



VÚOS - partner SCHP ČR

**ENSURING OF THE TASKS CONNECTED WITH
REALIZATION OF PROJECT NO. 1CE011P2
„CHEMICAL LOGISTIC COOPERATION ON
CENTRAL AND EASTERN EUROPE“
CHEMLOG**

**SWOT ANALYSIS OF TRANSPORT OF CHEMICAL SUBSTANCES
IN THE CZECH REPUBLIC**

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Introduction

This documents was elaborated on the basis of SCHP/ChemLog/1 Agreement, contracted on 2/2/2009 between representatives of Association of Chemical Industry of the Czech Republic and VÚOS, a.s. Pardubice for ensuring of the fulfillment of the tasks connected with the realization of the project No. 1CE011P2 „Chemical Logistic Cooperation on Central and Eastern Europe ChemLog, funded by European Regional Development Fund within the frame of project INTERREG IVB, part WP 3 „Analysis and Exchange of Experience“. The Agreement was conclude on the basis of tender results, proclaimed by representatives of Association of Chemical Industry of the Czech Republic.

The object of analysis is mainly ensuring of fulfilment of tasks connected with realization WP 3 “Analysis and Exchange of Experience, namely to work up SWOT analysis for transport of chemical substances by road, railway, ferry and intermodal or pipeline transport in order to obtain outputs that could serve for working up of the Feasibility studies.

For processing of the materials, the working group was established by submitter to guarantee the technical content of the task in the required deadlines.

The work was divided into several separate steps according to submission:

- Step 1 – working up of the overview about amount of transported goods
- Step 2 – working up of the overview of various types of transport
- Step 3 – contacting of the selected (main) involved companies and organisations
- Step 4 – working up of the analysis

During elaboration of this report the sequence of steps has been slightly changed to maintain the logical consecution.

The partial goals are mainly:

- a) To obtain the general information about actual state of affairs by means of describing the transport of the chemical substances in Czech Republic
- b) To identify strengths, weaknesses, threats and opportunities of the chemical transport in the Czech Republic



1. Basic facts about the territory of Czech Republic

The Czech Republic is continental country, situated in the central Europe with wide cultural, historical and natural wealth. The Czech economic is showing dynamic increase after Velvet revolution in 1989 mainly because of export and interest of foreign investors.

The Czech Republic, with its total area of almost 97 000 km² belong to the middle-sized countries, but from the overall area of European Union occupies Czech Republic only little more than 2%. With approximately 10.3 million of inhabitants belongs to the Czech Republic 12th rank among European countries.



Fig. 1: Czech Republic and its regions

The development of GDP of Czech Republic was very favorable from 2000 to 2007 and this trend continued in 2008. The Czech economy grew constantly from 1999, whereas from the 2nd quarter of 2005 the growth rate did not decrease below 6%. In 2007 the economic performance of the Czech Republic grew for approximately 6.3%. The economic performance was supported mainly by manufacturing industry on the side of resources formation and mainly by household's spending for final consumption on the side of usage. There was identified a significant year-on-year growth of 8.2% in 2007, which was connected with creation of new manufacturing capacities in automotive field, electronic and computer industry. Beside the above mentioned branches also the rubber, plastic, energetic, and engineering industry was developing very quickly.

	2000	2001	2002	2003	2004	2005	2006	2007
mld. CZK	2 189,2	2 352,2	2 464,4	2 577,1	2 814,8	2 987,7	3 231,6	3 557,7
mld. EURO	80,0	85,9	90,0	94,1	102,8	109,1	118,0	129,9
Year-on-year increase (%)	5,2	7,4	4,8	4,6	9,2	6,1	8,2	10,1
thous. CZK per capita	213,1	230,1	241,6	252,6	275,8	292,0	314,8	344,6
thous. EURO per capita	7,783	8,404	8,824	9,226	10,073	10,665	11,497	12,586

Tab. 1: Gross domestic product in Czech Republic (GDP) in years 2000 – 2007 ⁽⁸⁾

The GDP value was approximately 3 557.7 milliards (mld.) CZK^(*) in 2007 and year-on-year increase was approximately 10.1% (326.1 mld. CZK). The 2/3 of this significant growth was caused by increase in physical volume and 1/3 by increase in total price level.

The foreign trade with goods and services ended with surplus of approximately 172.9 mld. CZK that is 4.9% of GDP. The growth rate of import and export in 2007 maintain double figured values – Czech companies exported by 328 mld. CZK more (+15.3 %) than the previous year, import grew for about 275mld CZK (+13.2 %). The attained surplus influenced positively exchange relations. Czech Republic has as the only one from the new EU countries positive trade balance. In 2007 the tendency of trade surplus increase with the EU countries continues as well as the growth of deficit with other territories.

^(*) CZK is an abbreviation for Czech Crown, Czech currency

2. Basic information about chemical industry in the Czech Republic

The chemical industry in the Czech Republic is concentrated in the two main basic areas, north-west and south-east area. The Central and Eastern Bohemia represent the central chemical region of the Czech Republic.

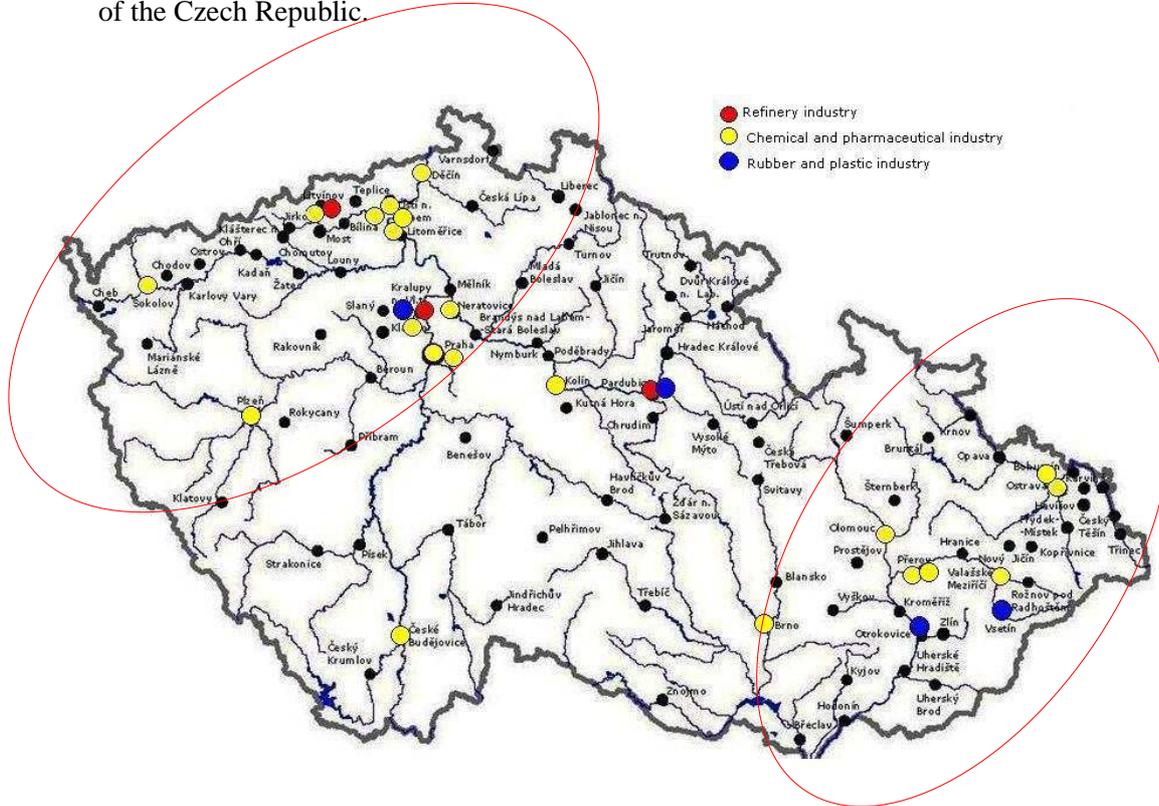


Fig. 2: Basic trade balance of the chemical industry in the Czech Republic

Chemical industry belongs to the youngest industrial branches in the Czech Republic. It forms approximately 14.4 % (SHP 2007) of overall manufacturing industry of the Czech Republic. Its products are produced for usage in others branches of industry. The chemical industry is very demanding in terms of research and preproduction phase. The majority of raw materials are imported from abroad. According to the raw materials, Czech chemical industry can be divided in several categories mentioned below:

a) Petro chemistry, dealing with production of substances like asphalt, oil, lubricants, petroleum and petrol (also kerosene) form crude oil by means of fraction distillation. These products are made into chemicals, plastics, cleaning and washing agents, artificial rubber, explosives, cosmetics, dyes and varnishes. The centre of the petro chemical industry is situated in Kralupy nad Vltavou, in Litvinov, in Usti nad Labem, in Pardubice and in other plants in Ostrava and Zlin region. The import of crude-oil to the Czech Republic is realized by pipeline Družba (to Litvinov) and Ingolstadt (to Kralupy).

b) Coking chemistry, dealing with manufacturing of the by-products from the production of coke, i.e. coal-tar, which contains approximately 200 components, which are widely used in production of fats, soaps, dyes, medicaments, diluents, plastics and explosives. The most important centre is in Valasske Mezirici, in Pardubice, in Lovosice, in Usti nad Labem, in Liberec and the production of plastics and artificial fibers is situated in Plana nad Luznici.

c) Rubber industry, dealing with production of tires, other products e.g. latex foam or rubber clothes. The world known centre is situated in Otrokovice, in Breclav and in Napajedla.

d) Pharmaceutical industry dealing with production of pharmaceuticals. The biggest producers come from Praha, Neratovice, Ústí nad Labem, and Opava; some active substances for pharmaceutical industry are produced in Pardubice (VÚOS).

There are several smaller chemical branches in the Czech Republic, e.g. Acrylate chemistry, which is situated in Sokolov. Mainly acrylates for glues and dyes are produced there. The production of cleaning and washing agents in Rakovník represents also a significant part of Czech chemical industry. The cosmetic industry is situated mainly in Prague.

