the country.

**Sectoral structure**
The Czech economy is characterised by the manufacturing industry. Compared to the agriculture and services sectors, the industrial sector contributed 37.7% to gross value added in 2017, while in Germany the share contributed by this sector was only 30.5%. The industrially influenced structure of the Czech economy is also clearly reflected in the percentage distribution of the labour force across economic sectors. The Czech Republic is the world leader in the percentage of the labour force in the manufacturing industry. The international automotive and supplier industry continues to have a major influence on this development. Between 2004 and 2015 the annual production of passenger cars almost doubled – despite stagnation or partial decline in the crisis years 2008, 2012 and 2013. In 2015, the three largest manufacturers Škoda, Hyundai, and TPCA (joint venture of Toyota, Peugeot and Citroën) produced about 1.3 cars. This corresponds to 12 cars produced per 100

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**Top 3 goods imported from Germany in 2017**
- Electrical engineering industry: 13%
- Automotive and supplying industry: 23%
- Mechanical and plant engineering industry: 15%

**Top 3 goods exported from Germany in 2017**
- Mechanical and plant engineering industry: 10%
- Electrical engineering industry: 10%
- Automotive and supplying industry: 13%
Tooling in Czech Republic

inhabitants. This means that more cars were produced per inhabitant than in Germany (7 cars per 100 inhabitants). The backbone of the Czech economy is, in addition to the three car manufacturers, a strong supplying industry that has recorded high growth rates in recent years. From 2009 to 2015, the increase in sales for the supplying industry was around 50 %. In addition to the three automobile manufacturers Škoda, TPCA, and Hyundai, the largest manufacturing companies are mainly from the supplying industry.

Bosch, Continental, Borum, Brose, Mobis, and other suppliers operate production sites in the Czech Republic. In the electrical engineering industry, Foxconn, Panasonic, and ABB are the largest players in the country. The establishment of many international companies in the Czech Republic is also the result of a high level of business friendliness and business regulation, which is rated in the World Bank’s Ease of Doing Business Index. The Czech Republic ranks 30th out of a total of 189 countries. Another indicator of the development of the tool and die making sector is the development of the machine tool sector. Compared to 2014, sales grew by an average of 15%. The sales forecast for 2018 of €1,212m shows a positive outlook. A disadvantage of the strong industrial focus of the economy is that it is highly susceptible to economic fluctuations. In addition, foreign trade is highly dependent on the German economy. The Czech government is aware of this risk and is, therefore, actively trying to promote technologies in the information technology, biotechnology, and nanotechnology sectors.

The Czech Republic occupies the first place in percentage of the labor force in manufacturing industry

Rank of the Czech Republic out of 189 countries in the Ease of Doing Business in 2018

Turnover of the machine tool industry from 2014 to 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Turnover [€ m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>1,034</td>
</tr>
<tr>
<td>2015</td>
<td>1,116</td>
</tr>
<tr>
<td>2016</td>
<td>1,149</td>
</tr>
<tr>
<td>2017</td>
<td>1,164</td>
</tr>
<tr>
<td>2018</td>
<td>1,212*</td>
</tr>
</tbody>
</table>

* Estimated
Overview of selected manufacturing companies in the Czech Republic
The strong position of the manufacturing industry and the high density of automotive suppliers increase the attractiveness for tool and die making companies. Growth in the manufacturing industry is accompanied by an increasing demand for tools.

**Domestic demand**

In 2016, the Czech Republic produced tools and dies with a total value of €314.3m. Contrary to the growth of the Czech economy and manufacturing industry, the Czech tool and die making industry has not been able to achieve a significant increase in production volume in recent years. In 2013, Czech companies produced tools worth €299.7m. This value could only be increased by 5% until 2016. During the same period, domestic demand for tools increased by 30%. As a result, the domestic market volume for tools and dies in 2013 was €355m. Due to the good economic development, this figure rose to €461m by 2016. Divided by tool type, companies focused on the manufacturing of injection molds recorded the highest absolute growth. From 2013 to 2016, domestic demand for injection molds grew by €98.4m (+54%). The increasing demand is largely covered by Czech companies through imports from Germany. Since 2016, the Czech Republic has been the second largest buyer of German injection molds after the USA. Despite the rising overall market volume, the decline in sheet metal and solid forming tools is conspicuous, with the market volume shrinking by €8.6m (-6%) in the same period.

