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POSITION AND THE DEVELOPMENT OF THE GLOBAL STEEL INDUSTRY

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In the article, the view to the position and development of the global steel industry is commented using the experience of last 20 years of evolution of the Czech steel industry. The changes are observed in the scope of production, consumption, and trade.

Key words: global steel production, consumption, Czech steel industry, future of steel

Položaj i razvitak svjetske čelične industrije. Na temelju iskustva posljednih 20-ak godina ustroja češke čelične industrije, u članku se daje osvrt na položaj i razvitak svjetske čelične industrije. Promjene se motre u dosezima proizvodnje, potrošnje i prodaje.

Ključne riječi: svjetska proizvodnja čelika, potrošnja, češka čelična industrija, budućnost čelika

INTRODUCTION

Production of iron and steel has had a long tradition in the Czech lands. Many companies were established more than 200 years ago and two of three biggest Czech companies – Vítkovice and Třinecké železárny began their activity in the first half of 19th century. It was a year 1849, when the montan technical university was established – the Technical University VŠB has had a seat in Ostrava since 1945, when it was relocated from the primary seat in Příbram.

STEEL INDUSTRY IN CZECHIA

Nowadays, the steel production in Czechia varies from 6 to 7 million tons, which is about 700 kg per capita. In the years of the maximum production, it was easy to remember the production 1000 kg per capita and the consumption 700 kg per capita. As the consequence of the political and economical changes, the consumption dropped to 240 kg per capita in mid 1990s, but it achieved the level higher than 600 kg last year as it can be seen at the Figure 1. From the graph it is evident that the Czech producers managed the situation, they found the new markets, but the traders followed the new situation in consumption.

The trade, import as well as export including deliveries within EU, is higher than 5 million tons, but the most significant characteristic for the last 15 years is steady growth of import. The aim of our presentation is to comment the trends in the global steel industry from the point of view of the Czech experience. Is it possible to see the future?

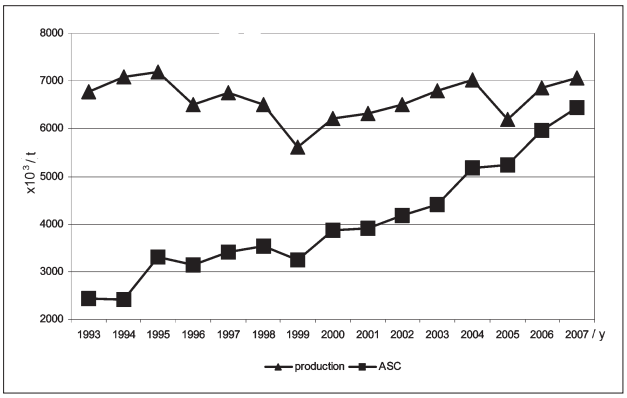

Figure 1. Development of production and inland consumption in Czechia

GLOBAL DEVELOPMENT OF STEEL PRODUCTION

The contemporary development is often called as a "new economy." It is connected with the termination of the classical industrial branches – the steel industry, which is one of the oldest human activities and iron named even one historical period, can be often considered as unprospective industry. But the recent trends of the global production have proved steel as the material of future. It results from the comparison of the situation in the developed countries with the needs of other countries, but also from the growing intensity of innovations and relevant trends of R&D as well as the sustainable growth of steel products consumption.

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The industry reporting steady year-on-year growth of consumption above 5 % cannot be considered as extinct one. Not only that, the global consumption exceeded 1 billion tons of steel products. The comparison with other commodities, such as coal, cement, aluminum, glass, plastic, and other metals results in prospective future of steel. It is also supported by narrow co-operation between steel producers and consumers mainly in machinery, construction, and automotive industry – we can tell that about 40 % of steel products are "younger" than 10 years. The relationship of steel and other materials cannot be considered as a throat cutting competition, but more like a symbiosis as is can be documented by many applications in construction or automotive industry.