Main chemical companies in the Czech Republic are listed below:

a) Southwestern area :

Hexion – fine chemicals, acrylate, polymers, <http://www.hexion.com/>

Unipetrol RPA – plastics, agro-carbamide, monomers, alcohols, fine chemicals, <http://www.unipetrolrpa.cz/cs/index.html>

Česká rafinérská – Shell, ENI, PKN, <http://www.ceskarafinerska.cz/cz/index.aspx>

Spolchemie – resins, inorganic chemicals, fine chemicals, http://www.spolchemie.cz/pg_txt.aspx?id=97

Setuza – bio-fuels, cosmetics, <http://www.setuza.cz/>

Lovochemie – inorganic products, fertilizers, <http://www.lovochemie.cz/>

Synthos – plastics, rubber, monomers, <http://www.kaucuk.cz/html/intro.html>

Spolana – PVC, inorganic compounds, fine chemicals, <http://www.kaucuk.cz/html/intro.html>

Chemotex – industrial chemicals, <http://www.chemotex.cz/>

SIAD, Air Products – technical gases, <http://www.airpower.com.sg/index.php?q=products/siad>

Dekonta – dangerous wastes, <http://www.dekonta.cz/>

b) Northeastern area :

Bochemie -retail cleaning agents, <http://www.bochemie.cz>

BorshodChem – inorganic compounds, http://www.bc-mchz.cz/site/mchz/web.nsf/new_top_cz?readform

Deza – benzene, coal-tar products, <http://www.deza.cz/vgs/deza/d.htm>

Fatra – PVC, PET for insulation, <http://www.fatra.cz/>

Fosfa – fertilizers, phosphoric acid, <http://web.fosfa.cz/>

Gumotex - rubber, <http://www.gumotex.cz/>

Precheza – inorganic pigments, titanium white, <http://www.precheza.cz/www/index.htm>

PLIVA-Lachema – pharmaceutical products, <http://www.lachema.cz/cz/index.php>

CS Cabot – carbon black, <http://www.cabot.cz/>

c) Other chemical plants:

Cepro – retail with petrol, pipelines, state reserve, <http://www.ceproas.cz/>

Silon – polyester fibers, <http://www.silon.cz/>

Paramo – oils, lubricants, paraffin, <http://www.paramo.cz/cs/index.html>

Synthesia – organic pigments and pharmaceutical specialties, <http://www.synthesia.eu/>

Explosia – explosives and smokeless powders, <http://www.explosia.cz/>

Linde Gas - technical, special and medicinal gases, www.linde-gas.cz

Zentiva – pharmaceutical products, <http://www.zentiva.cz/>

Number of entrepreneurial subjects	2000	2001	2002	2003	2004	2005	2006	2007
CZ all together	147642	154411	155047	154226	152745	150987	150585	154647
Production of chemicals, preparations, and pharmaceuticals	1 642	1 813	1 193	1 042	1 123	1 573	1 528	1 539
Rubber and plastic products	2 511	2 948	2 992	3 137	3 119	2 818	3 000	3 321
Employees in thousands								
CZ all together	1 511	1510	1 513	1 489	1 409	1 422	1 493	1 458
Production of chemicals, preparations, and pharmaceuticals	46	47	44	44	42	43	41	37
Rubber and plastic products	57	65	67	70	75	77	85	80
Results in mld in CZK (GDP)								
CZ all together	2 175,4	2 429,8	2 438,8	2 587,7	2 814,8	2 983,9	3 215,6	3 550,2
Production of chemicals, preparations, and pharmaceuticals	123	121	113	116	145	149	165	166
Rubber and plastic products	86	106	113	134	158	175	213	253

Tab. 2: Basic characterization of chemical companies in the Czech Republic – included are all chemical companies, which have chemical industry as a main sphere of business activity ⁽⁷⁾

	company with more than 20 employees	Share on the volume of Sales in %	Share on the volume of employees in %
Refineries and crude-oil processing	5	24,4	3,0
Chemistry and pharmacy	140	51,5	52,5
Rubber and plastic industry	303	24,1	44,5
Overall	448	100	100

The inconsistency of the data (industrial fields) is caused by inconsistency in the utilized primary literature sources.

Tab. 3: Detailed information about chemical companies in 2007⁽⁷⁾

2.1. Business with chemicals in the Czech Republic

2.1.1. Export

2.1.2.

Overall / thous. tons								
	2000	2001	2002	2003	2004	2005	2006	2007
fertilizers	363	801	514	438	443	291	425	465
chemicals	3299	3315	3144	3087	3580	2908	3102	3017
overall	43550	43291	41338	42380	39692	38723	42827	42014
railways								
fertilizers	6	175	137	223	185	188	197	255
chemicals	1535	1432	1330	1320	1260	1300	1309	1211
overall	24582	23759	21913	22692	20456	20523	21924	22140
roads								
fertilizers	205	478	309	144	178	20	162	166

chemicals	1761	1882	1811	1765	2319	1602	1769	1795
overall	18346	19016	19007	19313	18983	17653	20525	19618

Tab. 4: Export of the selected chemicals from the Czech Republic ⁽⁷⁾

The available statistic data are not in the right detailed structuring; nevertheless the obtained data show that the export of chemicals is approximately 10% of overall export volume (in weight units). The splitting between road and railway transport is almost same. Overall volume of export shows steady state in the monitored period. Only in 2004 small decrease of 6.3% was observed, or if you like one year later in 2005 the decrease of 8.6% was observed in comparison with 2003. In terms of export of chemicals and fertilizers the trend is also steady. The exception is only year 2005, when the decrease of 5.8% was registered in comparison with 2003. In 2004 rare increase of almost 16% was observed in comparison with 2003.

2.1.2. Import

Overall /thous. tons								
	2000	2001	2002	2003	2004	2005	2006	2007
fertilizers	515	695	681	569	749	627	659	732
chemicals	2872	2987	3171	2698	3266	2702	2785	3029
overall	33731	35844	34453	37752	37189	33328	39414	39659
Railways								
fertilizers	415	629	577	513	601	550	510	463
chemicals	1542	1401	1167	1138	1141	1184	1211	1297
overall	20908	21167	20301	22442	21321	18907	22057	22759
Roads								
fertilizers	61	24	77	41	132	69	144	266
chemicals	1322	1579	1999	1554	2074	1480	1566	1730
overall	12341	14195	13768	15070	15569	14057	17021	16652

Tab. 5: Import of the selected chemicals to the Czech Republic ⁽⁷⁾

In the observed period of 2000 – 2007 the import shows a slight increase. The size of ratio of transport of chemicals compared to overall transport is on the same level as for export. The railway transport is more dominant for import. More significant statistic abnormalities were not observed.

2.1.3. Intranational transport in the Czech Republic

Overall/thous. tons								
	2000	2001	2002	2003	2004	2005	2006	2007
fertilizers	11337	13811	12733	10524	9781	9904	10708	11462
chemicals	11218	8063	8294	9622	10826	5116	7096	7784
overall	428962	449878	483226	452774	468642	463790	444351	445330
railways								
fertilizers	419	430	291	219	222	175	195	274
chemicals	1158	1155	1067	947	778	742	1416	778
overall	46039	45196	42741	40849	39765	39506	45861	46959
roads								
fertilizers	10913	13377	12442	10304	9521	9716	10512	11188
chemicals	10059	6994	7306	8674	10048	4374	5679	7006
overall	382287	403932	439725	411367	428256	423598	398071	407741

Tab. 6: Intranational transport in the Czech Republic ⁽⁷⁾

In the case of domestic transport, the road transport is significantly dominant. Overall transport of chemicals represents few percents from overall transport.

The obtained statistical data do not include the balances for transit over the Czech Republic. The transported amounts oscillate statistically – significant upward or downward trend cannot be found.

2.1.4. Intermodal transport

Railways/thous. tons								
	2000	2001	2002	2003	2004	2005	2006	2007
overall	2826	2773	3411	4136	4551	5081	5746	6986
intranational	680	455	618	806	775	947	1257	1471
Intermodal overall	2146	2318	2792	3330	3776	4134	4489	5515
export	849	963	1180	1354	1603	1790	1919	2185
import	795	952	1246	1549	1774	1960	2191	2757
transit	502	402	367	427	399	384	382	572

Tab. 7: Intermodal transport ⁽⁷⁾

From the above mentioned table it can be very easily concluded that there is a significant tendency of increase in intermodal transport both for import and export. On the other hand, the amount of goods transported by intermodal transport over the territory of Czech Republic (transit) does not show any trend. In the previous year the amount of goods transported by intermodal transport was the highest for last 8 years.

2.1.5. Transport flows in export

Thous. tons								
	2000	2001	2002	2003	2004	2005	2006	2007
overall	43550	43289	41332	42381	39692	38723	42827	42014
EU	28392	28215	27517	40967	38161	37575	41481	40885
Germany	18398	17685	16293	14576	13075	13263	13783	13705
Poland	5427	5427	4228	4067	3763	3884	5066	5366
Austria	5797	6127	6370	6934	7096	6519	6641	6135
Slovakia	5798	6321	5866	6541	5760	5754	6987	7127
railways	24582	23759	21905	22692	20456	20523	21924	22139
EU	13251	12709	11684	21864	19502	19892	21204	21566
Germany	8306	7417	5988	5392	4453	4548	4938	4987
Poland	4383	3251	2824	2761	2852	2899	4005	4516
Austria	4398	4613	5116	5954	5219	4829	4305	4207
Slovakia	4182	4592	4430	4465	3980	3977	4575	4387
roads	18347	19014	19007	19313	18983	17653	20525	19618
EU	14518	14993	15412	18566	18126	17136	19900	19063
Germany	9501	9786	9921	8831	8401	8194	8496	8492
Poland	1044	975	775	1306	911	985	1061	865
Austria	1399	1484	1254	980	1878	1690	2337	1928
Slovakia	1616	1730	1437	2076	1780	1777	2412	2740

Tab. 8: Export flows in the EU and neighboring countries of the Czech Republic; ⁽⁷⁾

Only the main partners (the amount of transported goods at least 1000 thousand tons per year) are mentioned in this table. Therefore the sum of numbers in the columns per one particular year for all mentioned countries do not equal to the overall number. Also some countries which join the EU in later in 2003 (Slovakia, Poland) are not included. The trade is also directed to the other countries than to Europe and EU.