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**Development of the tool production, imports and exports**

<table>
<thead>
<tr>
<th>Tool and die production</th>
<th>Tool and die exports</th>
<th>Tool and die imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>2016</td>
<td>2016</td>
</tr>
<tr>
<td>299.7</td>
<td>314.3</td>
<td>299.7</td>
</tr>
<tr>
<td>+5%</td>
<td>-21%</td>
<td>+9%</td>
</tr>
<tr>
<td>314.3</td>
<td>279.3</td>
<td>366.3</td>
</tr>
<tr>
<td>334.8</td>
<td>366.3</td>
<td></td>
</tr>
</tbody>
</table>

---

[Domestic demand for tools and dies has risen by 30% in the last three years.]
Foreign trade

As a result of the development described above towards a deliberate focus on the domestic market and the associated increase in demand, tool and die requirements in the Czech Republic were met by an increase in tool and die imports of 9%, but above all by a 21% decline in tool exports. This fact resulted in a negative trade deficit in the tool and die making sector. In 2016, tool imports of €366.3m. were offset by tool exports of only €219.3m. Accordingly, the negative trade deficit amounted to €147m. Imports exceeded exports of sheet metal and solid forming tools, injection molding tools, and high pressure die casting tools.

Development of the local tool and die demand

<table>
<thead>
<tr>
<th>Tool and die demand</th>
<th>2013</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection molds</td>
<td>142.9</td>
<td>134.3</td>
</tr>
<tr>
<td>Sheet and solid forming tools</td>
<td>46.1</td>
<td>45.6</td>
</tr>
<tr>
<td>High pressure die casting tools</td>
<td>29.3</td>
<td>23.0</td>
</tr>
<tr>
<td>Total</td>
<td>451.0</td>
<td>461.0</td>
</tr>
</tbody>
</table>

Tool and die exports 2016

- Injection molds: €150.7m
- Sheet and solid forming tools: €64.5m
- High pressure die casting tools: €4.1m
- Total: €219.3m

Tool and die imports 2016

- Injection molds: €236.2m
- Sheet and solid forming tools: €119.4m
- High pressure die casting tools: €10.7m
- Total: €366.3m
Regional structure
The total number of Czech tool and die making companies is estimated to be about 350-400. These are homogeneously distributed throughout the country. There is no strong concentration of tooling companies in the Czech Republic, as is the case of Germany. The regional distribution of the 160 largest tool and die making companies in terms of turnover reflects the balanced distribution. Especially in the eastern part of the country, i.e. in the surrounding areas of larger cities such as Prague, Brno and Pilsen, there is an increased number of companies. The Pardubice and the Hradec Králové region between the cities of Prague and Olomouc, where almost 20% of Czech tool and die making companies are located, form the largest agglomeration of tool and die making companies.

Regional distribution of the 160 largest tool and die making companies

Legend (Density of the tool and die making industry)
- Very high
- High
- Medium
- Low

Share of tool and die making companies located in the Pardubice and Hradec Králové region
Robust, precise, and a good reputation – more than half of all Czech tool and die making companies cite these characteristics when asked how they want to convince potential customers of their performance. The products of Czech tool and die making companies are oriented in particular to the needs of German and international customers. In the following, the customers with the highest imports, and the relevant types of tools and orders will be examined.

**Customers**
When looking at customers' countries of origin, it should be noted that only 30 % of the production volume is produced for the domestic market. The 70 % of tools not manufactured for the domestic market are mainly exported to Germany, Austria, or Slovakia. In terms of trade volume, Germany is currently the Czech Republic's most important trading partner for both imports and exports.

**Product**

*Injection molds represent an increasingly significant share of the production volume of Czech tool and die making companies.*

Imports of tools to the Czech Republic - Top 3 countries by trading volume

Exports of tools from the Czech Republic - Top 3 countries by trading volume

Top 3

- Germany: 140 [€ m]
- China: 68 [€ m]
- South Korea: 45 [€ m]
- Austria: 44 [€ m]
- Slovakia: 18 [€ m]
In 2016, tools and dies worth €111m were exported to Germany. This corresponds to 40% of the total Czech tool and die exports. At the same time, tools and dies worth €140m were imported from Germany. The Czech Republic thus recorded a trade deficit with Germany. China and South Korea took second and third place with an import volume of €68m and €45m respectively.

**Tool and die types**

With 62% of all the tools produced, the injection molding industry occupies a dominating position in the Czech Republic. From 2013 to 2016, Czech tool and die making companies increased the production of injection molds by 17% to €195.9m. On the other hand, the size of the Czech sheet metal and solid forging tool industry is decreasing. In 2013, sheet metal and solid forming tools worth €112.3m were manufactured. This value was reduced to €79.4m in 2016. One of the reasons for this development could be the increasing competition with Eastern European and Chinese tool manufacturers. As a percentage of total tool production, this development corresponds to a decline from 37% to 25%. The production volume of high pressure die casting tools rose continuously and almost doubled. However, these tools account for a relatively small share of the total production volume with around 12%. Czech tools and dies have a wide variety of dimensions. Nevertheless, there is a trend towards smaller tools. The majority of tool dimensions are below 1,000 mm x 1,000 mm. Less than half of the companies manufacture tools in larger dimensions.