It was the year 2004, when the global production hit the value of 1 billion tons of crude steel. So, after the period of stagnation – better to say stabilization, which lasted from 1975 to 1995, the steel production has been continually growing. Last year, the year-on-year growth reached the level of 7.5 %, as it is shown in the Table 1 besides the regional distribution of the steel production. [1, 2]

Table 1. **Regional distribution of the steel production in 2007**

Region	Countries	Production / Mt	% / global share	% / index 07/06
Asia		754,3	56,1	11,7
	China	489,0		15,7
	Japan	120,2		3,4
Europe		364,8	27,2	2,8
	EU 27	210,3		1,7
	EU 15	175,7		1,4
	CIS	124,0		3,4
North America		132,1	9,8	0,4
	USA	97,2		-1,4
South America		48,3	3,6	6,5
Africa		18,8	1,4	0,1
Middle East		16,4	1,2	6,7
Australia		8,7	0,6	0,6
Total World		**1 343,5**		**7,5**

The trends of production were not always straightforward. The stabilization in the period from 1970s was connected with the considerable restructuring of steel industry in main European countries as well as in North America. Its effect reflected the reaction to the energetic crisis as well as the political changes in the world. The territorial shifts were evident as it refers in Table 2. In 1950s, the East European countries took the relay stick from the Western European countries. This shift did not affect America. Later, the share of production in Japan leaped ahead at the expense of North America. The share in the rest of Asia, mainly in China and Korea, grew by the same time. New capacities in South-East Asia and political changes in former Soviet block were accompanied by plummeting share of Eastern Europe and rocketing production in China, which has been lasting up till now. The share of Chinese steel in 2007 reached 36.4 % while the Asian portion exceeded one half of the world production yet. The most dynamic countries – Brasil, Russia, China, and India – are often referred as BRIC.

Table 2. **Territorial shifts in the steel production (portion in % of the global production)**

Year	W. EU	E. EU	N. AM.	Japan	China	O. Asia	O. World
1938	46 **max**	20	27 **max**	6 **min**	0 **min**	3 **min**	1 **min**
1950	41	19	27	7	0	4	2
1960	29	26	27	8	2	5	3
1970	24	26	20	16 **max**	3	7	4
1980	20	29 **max**	14	16	5	10	6
1990	18	26	12 **min**	14	9	14 **max**	7
2004	16 **min**	16 **min**	13	11	26 **max**	11	8 **max**

max/min – maximal/minimal value for the region in the course of time

GLOBAL STEEL CONSUMPTION

The 41st IISI Annual Conference estimates this year's growth of 6.8 %, the same as the year before, sets the consumption at the level of 1,280 million tons. The last prognoses appeared always lower than the reality afterwards. The consumption as well as production has been continuously growing since 2000. It is necessary to take into consideration that dynamic of the growth is different region by region. [1,2]

The fastest are the BRIC countries. The average consumption per capita in the World exceeded 200 kg. The trends in the Czech Republic demonstrate the above-mentioned changes as the specific consumption doubled within last 8 years and comparing the minimum value in mid 1990s it is nearly triple figure. [3, 5] The consumption in selected regions and countries are shown in Tables 3 and 4.

The growth of consumption was influenced by the close co-operation of the steel producers and the end user's branches. The consumption portfolio varies in different branches as well as in different regions. In China, the dominant share of end-users is the construction (more than 50 %), because of massive infrastructure building. In the case of the Czech Republic, it consists mainly of machinery and metal processing (40 %), construction (20 %), and auto-motive industry (20 %). The consumption increments in Czechia correspond with the situation in EU, but they are obviously higher, as the EU market is the paramount one for the Czech producers. The relation between Czech and EU increments is shown in the Figure 2.