It is obvious from the above mentioned numbers that the export is usually directed to nearest, i.e. neighboring countries regardless the membership in the EU. The balance between the railway and road transport appears to be equable. It can be concluded from the balances, that the biggest business partners of the Czech Republic are traditionally Germany, Poland, Austria and Slovakia.

2.1.6. Transport flows for import

Import/thous. tons								
	2000	2001	2002	2003	2004	2005	2006	2007
overall	33731	35844	34451	37752	37189	33328	39413	39659
EU	14609	15981	15638	29379	28619	32769	38688	38980
Germany	9759	9668	10213	11135	11056	9372	11418	11680
Poland	5210	5211	4711	5606	5604	6706	8037	8738
Austria	1184	2243	1433	915	1241	1331	1398	1518
Slovakia	12729	6188	5286	6026	5067	10190	11760	10827
railways	20908	21467	20296	22442	21321	18907	22057	22759
EU	4621	4428	4152	14381	13024	18647	21688	22357
Germany	3601	3493	3397	4115	3292	2983	3583	4453
Poland	4830	4447	4159	4716	4752	5720	6995	7738
Austria	672	564	382	340	355	389	326	315
Slovakia	11097	4708	3147	4556	3832	8712	9853	8737
roads	12341	14196	13768	15070	15569	14057	17021	16652
EU	9504	11071	11098	14626	15213	13757	16665	16375
Germany	5732	5748	6453	6803	7488	6050	7526	7014
Poland	380	0	0	890	852	987	1042	1000
Austria	511	1679	1052	575	886	942	1072	1202
Slovakia	1163	1480	1339	1470	1236	1478	1907	2090
Holland	669	691	547	745	693	614	872	719
Ukraine	418	470	351	502	577	485	595	581

Tab. 9: Import flows in EU and selected European countries ⁽⁷⁾

In the above mentioned table again only the main partners are mentioned. Therefore the sum of numbers in the columns per one particular year for all mentioned countries do not equal to the overall number. Also some countries which joined the EU in 2003 (Slovakia, Poland) are not mentioned. The trade is also directed to the other countries than to Europe and EU.

In 2003 and 2004 large volumes of goods were transported to Ukraine by railway. It was approximately 8000 tons per year. These data are missing in the above mentioned table. With a view to road transport, Holland and Ukraine belong also to important partners of the Czech Republic. The transported amounts for these countries reach only values of 500 to 800 tons per year. These data are also not mentioned in the table.

The above presented import results differ significantly in comparison with export, because transported amounts are statistically equally divided among main suppliers from the neighboring countries. The Germany is traditionally on the first rank.

From the comparison of the numbers for export and import, the balance of transported amount of chemicals appears to be equable, i.e. there is no significant difference between export and import.

3. Transport infrastructure in the Czech Republic

3.1 Transport and Transport Union of the Czech Republic- generally

Modern society is dependent on the advantages which are offered by production of wide range of chemicals. The Czech Republic belongs to countries where the chemical industry is highly developed. But many chemicals obtained by means of chemical industry are classified as dangerous (dangerous substances or preparations according to the law 157/1998 Sb. about chemical compounds). Transport of chemical substances is very frequent round all European countries, including our country. Quite many road accidents occur during their transport and serious damage of surroundings environment can happen. There can be found sometimes some weak points in transport of dangerous substances. Missing information about transport companies, routes, type and quantity of transported substances belongs to the crucial weak points. Monitoring (preferable automatic) of moving carriers could be very suitable. If all subjects of Integrated Rescue System (IRS) have this information, in case of road accident, their help would be quicker and more effective.

The Union was founded as an independent, voluntary, non-political, open, interest-related organization. This organization unites employers and business entities that operate in all basic and related branches of transport.

At the beginning of 1994, the Union fused with the Industrial Union of the Czech Republic, which is an umbrella organization that covers all branches of industry and which pays attention to the predominant part of the major business entities. This new association took on the name of the Union of Industry and Transport of the Czech Republic and became the strongest business union in the country. It covers more than 25 business unions and has a membership base of approximately 1.3 million workers.

In total, the Transport Union of the Czech Republic associates 123 business entities that are involved in transport and that provide employment for more than 100 thousand workers.

The main aim of the Union is to create conditions for development of system of transport in the Czech Republic in all basic and neighboring branches.

3.2 Structuring of the transport in the Czech Republic, history

3.2.1 *Railway transport*

3.2.1.1 The history and progress of the railway transport

The beginning of the railway transport on the territory of Czech Republic goes back to years 1825-1832, when the first railway in Europe, powered only by horses, from České Budějovice to Linec was built. Its importance increases and in 1860 approximately 27 thousands of passengers were transported by this horse-powered railway. This was the outset of railways in the Czech lands. Later on, in 1870 this railway was superseded by steam railway. At the beginning of the 20th century the railways were systematically built by the state. In the fifties of 20th century the railways were electrified. The railway network become wider and more sophisticated, all big cities are connected through railways.



Fig. 3: Main railway corridors in the Czech Republic

Railway transport on the territory of the Czech Republic is realized by means of wide intranational railway network with high level of electrification and modernization with connection to the international transport pathways. Thus it is very surprising that the share of intranational railway transport on the overall transport was only 10.3% in 2007 (from 455 922 transported thous. tons, only 46 960 thous. tons by railway). From this number 778 thousand tons were chemicals (without fertilizers), i.e. 10% from all transported chemicals.

The below mentioned railway transport corridors are widely used in the Czech Republic:

- I. Transit corridor : Děčín (borderline) - Prague - Pardubice - Brno - Břeclav (borderline)
- II. Transit corridor: Petrovice u Karviné (borderline) - Ostrava - Přerov - Břeclav (borderline)
- III. Transit corridor: Mosty u Jablunkova (borderline). - Ostrava - Přerov - Prague -Plzeň- Cheb (borderline)
- IV. Transit corridor: Děčín (borderline) - Prague - České Budějovice - Horní Dvořiště (borderline)

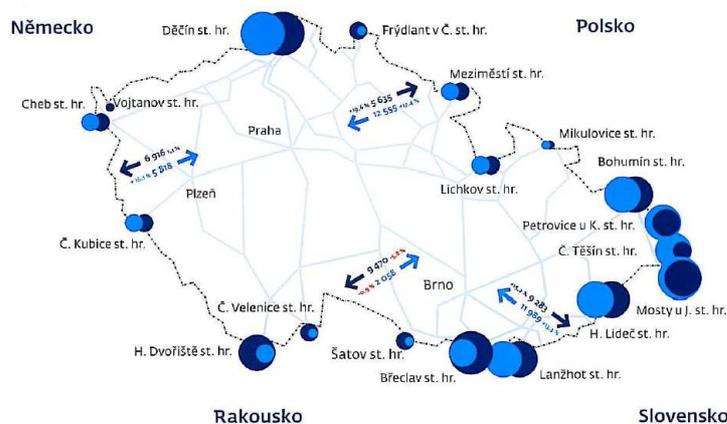


Fig. 4: Main railway border crossings between Czech Republic and neighbors

3.2.1.2 The railway transport within the Transport Union of the Czech Republic

The Rail Transport Section brings together important transportation, logistic, and supply companies that operate in the field of rail transport or combined transport or that contribute significantly to the construction of the rail transport infrastructure.

The activity of this section of railway transport is primarily based on specialized operational, transportation, and vehicular and infrastructure subsections. The aim is to get closer to the demands and targets of the EU in the field of rail transport, to maintain the full functioning rail transport in the Czech Republic, and to play a full part in the European rail network.

With the approval of Rail Act No. 266/94 Coll., other transporters apart from Czech Rail were allowed access to the railways. The necessity to ensure not only competition, but also the cooperation of all transporters involved was certainly something to emerge from this agreement. In fact, the railways account for 40 % of all freight transport, which is considerably higher than in Europe in general. In terms of passenger transport, its market share has increased in the face of a slight downturn given the fact that bus transport has witnessed such a considerable decline.

The number of carriers in freight transport has developed at an extremely fast rate, mainly at the integrated transport substrata in carriage from mining areas or places of production to the places of consumption. The entry of external carriers to the rail network has been realized at a price regulated by the Ministry of Finance, which has itself caused a whole range of problems both on the part of external carriers and also on the part of the administrator of the Czech Rail network.

Following the beginning of privatization and the leasing out of regional lines, more carriers are beginning to develop the operation of passenger transport. Even this is a controversial point, given the distribution of state subsidies on passenger transport, since no subsidy regulations have been set forth.

From the conceptual side of affairs, tasks associated with cooperation on the implementation of the principles determined by the Government Resolution on the transport policy of the Czech Republic for the sphere of rail transport are the primary assignments that lie in front of the section at the current time. This principally involves assignments in the privatization and transformation process at Czech Rail, in the preparation of conditions for the accession of the Czech Republic to the EU, the assurance of an optimized transport service for the regions, the development of the infrastructure, and the harmonization of conditions on the transport market.

In relation to these fundamental tasks, the significant improvement of the legislative framework for rail transport would appear to be the most important in the period in question, both within this branch of transport itself and in relation to the other types of transport.



Fig. 5: Railway transport in the Czech Republic

3.2.2 Road transport

3.2.2.1 The history and progress of road transport

Road transport is most widely used and most popular kind of transport in the Czech Republic. The road transport is the very flexible and offer connection between cities in whole Czech Republic. The extensions of the road transport provide connection with foreign European countries. The development of road transport is jointed tightly together with building-up of the highways. Building-up of the sufficient network of high ways represents one of the main goals of the Czech Republic at the moment.