**Development of the tool and die production according to the type**

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sheet and solid forming tools</strong></td>
<td>€112.3m</td>
<td>€78.3m</td>
<td>€95.3m</td>
<td>€79.4m</td>
</tr>
<tr>
<td><strong>Injection molds</strong></td>
<td>€167.3m</td>
<td>€183.5m</td>
<td>€207.3m</td>
<td>€195.9m</td>
</tr>
<tr>
<td><strong>High pressure die casting tools</strong></td>
<td>€20.1m</td>
<td>€28.9m</td>
<td>€34.2m</td>
<td>€39.0m</td>
</tr>
</tbody>
</table>
Order types
The distribution of sales between order types is similar to that in Germany. The most important type of order for Czech tool and die making companies are new orders, which are responsible for generating about half of the turnover. On an average, 21% of the order types of a Czech tool and die making company are repair orders, followed by change orders with 15%. Maintenance orders and miscellaneous orders, such as development services, account for a small proportion of total sales. The high proportion of maintenance and repair orders can be explained by the proximity of the tool and die making industry to the manufacturing industry. Automotive manufacturers as well as manufacturers of electrical engineering products equally require rapidly available tool and die making expertise in the event of disruptions in series start-up and production.

Order distribution in the tool and die making industry

Typical tool and die dimensions (Multiple answers possible)

- > 2,000 x 1,000 mm: 33%
- < 2,000 x 1,000 mm: 49%
- < 1,000 x 1,000 mm: 61%
- < 500 x 500 mm: 59%
- < 250 x 250 mm: 24%
The efficiency of tool and die making companies is closely related to the level at which the processes are understood. High process efficiency is primarily shown by short lead times, a high adherence to delivery dates as well as an efficient outsourcing process.

**Lead times**

Within the framework of a survey, the average lead times for the three tool and die types injection molds, sheet metal and solid forming tools as well as high pressure die casting tools in the Czech Republic was compared with corresponding values of German tool and die making companies. While the average lead time of the injection molds in Germany is 61 days, the average lead time of Czech companies is around 55 days. A similar picture emerges for sheet metal and solid forming tools. The lead time in the Czech Republic is with an average of 19 days shorter than that in Germany. For high pressure die casting tools, the average difference in lead time is 10 days. Possible reasons for differences in lead times between German and Czech tools and dies are a higher complexity of the products as well as higher tolerance requirements. Another reason is the focus of Czech tool and die making companies on tools and dies for the production of structural components.

**Adherence to schedules**

In addition to internal performance capabilities, efficient outsourcing is also decisive for short lead times and adherence to schedules. With regard to adherence to delivery dates, Czech tool and die making companies report adherence to delivery dates of around 76% for all tool and die types. The average adherence to delivery dates by German tool and die making companies is 81%. Czech tool and die making companies, therefore, show a competitive adherence to delivery dates.

**Outsourcing**

A characteristic feature of the Czech tool and die making sector is the low outsourcing rate as compared with Germany. Due to the low wage level, the majority of production steps in the Czech tool and die making industry are carried out internally. Czech tool and die making companies cover almost the entire process chain of technological production steps. This means that particularly more complex tools which require a large number of production technologies and steps, can be manufactured from a single source. Only 8% of the Czech tool and die making companies outsource production steps related to the milling of components (HSC-3+2-axis milling, HSC-3-axis milling, 5-axis milling, 3+2-axis milling, 3-axis milling, manual milling) to external companies.
Outsourcing rate with regard to various technologies

- HSC-3 + 2-axis milling: Czech Republic 15%, Germany 17%
- HSC-3-axis milling: Czech Republic 0%, Germany 17%
- 5-axis milling: Czech Republic 24%, Germany 0%
- 3+2-axis milling: Czech Republic 26%, Germany 8%
- 3-axis milling: Czech Republic 0%, Germany 33%
- Manual milling: Czech Republic 0%, Germany 24%
- Hard turning: Czech Republic 8%, Germany 26%
- Turning: Czech Republic 8%, Germany 33%
- Wire erosion: Czech Republic 8%, Germany 35%
- Die-sinking EDM: Czech Republic n.A., Germany 22%
Resource

[Czech tool and die making companies can rely on well-trained employees.]