Table 3. **Consumption in regions / thousand tons and dynamic / %**

	2006	2007	2008	2005/06	2006/07	2007/08
World total	1 120,9	1 197,7	1 278,6	8,8	6,8	6,8
Asia	607,2	663,2	721,1	6,2	9,2	8,7
EU-27	184,9	192,2	195,0	11,4	4,0	1,4
NAFTA	155,7	148,1	153,9	11,5	-4,9	4,0
CIS	50,0	59,8	65,2	18,1	19,5	8,9
Middle East	37,2	40,4	43,4	9,8	8,4	7,5
S & M Americas	35,6	39,5	41,6	11,8	10,9	5,2
Rest of Europe	27,2	29,3	31,0	11,0	7,8	5,7
Africa	23,1	25,1	27,5	11,4	8,9	9,5

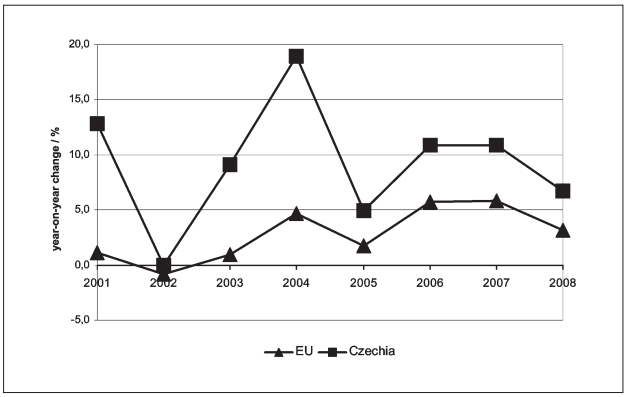

Figure 2. Development of consumption increments in EU and Czechia / % per year

FACTORS OF STEEL DEMAND, PRICES

The prices of inputs have jumped up, but the steel producers managed to damp that by production rationalization and better logistics, as well as the industry conso-lidation. Although, the part of the costs had to be moved to the customers.

The demand for steel is influenced by following factors:

- long term stagnation – stabilization in the past
- transition of the planned economies to the market ones
- appearance of the low-cost countries like BRIC – the dynamic of the growth is expected to accelerate in the future
- current trends will continue for about next 5 to 10 years
- providing the global consumption reaches today's developed countries, the level of steel production could climb up to 2.5 billion tons
- changes of portfolio towards higher utility value in developed countries, as the consumption is more or less saturated
- growing consumption of merchant grades in other countries

The dynamic of production within last decade for TOP10 countries is shown in the Table 5.

This table acknowledges aforementioned factors; not only that the steel industry can be characterized by the upstream integration, forming the multinational corporations, creation of the new service centers. The new element is creation of the early warning systems, which help with eliminating the influence of undesirable

Table 4. **Specific consumption in selected countries / kg per capita**

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007e	2008f
Germany	438	473	449	427	416	442	439	465	488	496
Italy	507	524	525	513	554	568	544	620	622	632
Spain	424	422	458	477	508	502	497	579	591	596
Francie	303	325	290	288	263	282	246	271	274	271
UK	231	229	229	214	209	224	188	212	213	212
Austria	345	366	380	394	394	418	425	492	520	528
Belgium-Lux.	437	639	605	502	453	488	415	505	505	484
EU 15 average	372	394	384	376	374	388	373	411	422	424
Czechia	319	379	381	410	433	508	513	585	630	681
Poland	186	199	176	202	202	225	222	275	317	335
EU 27 average	328	350	341	339	339	357	345	384	399	405
Russia	124	169	187	173	198	203	211	250	312	342
Ukraine	101	126	149	143	171	151	155	183	214	233
USA	399	411	363	367	344	391	363	404	379	394
China	89	91	115	139	180	205	249	272	303	338
Japan	574	635	610	598	612	601	610	619	629	631
Southern Korea	705	803	799	912	947	979	977	1016	1 108	1 141
India	24	25	26	28	28	31	36	42	47	53
World	**125**	**136**	**139**	**148**	**159**	**171**	**180**	**196**	**210**	**224**

Table 5. **Development of Top 10 countries in last decade**

	1997		2007		% growth
	Rank	Production	Rank	Production	
World		**798,9**		**1321,5**	**165,4**
China	1.	108,9	1.	489,32	449,3
Japan	2.	104,5	2.	120,2	115,0
USA	3.	98,5	3.	97,2	98,7
Russia	4.	48,5	4.	72,2	148,9
Germany	5.	45,6	7.	48,6	106,6
Southern Korea	6.	42,6	6.	51,4	120,7
Brasil	7.	26,1	9.	33,8	129,5
Italy	8.	25,8	10.	32,0	124,0
Ukraine	9.	25,6	8.	42,8	167,2
India	10.	24,4	5.	53,1	217,6

events. Those systems are for example created by EUROFER or Steeelindex in the USA.