The high way and speedway network is continually developed in the Czech Republic. Nowadays forwarding agents can use approximately over 1000 kilometers of the high quality high ways, whereas it is assumed that the extension to 2100 km can be reached within few decades.

Nowadays road transport is the widest, most progressive and also most common kind of transport of goods and passengers. This fact is caused mainly by very complex road network in the whole Europe. With respect to this fact it is possible to transport goods from factory to factory by vehicle. Costs of transport on these short or middle distances are relatively low. Moreover, road mounts are very flexible, especially when the transportation tasks or points (starting or terminal) are changed. These kinds of transport usually provide smaller idle and waiting times in comparison with other kinds of transport. The main drawbacks are dependency on the traffic, weather, restricted transport volume and also exclusion of the dangerous materials from the transport.

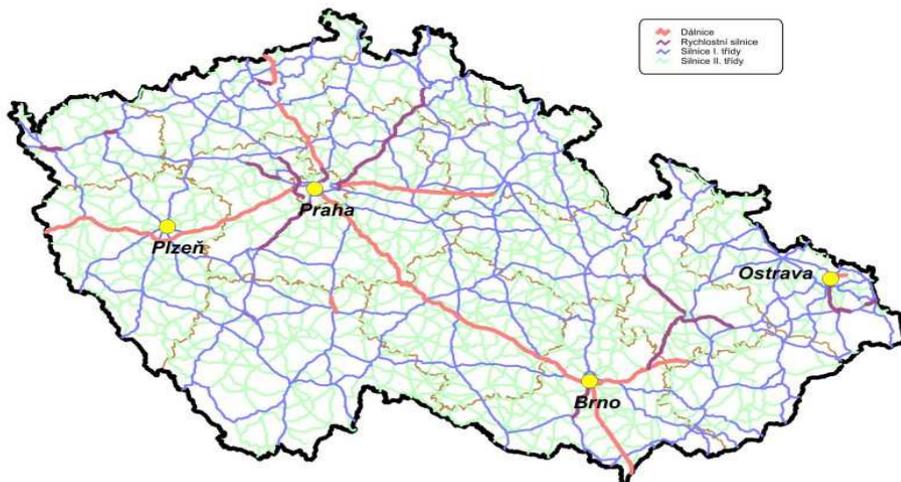


Fig. 6: Main high ways in the Czech Republic

Road transport in the territory of Czech Republic is realized by wide network of domestic roads and high ways with the connection to international transport pathways. The road transport in the Czech Republic is the most widely used type of transport with the crucial share on overall performance of intranational transport, e.g. in 2007 from overall 455 922 thous. tons transported, 407 741 thous. tons were transported on the roads (89.4%). From this value approximately 7 005 thous. tons of chemicals (without fertilizers) were transported (90% from all transported chemicals).

The highway network of 1008 km in the Czech Republic is defined as follows:

- D1 Prague - Brno - Vyškov - Přerov - Lipník n.Bečvou, length of 377 km
- D2 Brno - Břeclav - borderline Czech/Slovakia, length of 61 km
- D3 Prague - Tábor - České Budějovice - borderline Czech/Austria, length of 172 km
- D5 Prague - Plzeň - Rozvadov - borderline Czech/Germany, length of 151 km.
- D8 Prague - Lovosice - Ústí nad Labem - borderline Czech/Germany, length of 92 km
- D11 Prague - Hradec Králové - Jaroměř - Trutnov - borderline Czech /Poland, length of 55 km

The longest highway is D1 (almost 380 km) highway, starting in Prague continuing to Brno and ending in Bratislava. This highway is a part of European corridor Berlin/Nurnberg - Prague – Brno - Bratislava - Budapest – Constanta (Thessaloniki) - Istanbul. After the high way will be finished it will become utmost important European corridor from Poland to the south of Europe and from west to east.

The highway network in the Czech Republic is interconnected with carrying network TINA with three Cretan – Helsinki corridors:

- Corridor No.IV. - Berlin/Nurnnberg - Prague - Bratislava - Budapest - Istanbul,
- Corridor No.IV. branch „A“ - Nurnnberg - Praha,
- Corridor No.IV.branch „B“ - Gdansk - Katowice - Ostrava - Brno.

Since 2007 the road toll was introduced for usage of Czech high ways and some sections of first class roads. This precaution had one significant aim – to ensure money for building-up of other high way sections and to decrease the cargo transport on the roads in the Czech Republic. Road toll is collected on approximately 1200 kilometers; from this amount more than one half are high ways. The toll has to be paid by trucks above 12 tons, (very heavy vehicles), but also public transport buses. The road toll is paid for one kilometer and the tariffs are structured according to the Euro regulations, which take to an account how many dangerous emissions are emitted by particular engines. The charges are divided with respect to the number of axletrees of the truck.

3.2.2.2 The road transport within the Transport Union of the Czech Republic

Historically speaking, the membership of the Road Transport Section came into being out of the former businesses of CSAD (Czech Buses), which were transformed and restructured through all forms of the privatization process to occur in the Czech Republic between 1992 and 1998. The section now has 39 business entities and more than 12 000 employees and these member companies have many thousands of buses and trucks at their service.

The majority of companies also have very high quality technical facilities and thanks to this fact, all major foreign and domestic manufacturers of trucks, buses, and semi-trailers are also represented (Volvo, DAF, Mercedes, Karosa, Renault, MAN, Scania), including those that offer a comprehensive accessory line of goods and spare parts that ranges from tires and diesel to special tools and work aids. Thanks to this high quality technical background, practically all companies are able to provide comprehensive transportation, dispatching, servicing, and additional business services to thousands of small transport companies and traders, including all trucks and buses that cross borders.

The Road Transport Section defends the interests of businesses in the sphere of road transport against the bodies of public administration and self-autonomous bodies emphatically and uncompromisingly. The activity of the section and its results are based on the highly professional and active work of predominant groups of top specialists in the field of transport who work in the interests of the Road Transport Section.

The activities of the Road Transport Section must be acknowledged for their benefits in terms of the following:

- a) permanent pressure on changes to legislation in the branch of road transport and transport as a whole in the interests of drawing closer to the principles of the European Union, and the continual putting forward of comments regarding all laws, decrees, or state budgets within the scope of the circulation of draft bills for comment by individual Ministries; permanentní tlak na změnu legislativy pro
- b) the creation of equal conditions for conducting business in international and domestic freight transport for national and foreign carriers.

The fundamental strategic aims of the Road Transport Section are as follows:

- a) to create uncompromising pressure on the harmonization of the legislative conditions of the Czech Republic and those of the European Union in the field of road transport (particularly in the conditions of entry to the transport market, the promotion of the principles of the commitments of public service and the support of business);
- b) to generate effective pressure on the obligation of the state to perform special state supervision both in the technical sphere and in the field of transport.



Fig. 7: Road transport in the centre of Prague

3.2.2.3 The road management

The section of road management was founded in the middle of 2001 and the founding members were state allowance organizations known to the general public as the Administration and Maintenance of Roadways (SÚS).

Not long after activity got underway at the new specialized section, the Directorate of Roads and Highways of the Czech Republic applied for acceptance. Through this, two systems that have a major influence on the situation of the road network in the Czech Republic joined up. Given the fact

that the founders of the Administration and Maintenance of Roadways were the District Authorities, the activity of which came to a close on 31.12.2002 in accordance with reforms of public administration, the competence of these within the scope of the new arrangement that was related to constitutional law was transferred to the newly established Regional Authorities on 31.10.2001 together with the infrastructure of class II and III road networks. The administration and maintenance of the motorway network and the network of class I roads remains under the administration of the relevant regional Directorate of Roads and Highways.

3.2.3 Air transport

3.2.3.1 The history and progress of the air transport

The development of transport aviation in Czech started in the period directly after The World War I., but the obstacles in this branch were significantly more difficult than in other branches, because there were not an availability of application system. There were also unfavorable internationally politically conditions, because Czechoslovakia, which signed an International agreement about aviation on 13th October 1919, was enclosed by countries, which have not signed this agreement and thus they impede to establish air lines above their territories. In the first years the air transport was operated only by French company Cidna. From the domestic transporters, the Czech Airlines (<http://www.csa.cz>) has the longest tradition. Several new air transporters appear in the recent years. These transporters are focusing mainly on the chartered flights.

Air transport does not play an important role in transport of chemicals regarding the amounts transported by other kinds of transport. Air transport is mainly used for samples, analytical materials, and fine chemicals with high value added.

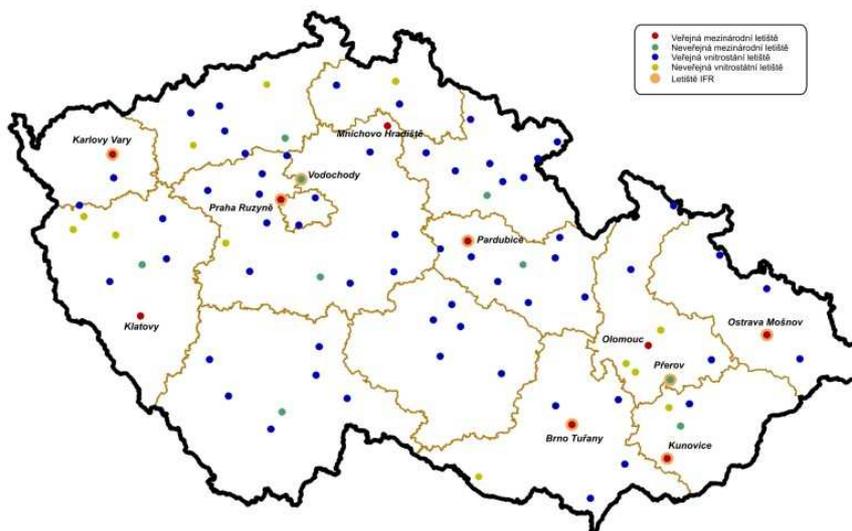


Fig. 8: Network of airports in the Czech Republic

Transportation policy of the Czech Republic was officially announced by Resolution of Government of the Czech Republic on 13th July 2005 No. 882 for years 2005 – 2013.