The performance capabilities of a tool and die making company depend largely on the employees and the manufacturing technologies. This makes them the main components of the resources in the tool and die making industry.

Employees

A key to the international competitiveness of the manufacturing industry is the good education system in the Czech Republic. In an OECD comparison, the Czech education system is only slightly behind Norway. In addition to the education system, good foreign language skills in German and English have led to the development of an export-oriented tool and die making sector.

Czech tool and die making companies benefit from the country’s good training system and its orientation towards technical occupations.

This aspect is underlined by the fact that 96% of all employees have at least a technical education. The training of employees in tool and die making is at the same high level as in Germany and creates a good starting point for the future development of the Czech tool and die making industry.

The distribution of employees among the various tool and die making departments is characterised by a high proportion of employees in production. Almost half of the employees in a typical Czech tool and die making company work in production. In Germany, this share is slightly under 40%.

Educational qualifications in the Czech tool and die making industry

- University graduate: 17%
- Technician: 33%
- No apprenticeship: 1%
- Successfully completed apprenticeship: 49%
Distribution of employees

Manufacturing technologies

A higher proportion of employees in production compared to German tool and die making companies is an indication of a lower degree of automation in Czech tool and die making companies. This is justified by the lower use of automation measures in the production technology of milling, which is regarded as the most important production technology for tool and die making. Automation measures used in milling production technology include tool changers, workpiece palletizing, tool pre-setting, robots, and job management. Only one out of nine automation measures is used more frequently in the Czech Republic than in Germany. The automation measure 'machine interlinking' is used by about a quarter of the companies. The biggest deficits found in Czech tool and die making companies are in the use of robots, handling systems, workpiece and tool pre-setting, and workpiece palletizing.
Automation measures in the technology “milling” in the tool and die making industry (multiple choices possible)

- Machine interlinking: 19% (Germany), 25% (Czech Republic)
- Job-management: 38% (Germany), 54% (Czech Republic)
- Robots: 37% (Germany), 13% (Czech Republic)
- Handling systems: 0% (Germany), 37% (Czech Republic)
- Integrated surveying: 38% (Germany), 60% (Czech Republic)
- Workpiece pre-setting: 52% (Germany), 25% (Czech Republic)
- Tool pre-setting: 49% (Germany), 73% (Czech Republic)
- Workpiece palletizing: 38% (Germany), 72% (Czech Republic)
- Tool changers: 75% (Germany), 89% (Czech Republic)
Interview with Mr. Paclík, Director of the Association of Engineering Technology (SST)

Dipl.-Ing. Oldrich Paclík

Dipl.-Ing. Oldrich Paclík has been the director of the Association of Engineering Technology (SST) since 01 June, 2014. The SST was founded in 1990 and unites the majority of companies and organizations in the manufacturing industry located in the Czech Republic. The association represents the common interests of its members towards domestic and foreign institutions and offers a platform for joint exchange. Its members include machine, plant, and tool and die making companies as well as the manufacturing goods industry. Through his activities at the SST Association, Mr. Paclík has extensive knowledge of the market and provides exciting insights into the characteristics and potential of the Czech industry and in particular the tool and die making sector.
For what does your organization SST stand and what are your most important activities?

The abbreviation SST stands for Svaz strojírenské technologie, which can be translated as the Association of Engineering Technology. The association is comparable to the German VDWF (Verband Deutscher Werkzeug- und Formenbauer e.V.). Under our umbrella we unite a large part of the manufacturing companies of the country and offer companies a platform for joint exchange. We also represent industry interests vis-à-vis domestic and foreign institutions. For example, we maintain a regular exchange with Czech politicians in order to improve training in technical professions and adapt to the changing requirements of Czech industry. We also work closely with CECIMO (European Association of Machine Tool Industry) and try to improve the networking of Czech industry at a European level.

How do you assess the current situation of the Czech economy and how will it develop over the next 3 to 5 years?

The Czech economy is currently in an excellent position. The country's GDP has risen steadily in recent years. The labour market in the Czech Republic has the lowest unemployment rate in the European Union. Despite this positive development, a number of challenges will have to be met in the coming years in order to sustain current growth. Our economy is currently still very susceptible to fluctuations in the automotive industry and developments in the German economy. More than 30% of our exports from the manufacturing industry are delivered to Germany. Here, the Czech economy will have to diversify in the coming years and increasingly focus on innovative manufacturing technologies and intensive cooperation in order to increase competitiveness. Germany is definitely the right partner in this respect, but certainly not the only one.