ENVIRONMENTAL ISSUES

Environmental protection, the issues of human resources and health and safety, as well as new projects for research and development are playing the key role in the forming the future of the steel industry.

The attitude of the steel producers towards the environmental burdens can be demonstrated on the case of the Czech steel companies. The investments within last 15 years have brought not only better and more efficient technologies, but also significant drop of pollution. Taking into consideration that the steel production remains relatively constant in the range of 6 to 7 million tons, the relative reduction of the pollutants can be seen at the Figure 3. The investments reached the value of CZK 75 billion, one third of this aimed directly to the environmental protection. These costs were borne by the companies with negligible contribution of the state.

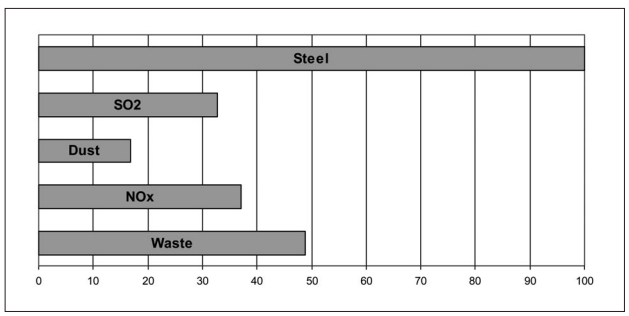

Figure 3. Effects of environmental investments in the Czech Republic / %

All key productive facilities in the Czech steel companies meet the criteria of the European directive 96/61/EC, dealing with IPPC. The majority of the steel companies received the ISO 14000 certificates. Recently, there are intensive negotiations concerning the trade with the greenhouse gas allowances, REACH, energy taxes, and the amendment of the environmental legislation within all EU countries.

THE HUMAN RESOURCES ISSUES

Even though the position of the steel industry have significantly improved and its products have continuously growing utility value, the awareness of the bad name of this branch is still ringing. This results in lack of interest among the new generation and ageing staff of the steel companies. This is the new challenge for the HR officials, who were used to manage different tasks during the period of restructuring. The new situation is connected with the close co-operation of the steel companies and the schools at all levels as well as changes in the education system. The work of Sector Council, where specialists from the industry, schools, and the state officials work together on forming the new educational requirements, is a good experience of today's solutions. Moreover, the situation has a strong regional character, so it is very beneficial that the companies support students, mainly the talented ones.

RESEARCH & DEVELOPMENT

The main research and development assignments are concerning the environment, energy effectiveness, and resource savings as well as fulfilling the requirements of the most important end users, which are the automotive and construction industries. It is conforming to the strategic research agenda of ESTEP – European Steel Technology Platform, which is based on the principles of sustainable growth: in four pillars – 4 P: Profit, Partners, Planet, People. ESTEP shows us the way to achieve the long term ambition through innovation and R&D and so, some EU countries have prepared their own R&D strategies respecting the European environment. [6-9]

The R&D projects conforming to the ESTEP trends can be supported not only be the Framework Programme but also from the RFCS – the Research Fund for Coal and Steel. The Czech government R&D strategy fully supports that approach.

CONCLUSION

Steel is the material, which substantially affected the world development and it will be largely important and useful in the future too. It will lead up to products with higher utility value, but the trends will vary in different regions. The consolidation and globalization of the steel industry will go on respecting the key role of demand for resources and logistics. The significant factors at the world markets are the developing regions like BRIC could bring some difficulties concerning coordination

of production and consumption. The limit global value of the steel products consumption is still at least twice higher than today's level. The mission for the young people – all professions can be used in the steel industry!

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Note: Author J. Raab is responsible for English language.