- it defines structure of priorities and aims of the transportation policy
- it specifies aims according to the priorities, particularly:
 - a) To speed up the building-up of the by-pass road of the cities

- b) To systematically substitute the larger portions of the dangerous chemicals transport by safer kinds of transport
- c) To improve the control activities to ensure the transport of the dangerous substance including more efficient coordination of the rescue
- d) To work up the conception of the development of the network of public logistic centers with closer interconnection of different types of transport (concentration of transportation flows, differentiation of transport activities)
- e) To reduce the influence of transport on the environment and public health

3.2.3.2 Air transport within the Transport Union of the Czech Republic

The Air Transport Section is currently only represented by the company Czech Airlines. Through this independent membership it actively participates in the activities of the Union. This is based on the fact that Czech Airlines is the largest and most prominent airline company in the Czech Republic (the company has 35 airplanes at its disposal). Furthermore, one of the most significant changes to have taken place was the modernization of the airpark that ČSA carried out.

The section draws up conditions for amendments to laws and regulations that are related to aviation on an ongoing basis and actively participated in the formulation of the Transport Policy of the Czech Republic.

The air transport market and access to it is gradually becoming more and more liberal and air transport will continue in its high growth trend that accompanies the loss of its one-time exclusivity and inaccessibility. Civil air transport is nowadays the subject of business on a global scale and in a highly competitive environment, which has led to the concentration of major airline companies and their powerful groupings.

In the near future, a potential domestic market of some 10 million people will be incomparable to the nations of Western Europe that are advanced in terms of transport given the current lower economic strength of the Czech Republic and purchasing power of the population.

The key issue from the perspective of European air carriers is the policy of airport charges as used by airport operators. The companies united as part of the AEA (The Association of European Airlines) and the Air Transport Section is striving for the reduction and control of airport charges in Europe. This situation has also been fully projected into the relations between the airline carriers and Czech Airport Administration in the Czech Republic. This administration is the only one of its kind in the transport infrastructure. It emerges from this that even airport charges and the prices of services tend to be monopolistic prices.

The concept of the program of development of the airline infrastructure must be primarily based on the alignment of airline techniques and technology with the countries that are advanced in terms of transport. A key role here is also played by the harmonization of the systems of managing flight operation in the sphere of civil and military aviation.

In conclusion, it has to be mentioned that the air transport is not very important kind of transport for chemicals. Air transport is usually used only for samples for analytical purposes or fine chemicals with high added value.

3.2.4 River transport in the Czech Republic

3.2.4.1 Current state of the river transport in the Czech Republic

After signing an agreement about accession of the Czech Republic and other countries to EU, the global TEN-T network was extended. TEN-T network is a European transport net, on which the transportation policy of the EU is focused. Ports in Decin, Usti nad Labem, Lovosice, Melnik, Kolin and Praha are included in the TEN-T network. The member countries declare in the WHITE BOOK about the European transportation policy that they will support the removing of the narrow parts on this infrastructure and the more intensive usage for water transport instead of road transport.

Rotterdam declaration from September 2001 is focused mainly on increasing of all-European cooperation in the field of intranational water transport.

Water transport in the territory of Czech Republic is restricted by bad utility of intranational water flows. Labe is navigable only from Usti nad Labem to borders, but the aim is to build up the required water weirs, to dredge the watershed and assure other necessary accessories to extent navigability of Labe from Pardubice to borders. The water transport represents only a small part of overall transport. In 2007, from overall transported 455 922 thous. tons, only 630 thous. tons were transported by ferries (i.e. 0.1%). The transport of chemicals is not realized by this kind of transport in Czech.

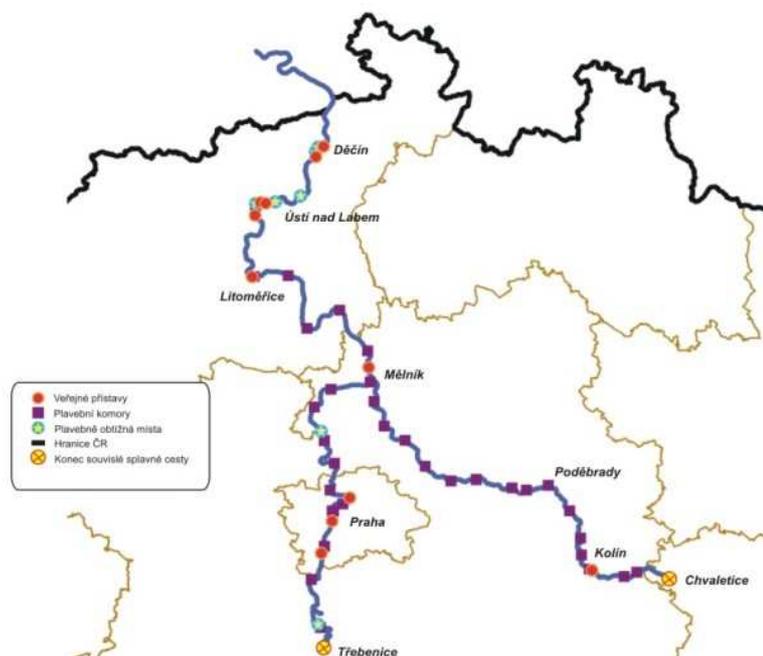


Fig. 9: Navigable rivers in the Czech Republic

3.2.4.2 River transport within the Transport Union of the Czech Republic

The section of water transport has nowadays more than 20 corporate members – organizations, private companies, which employ more than 1500 employees in the branch of water transport.

The subject of activity within the section is the creation of conditions for the development of transportation systems in terms of freight, passenger, and recreational water transport, particularly from the perspective of the needs of transporters, and the protection and representation of their interests. The section covers a broad professional and locally dispersed range of members.

The core subject of activity involves the handling of the following problems:

- a) the harmonization of the conditions for Czech carriers in the field of water transport upon accession to the EU and their preparation in terms of the legislative, documentary, and operational side of affairs;
- b) including of the water transport to the national programs according to the European program NAIADES
- c) active connection to the European water transport structures, e.g. the "European Union of Shipping Enterprises", the "Association for the Development of the Elbe Region", and so on;

The section primarily promotes the following:

- a) the construction and modernization of the water transport infrastructure in accordance with the implementation of the AGN agreement on international trans-European routes in Europe (valid in the Czech Republic - endorsed by the Ministry of Transport and Communication of the Czech Republic);
- b) the unification of legislative conditions concerning the movement of goods and carriers, as well as the creation of market relations among individual forms of transport;

3.2.5 Combined (intermodal) transport

3.2.5.1 Intermodal transport

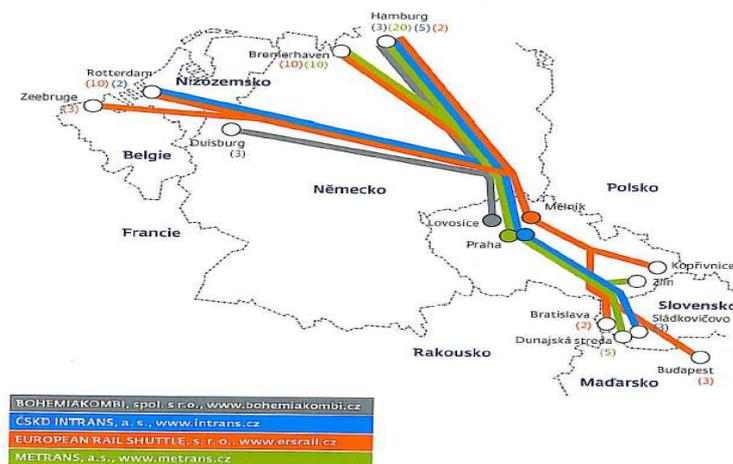


Fig. 10: Intermodal transport from Czech Republic to neighboring countries

In this system, unified units, which do not change neither weight nor form (ISO containers, system ACTS, CargoBeamer, modalohr and others) are transported. By means of this transport it is possible to realize an effort for reduction of the road transport or minimize at least negative influence on our environment. The major part of intermodal transport is realized on the railways. Road transport assures only the final delivery or haulage of goods.

In the Czech Republic this kind of transport is provided mainly by the customers of the Czech Railways, operators of the combined transport, BOHEMIACOMBI (<http://www.bohemiakombi.cz/>),

ČKD INTRANS (<http://www.intrans.cz>), ERS MELNIK, METRANS Uhrineves (<http://www.metrans.cz/terminal-pr.php>) and others.

3.2.5.2 Intermodal transport within the Transportation Union of the Czech Republic

The Combined Transport Section was founded in January 1997. This section is a voluntary association of entities that operate combined transportation and carriage. It has a nationwide field of activity. The role of the section is to represent and protect the economic interests of its members and to develop their activities and prestige. The section's main task is to support the development of combined transport and carriage and it actively participates in the creation of legislative and economic measures in relation to combined transport and carriage and comments on proposed regulations in the field of transportation and related issues.

The section primarily ensures the negotiation of framework conditions and supportive measures that lead to the development of combined transport in the Czech Republic. These measures have been accepted into the governmental proposal for the concept of the development of combined transport in the Czech Republic.

The section prepared concrete proposals for the temporary handling of the balancing up of the conditions of operating combined transport in terms of competing types of transport (road) until such time as similar acts of charging on the most significant routes in the Czech Republic are introduced.

4. Transport of the goods and chemical substances in the Czech Republic

The transport of chemicals, including dangerous chemical substance can be realized also by pipelines. In the Czech Republic pipelines are mainly used for transport of crude-oil or gases. This kind of transport can be regarded as the safest way of transport of these substances. Air and water transport are of minor importance mainly because of the frequency of usage and the transported amounts. Road transport is of utmost importance in the Czech Republic. Railways are more similar to road transport with respect to the transported amounts.