What are the greatest strengths and potentials of the manufacturing industry in the Czech Republic?

Thanks to our good training system, the manufacturing industry can fall back on qualified specialists and is able to master complex requirements at a high level. Another strength of the Czech economy is the close cooperation with European companies. This has resulted in a large number of close partnerships between European and Czech companies, which have created a sustainable, export-oriented economy.

Great potential for the Czech economy can be found in the field of automation and the implementation of Industry 4.0. In the mid-term, this can further increase production efficiency. A further potential for improvement is the expansion of the public infrastructure in order to make the business location competitive for the future. European companies must continue to be offered incentives to open and expand production sites in our country in the coming years.
**How do you assess the capabilities of the Czech tool and die making industry?**

The supply of tools and dies to the domestic market plays a key role in the high growth rates of the manufacturing industry. Without a strong Czech tool and die making industry, the manufacturing industry will not be able to continue to grow at this rate in the future. I think that the Czech tool and die making industry can meet this challenge, and I see the development of domestic tool and die making companies at a high level. Czech tool and die making companies can cope with complex product requirements and are able to produce tools with low tolerance and high-quality requirements.

**What role does Czech tool and die making play in comparison to Europe and the world?**

Tool and die making in the Czech Republic plays an important role in the manufacturing industry and has great growth potential for the future. In recent years, interesting and specialized companies with high turnover and internal market access have emerged in the field of tool and die making. Czech companies are highly competitive in the European comparison and are able to supply European and especially German companies with tools and dies. The largest customer of Czech tools is Germany.

**How do you see the training and availability of tool workers in the Czech Republic compared to other countries?**

The Czech training system is at a very high level compared to other European countries. Especially through our nationwide engineering schools, which train skilled workers in three- to four-year courses, we consistently manage to train qualified skilled workers for the manufacturing industry and especially for the tool and die making industry every year. Certainly, there is still a large gap between us and the tool and die making nations such as Germany.

At present, however, it is difficult to find a sufficient number of skilled workers due to the shortage of skilled workers in technical occupations throughout Europe. For this reason, Czech companies are increasingly trying to look for qualified workers from other countries, e.g. the Ukraine. We are also trying to do our part there through far-reaching initiatives.

**What is your opinion on the automation potential in the Czech tool and die making industry?**

Basically, the use of automation solutions in the Czech processing industry must continue to increase. Whether the future degree of automation can also be transferred to Czech tool and die making companies is another question. I estimate the potential for individual and small series production to be rather low, although, even here, an application would also be possible.
Conclusion

Industrial environment
Measured by gross domestic product (GDP), the Czech Republic is one of the smaller economies in Europe and the forty-seventh largest in the world. Although the GDP of the Czech Republic approaches the average of the European Union in terms of purchasing power, its positive development has slowed down in recent years. Nevertheless, high growth is expected in the outlook for 2018. In particular, the international automobile manufacturers and suppliers, mechanical and plant engineering as well as the electrical engineering industry producing in the Czech Republic are the driving forces behind this development. At the same time, they drive the Czech tool and die making industry. In 2016, the Czech Republic produced tools with a total value of € 314.3m.

Product
Robust, precise products and a good reputation are the promise of the tool and die making industry in the Czech Republic. In terms of turnover, the injection molding industry produces more than half of all tools manufactured in the Czech Republic. From 2013 to 2016, Czech tool and die making industries increased the production of injection molds by 17 %. At the same time, the production volume of high pressure die casting tools increased from 7 % to 12 % of the total tool production volume in the period from 2013 to 2016. On the other hand, sheet metal and solid forming tools recorded a significant decline from 37 % to 25 %.

Process
The Czech tool and die making industry is characterized by good process efficiency, which is reflected in relatively short lead times and competitive adherence to delivery dates. A characteristic feature of the Czech tool and die making industry is the low outsourcing rate compared to Germany. Due to the low wage level, the majority of the production steps in the Czech tool and die making industry are carried out internally.

Resource
Czech tool and die making companies benefit from the country’s good education system and its orientation towards technical professions. In Czech tool and die making companies, 96 % of all employees have at least one technical qualification, which creates a good starting point for future development. In addition to good training, Czech tool and die making companies have a high proportion of employees in production. This is due to the lower spread of automation measures.

Conclusion
The sectoral structure of the Czech economy is characterised in an outstanding way by the automotive sector with the supplying industry and the electrical engineering sector. These sectors benefit from a strong tool and die making industry, which in recent years has been able to catch up with the leading tool and die making nations and is one of the key enablers of a functioning manufacturing industry in the Czech Republic.
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