4.1 Number of entrepreneurial subjects, which provides particular types of transport in the Czech Republic

Number of entrepreneurial subjects	2000	2003	2004	2005	2006	2007
Road transport	59 060	65 024	66 367	67 780	68 878	70 636
Water transport	416	248	252	292	264	517
Air transport	132	158	154	157	177	182
Railways¹⁾	438	386	380	361	367	364
Overall	60 046	65 816	67 153	68 590	69 686	71 699

Tab. 10: Number of entrepreneurial subjects, which provides particular types of transport in the Czech Republic – included are all logistic and forwarding companies, which have transport as a main sphere of business activity

From the above mentioned table, it is obvious that the entrepreneurial subjects who offer road transport services dominate. There is a year-on-year increase in number of entrepreneurial subjects. The increase of subjects from year 2000 to year 2007 is approximately 30%. The values mentioned in the domestic water and railway transport can be overestimated. Regarding this fact, it has to be pointed out that there are mentioned all the entrepreneurial subjects, which have registered as companies with water or railway transport as a main subject of their business.

The following Figure (11) shows the ratio of the companies operating in transport to all companies in the Czech Republic in the period of ten years (1997-2007). In 2007 the share of transport companies was approximately 3.5%. Only the companies which have a permission to conduct some kind of transport are mentioned in this table. The yellow line represents the GDP progression. The share of transport from 1997 to 2007 on the overall GDP is fluctuating from 9 to 10.5%.

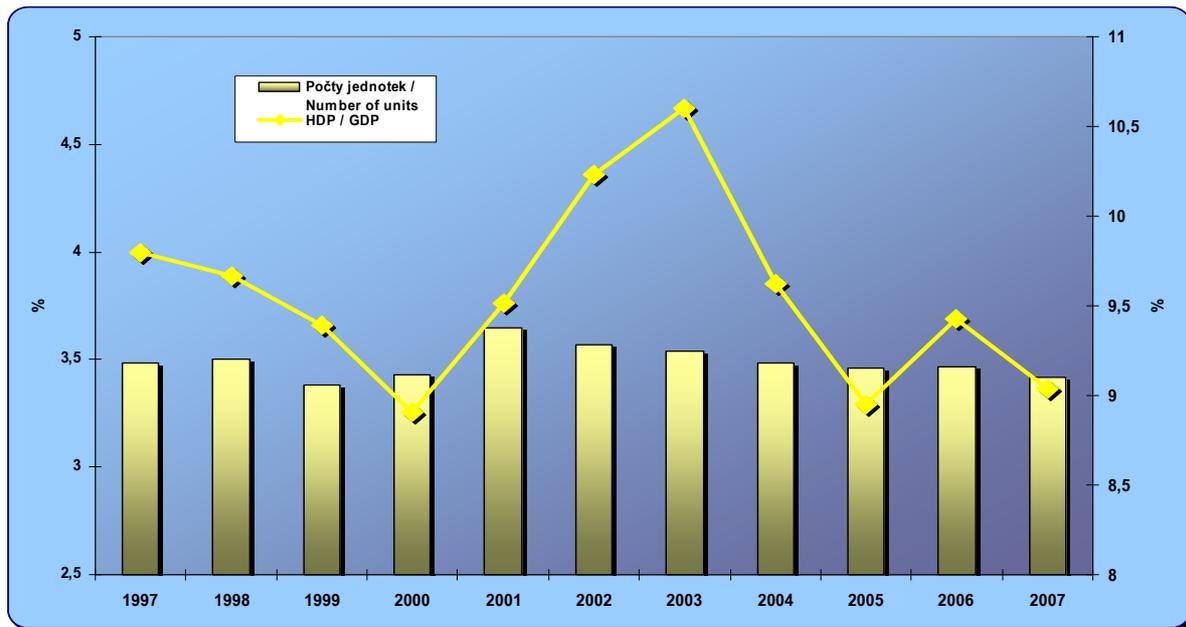


Fig. 11: The share of companies operating in transport to all Czech companies

4.2 The transport of crude-oil in the Czech Republic

In the Czech Republic the crude-oil is obtained only in region of Hodonín (approximately 300 tons per day), that is why Czech Republic has to buy almost all required crude-oil.

The first pipeline on the Czech territory was Druzba. This pipeline goes from former Soviet Union to Bratislava (1963), later on the pipeline has been extended to Zaluži u Mostu (1965). Approximately 18 million tons of crude-oil were delivered by Druzba to Czechoslovakia till the 1989. In 1989, after a velvet revolution, the foreign markets and newly built pipelines offered other sources of crude-oil.

In 1990 the pipeline Adria was built. This pipeline was planned from year 1984 and was done together with former Yugoslavia and Hungary. The pipeline starts in Omišalj on island Krk and continues over Rijeka to Sisak, where the pipeline divides into two branches – south branch continues to former Yugoslavia and north branch continues to Hungary and former Czechoslovakia. This pipeline is connected with pipeline Druzba. The capacity of pipeline Adria is 5-6 million tons per year.

year	2000	2003	2004	2005	2006	2007
Transport of crude-oil (thous. tons)	8 346	8 962	9 192	11 305	10 875	10 131

Tab. 11: Transport of crude-oil in the Czech Republic

4.2.1 Transportation pathways of crude-oil in the Czech Republic

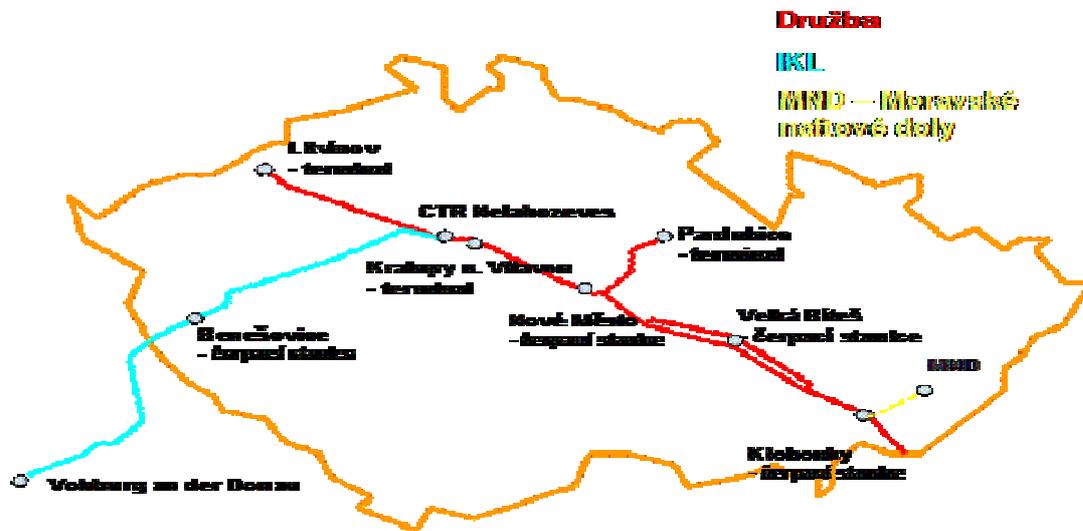


Fig. 12: Network of crude-oil pipelines in the Czech Republic

The company Mero Czech Republic is an owner and operator of the Czech section of pipeline Druzba and IKL. This company is the only transporter of the crude-oil to Czech Republic and most important company assuring storage of emergency strategic reserves of crude-oil. Both pipelines flow into the central tank place for crude-oil in Nelahozevec, where approximately 14 crude-oil tanks with the overall capacity of 1 300 000 m³ are situated.

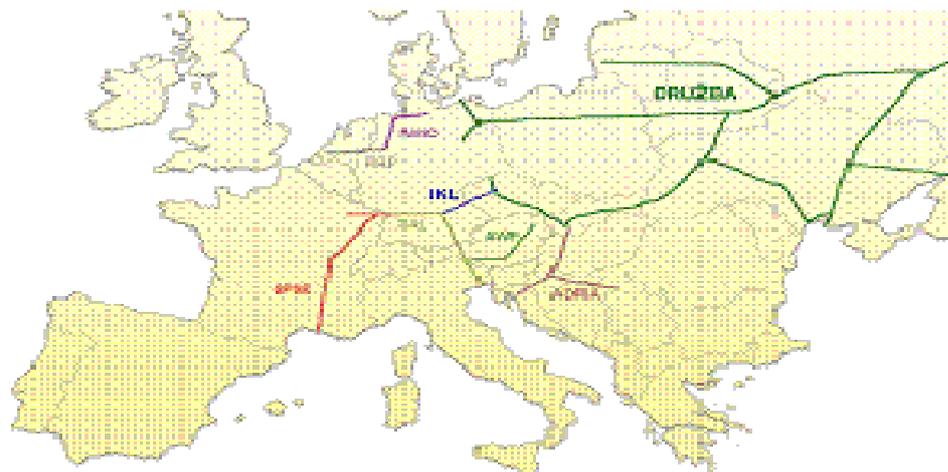


Fig. 13: Network of crude-oil pipelines in Europe

4.3 Gas pipeline

Only 1.5% of natural gas, which is consumed annually in the Czech Republic, is covered by mining in the region of Hodonin. The rest of supplies are realized mainly by import exclusively from

Russia. First natural gas started to flow to Czechoslovakia from Ukraine in gas pipeline Bratrstvi with the total length of 540 km in year 1967.

In 1972 the Transit gas pipeline, over the territory of Czechoslovakia, was built. It supplies the Western Europe with the Russian gas. Gas pipeline Bratrstvi was still operating in this time. The capacity of Transit gas pipeline was constantly increased with the growth of the supply from the Russian gas. 3-4 parallel main lines over the Czechoslovakia (4 for south Moravia and 3 were continuing from Moravia to west) were built. This gas pipeline cross the borders in Slovakia in international delivery station in Velke Kapusany and continues to Austria, Germany and Czech Republic.

In 1979 gas pipeline Sojuz started to operate. Its length was 2 744 km and the start point was in Russian town Orenburg. This pipeline was linked to Transit gas pipeline. Nowadays Czech part of this pipeline is controlled by Transgas Company and Slovakian part by Slovtransgas. The delivery station is situated in Lanzhot.

On the 3rd of April 2007 the Declaration for building-up of pipeline Nabucco has been signed by representatives of European Commission and 5 south European countries. Nabucco should bring the gas from the Black Sea to the European markets around year 2012. By this important step, EU wants to decrease the energetic dependency.

4.4 Other pipeline transport

Pipeline for ethylene	Chemopetrol Litvínov-Horní Ves-Mníšek-borders
Pipeline for C4 fractions	Chemopetrol Litvínov -Komořany-Lišnice-Milá-Chožov-Černochoch (Usti region)
Pipeline for ethylene	Chemopetrol Litvínov -Komořany-Lišnice-Milá-Chožov-Černochoch (Usti region)
Pipeline for crude-oil	Chemopetrol Litvínov -Komořany-Lišnice-Milá-Chožov-Černochoch (Usti region)
Pipeline for ethyl benzene	Chemopetrol Litvínov -Komořany-Lišnice-Milá-Třtěno-Košnice (Usti region)
Pipeline for crude-oil	Chemopetrol Litvínov -Most-Vtelno-Chrámce-Libčeves-Košnice (Usti region)
Pipeline for nitrogen	Chemopetrol Litvínov -Lom-Osek-Teplice (Usti region)

Tab. 12: Other pipelines in the Czech Republic

For assuring of the production in some chemical plants the above mentioned pipelines with dimension of 150 to 300 mm are used. The distribution of fuels is realized mainly in the CEPRO network. Please see the Fig.14.

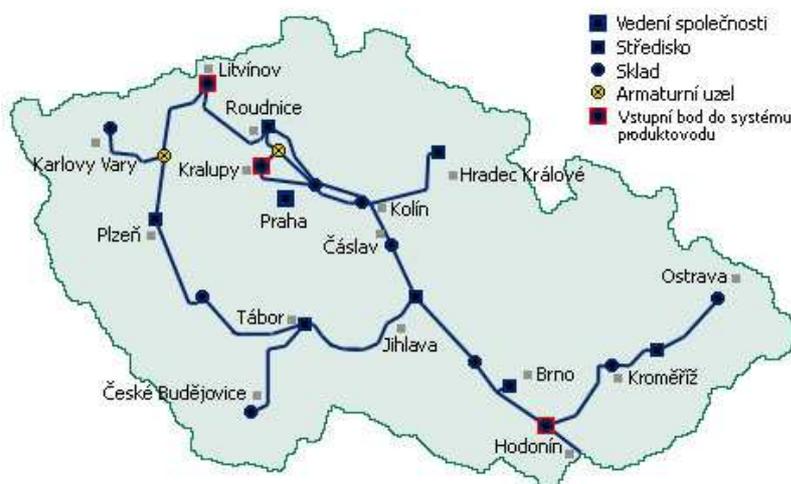


Fig. 14: The network of CEPRO pipelines for crude-oil and other products in the Czech Republic

4.5 Transportation policy of the Czech Republic

Transportation policy of the Czech Republic was officially announced by Resolution of Government of the Czech Republic on 13th July 2005 No. 882 for years 2005 – 2013.

- it defines structure of priorities and aims of the transportation policy
- it specifies aims according to the priorities, particularly:
 - f) To speed up the building-up of the by-pass road of the cities
 - g) To systematically substitute the larger portions of the dangerous chemicals transport by safer kinds of transport
 - h) To improve the control activities to ensure the transport of the dangerous substance including more efficient coordination of the rescue
 - i) To work up the conception of the development of the network of public logistic centers with closer interconnection of different types of transport (concentration of transportation flows, differentiation of transport activities)
 - j) To reduce the influence of transport on the environment and public health

4.5.1 Main subjects, which assure the realization of transportation policy

a) Ministry of transport of the Czech Republic



b) Czech Railways



c) Czech Railways Cargo



d) The Transport Union of the Czech Republic



e) The Association of Forwarding and Logistics



4.5.2 Voluntary tools of transportation policy

TRINS – Transportation and accident system

TRINS is a system of aid in the accidents connected with transport of dangerous chemicals. This system was founded in 1996 on the basis of agreement between SCHP (The Association of Chemical Industry of the Czech Republic) of the Czech Republic and Ministry of Internal Affairs – Board of Management of Fire Rescue Brigade and since this time it is fully operational. SCHP of the Czech Republic became voluntary organization of the Integrated Rescue System.

The TRINS centers provide three main services:

- Advise on the phone
- The participation of the expert on the place of accident
- Providing of own technique of the plants for the accident consequences removal

Involve 28 companies, members of the SCHP of the Czech Republic, conducting 36 TRINS centers. UNIPETROL RPA, Litvinov serves as a national centre for coordination of TRINS.

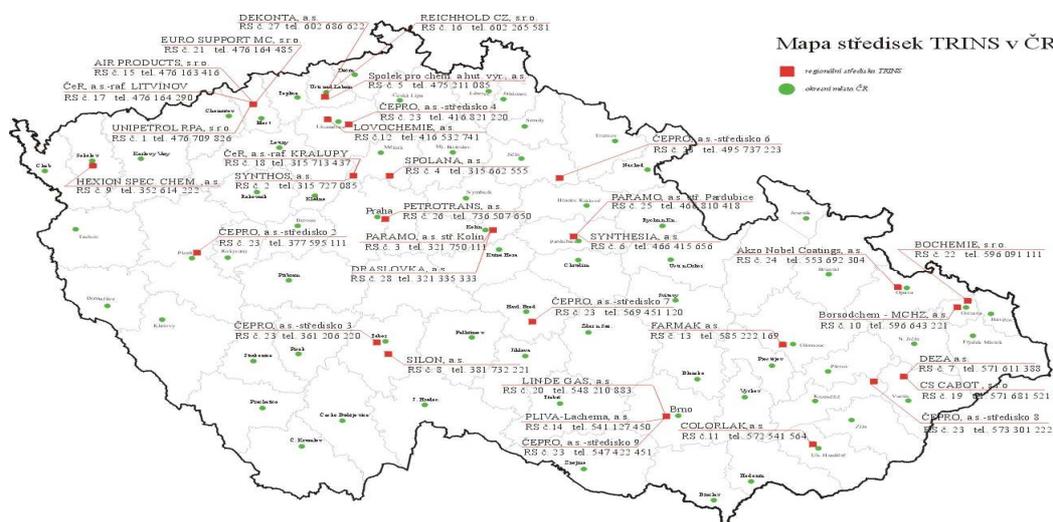


Fig. 15: The map of the TRINS centers in the Czech Republic

SQAS - Safety Quality Assessment System

The permanent attention is devoted to the enhanced propagation of the safe transport of chemicals based on all-European principles SQAS. SQAS fulfilled the role of the system for evaluation of safety and quality and environmental aspects by the providers of logistic services, based on the evaluation of transporters by independent inspectors.

From the initiative of the SCHP of the Czech Republic, Czech Association of clearing stations (CACS) was founded in 2006. The main aim of this association is to improve the quality of services in the field of cleaning of tanks and containers for transport of the chemicals. All six member organizations, which provide cleaning stations, went through the SQAS evaluation. After CACS was integrated to European association EFTCO, they got a possibility to issue unified European certificate about performed cleaning –ECD.

CACS – Czech Association of Clearing Stations for increasing the safety and quality during the transport of dangerous substances, provides documents about cleaning (ECD), founded in October 2006 – railway or road tanks; <http://www.cacs.cz/>

Company name	City	Email or webpage	SQAS a ECD
GS SOKOTRANS	Sokolov	www.lcskotrans.cz	x
KOVOPROGRESS	Středlice u Brna	ivanklouda@willig.cz	x
PRAŽSKÉ SLUŽBY	Praha 9	www.psas.cz	x
SPECTRA CZ	Třanovice	www.spectra.cz	x
UNIPETROL DOPRAVA	Litvínov	www.unipetroldoprava.cz	x
VADS	Bohumín	www.vads.cz	x

Tab. 13: CACS – Czech Association of the Cleaning Stations



Fig. 16: Cleaning stations in the Czech Republic

5. SWOT analysis

Introduction to SWOT analysis

SWOT analysis is the method for identification of internal STRENGTHS and WEAKNESSES, external THREATS and OPPORTUNITIES connected with realization of particular project. SWOT analysis is very important part of strategic (long term) planning.

5.1 SWOT analysis within CHEMLOG

The general questionnaire for SWOT analysis, created within the CHEMLOG project, is focusing mainly on the logistics of chemical substances, transportation flows, types of chemical transport and other questions connected with logistics of chemical substances. This questionnaire was addressed to chemical plants, logistic and delivery corporations and other companies operating in the field of chemical logistic. SWOT questionnaire was sent away by Association of Chemical Industry of the Czech Republic.

There was a disproportion between addressed companies and companies which responded and sent SWOT analysis back was quite small. The Association of Chemical Industry of the Czech Republic addressed 112 subjects operating within the field of chemical logistics and 17 responses were received back. The main reason was caused by timing of whole chemical logistic project (CHEMLOG), because nowadays, chemical companies are affected by global economic crisis and they are focusing more on the problems connected with this crisis. According to the discussion about SWOT questionnaires on the national meetings we assume that the validity of results is not influenced by the number of respondents.

Two national meetings in two zones with high concentration of chemical industry were organized beside the regular communication with respondents - in Ústí nad Labem (10th March 2009) and in Ostrava (19th March 2009). Both meetings were very fruitful and the outputs from these meetings were taken to an account in final evaluation of SWOT analysis. SWOT analysis and above mentioned discussions help to unambiguously identify strengths and weaknesses, threats and opportunities in the field of chemical logistics in the Czech Republic.

5.2 Structure of SWOT analysis

SWOT analysis was divided into two main sections. External threats and opportunities were examined in the first part, meanwhile strengths and opportunities were screened in the second part. The word „external“ mentioned in context with threats and opportunity means in this case an external factor, which cannot be influenced by company in the short time horizon. Contrary, word „internal,, mentioned in connection with strengths and weaknesses means factor, which can be influenced by the company itself. SWOT questionnaire was divided into subcategories (e.g. Economic trends, Social-cultural, Technological trends). These subcategories were separated into particular factors (e.g. Internationalization of markets in subcategory Economic trends), which respondent should classify as strength or weakness, threat or opportunity. For each factor the respondent should vote among three different degrees of influence - importance (small influence -1, medium influence – 2, big influence).

5.3 Evaluation of the SWOT analysis

1. Firstly, the average of degrees of influence for all the respondents (chemical and logistic companies) for one particular factor (e.g. internationalization of markets) was made. The averaged degree of influence obtained by this way can show how important (which stress is given to this factor) the particular factor is for the respondents (small influence -1, medium influence – 2, big influence).
2. Secondly, the frequency of choice of particular element in SWOT questionnaire was observed (element S-strength, W-weakness, T – threats, O -opportunity) for each factor (e.g. Internationalization of markets).

5.3.1 Outputs from SWOT analysis

The outputs from SWOT analysis in the form of table are enclosed to the document.

5.3.2 SWOT analysis –summary

With respect to the number of evaluated parameters, only the factors with big average degree of influence (average value of degree of influence is above 2.4) and with the satisfactory frequency of choice regarding the number of respondents will be discussed below. Answers from only 17 respondents were used for this evaluation. These questionnaires will be included in the evaluation in future. The parameters which were discussed on the national meetings will be discussed in detail also.

5.3.2.1 External treats and opportunities

A) Economic trends

Factor of **Internationalization of markets** was discussed in detail during the national meetings. Some respondents mainly from huge companies understood this factor as an opportunity for cleaning of the markets, its redistribution, eventually for decreasing of the competition of small companies.

Factor of **Market concentration/intensified competition** was considered by the addressed companies as a big threat for the future development and existence.

World-wide economic development was perceived by the chemical plants in the Czech Republic as great opportunity to extent the outlets of their products and services.

B) Socio-cultural trends

Some of addressed companies on the national meetings claimed that the change of values can be negative for them (it was a threat for them), mainly in relationship between employee – company. To support this fact it was mentioned that few years ago the loyalty to company was more prestigious than nowadays.

The availability of human resources in the field of logistics. It was mentioned by representatives of logistics and forwarding companies present on the national meetings that approximately 10 years ago there was a significant drain of Czech specialist from the logistics to the foreign countries, nevertheless nowadays the situation is almost stable – drain of specialist is not so big and the missing ones are compensated by the specialist from the foreign countries.

Skills of employees in the field of logistics (professional, social and intercultural). It is obvious from the evaluation of the SWOT questionnaire that this factor is very important for majority of companies, nevertheless for some companies it is threats, for other opportunity. High and secondary education in the Czech Republic helps to bring up professionals both in the field of logistics and chemistry. Also because of this fact, the logistic in the Czech Republic is on the very high level.

C) Technological trends

SWOT analysis of technological trends do not bring explicit piece of knowledge (the average degree of influence is medium). It is obvious from the SWOT analysis that the factors related to the technological trends are perceived by the majority of companies as a opportunity. This fact is supported also by claim of logistic and forwarding companies mentioned on the national meetings – technological trends (sophisticated mounts, monitoring during transport of the dangerous materials, tracking of the shipments, navigation, blockage of engine during the transport of explosives – system PATRIOT etc.) in the field of logistics must be implemented by each company in order to assure the competitive advantage of company.

D) Environment and Energy

Availability of non-renewable energy sources and particularly **energy costs** are perceived by most of the companies as huge threats. In connection with environment it was mentioned several times on the national meetings that in logistic of chemicals two main approaches are followed at the moment – obtaining of the customers by setting of the low price or on the other side by quality of logistic services (or by compromise between these trends). More and more often it is possible to meet companies which prefer competition by price and thus protection of our environment and safety during transport of chemicals is suppressed.

E) Politics and Innovation

Explicit conclusions cannot be made from SWOT analysis in connection with this category. REACH Regulation factor, which is missing in the SWOT analysis, was discussed several times on the national meetings and also some respondents add this factor as a potential threat in this category. Based on the national meetings discussion, it is obvious that most of the companies except companies which are focusing on analytical testing, consider REACH to be a huge threat.

Realization of some projects focusing on the developing of infrastructure in the Czech Republic is sometimes very difficult. Firstly, the costs for one kilometer of the highway is usually overestimated (1 mld. CZK per one kilometer).

F) Transport infrastructure (railway, waterway pipeline and intermodal transport)

For Czech chemical companies is the utilization of *railway and intermodal* transport opportunity.

Water ways are almost not used by the addressed respondents. The main drawback of this kind of transport is the seasonal character of water transport and irresoluteness of the navigability of water flows in the Czech Republic. On the other side, it was mentioned that the port stores are on the high

level and could be used for logistic purposes. Several steps have to be done to improve the river transport in the Czech Republic:

1. To dredge the mud from the river sheds and clean the river sheds
2. To built-up the river dams and submerged dykes

In connection with the road transport the big threat was mentioned about increasing of the road toll. The solution is very often seen in the substitution of this kind of transport by other kind, e.g. by combined, railway or water transport. To factors **Location and structure of the road network** and **Capacity and efficiency of waterway** can be classified as very important with respect to the average degree of influence, but for some companies it is threat for other opportunity.

Pipeline transport was discussed at the beginning and will not be discussed during evaluation of the SWOT analysis, because the transport of chemicals by pipeline is not so important in the Czech Republic.

G) Safety and Security

There was a great importance given to the factor **tracking of the cargo**, but for the majority of companies, which are not dealing with logistics it is a neutral parameter. For the logistic and forwarding companies this factor represents strengths, because it is service for customer.

H) Industry sector and competition

The factor of **Degree of concentration, Level of product standardization** and also **Relevance and importance of the industry sector** represents the great opportunity for most the chemical plants to address customers and offer them the required product or service.

Economies of scale represents for all companies big opportunity. If the huge amount of load is transported, mainly the river or railway transport is used. In context with river transport we have to mention that many companies do not transport such a huge amount of load to fill the ferry. One of the commodities transported still by ferries is coal. The proposals for solving of the competitive advantage of water transport were discussed in chapter F.

5.3.2.2 INTERNAL STRENGTHS AND WEAKNESSES

From the evaluation of SWOT analysis for strengths and weaknesses it is obvious that chemical companies gives to factors mentioned in this part of the questionnaire great significance. The companies are also very self-confident in evaluating these factors (almost all factors were marked as strength or at least as a neutral by the majority of chemical companies). This can be caused by very good organisation within the companies on all levels with relationship to logistics.

A) Procurement

Procurement lead time for raw material and intermediates, Suppliers' availability, reliability and flexibility, Collaboration demand planning, Sourcing strategies (global versus single), Quality of product and packaging, Terms of payment and delivery were evaluated as strengths of majority of companies. These factors are taken as strength mainly because of the high quality employees and fully functional quality systems and related directions.

B) Warehousing of raw materials, semi-finished and finished products

Nowadays, there are strong tendencies to minimize warehouse stocks and utilize the raw materials and intermediates for production by „just in time approach“. It is obvious from the evaluation of the SWOT questionnaire the most of the addressed companies perceived the questions connected with warehousing of raw materials, intermediates and final products as a strength or neutrally (it is neither strength nor weakness). The significance given to the factors in this category was relatively high (average degree of influence was higher than 2.4).

C) Production logistics

The majority of respondents give to the factors connected with logistics of production great significance – the degree of influence was quite big. Factors in subcategory production logistics was perceived as strengths (or neutrally), only few companies thought that this factor could be their weakness. Factor Stability of production was evaluated as an utmost important factor (all companies give degree of influence 3).

D) Distribution and Transport

The factor Delivery time and performance in category Distribution and transport was evaluated by all companies as a factor with great importance. With respect to the respondents, which were mainly represented by chemical and logistic (or forwarding) companies was this choice unambiguously right – logistic and forwarding companies as well as customers, chemical companies, are interested in delivery of goods on time. For most of the companies the **Delivery time and performance** is strength. This fact was confirmed several times on the national meetings. It was mentioned that for each company which is offering services in some degree of quality, this factor is undoubtedly strength.

E) Planning and Controlling

Planning and controlling is in several aspects similar to the other sections of the questionnaire describing strengths and weaknesses. Most of the factors are regarded as very important, which can be seen from the high average degree of influence. While in **Accuracy and Flexibility in Planning** of inventory levels most of the companies see their own weakness, in **Accuracy and Flexibility in Production Planning** most of the companies perceived as their strengths.

Processing, cycle time of processing, stability within the processing of the order is the strength for almost all companies. This fact is confirmed by great importance of this factor measured by degree of influence.

6. Conclusion

The first part of the CHEMLOG project was focused on the evaluation of the strengths and weaknesses, threats and opportunities and how they are perceived by companies from the field of chemistry and chemical logistic.

In case of opportunities, usually appropriate recommendation how to develop the opportunity into an advantage was given – e.g. the river transport on Labe can be improved by both building-up of the dams in Decin and Prelouc and by regular watershed maintaining (digging of the mud deposits). This step can extend the navigability of the river to chemical plants in Pardubice. These recommendations were usually based on the information obtained during the national meetings both in Usti nad Labem or Ostrava. The possible explanation why the companies see the threats in some factors and how can they face them up was also given.

In the second part of SWOT questionnaire the addressed companies voted very often for strength for particular factor. The first explanation for this approach could be that the companies are in reality strong in these points. The other explanation could be that during the group discussion on national meetings (or in questionnaire) companies did not want to disclose their weaknesses.

Conclusions from discussion and SWOT questionnaires are given in detail in chapter 4.

In conclusion, it has to be mentioned that timing of this SWOT analysis was not appropriate with respect to the global economic crisis. Nowadays, chemical companies as well as logistic companies trying to face the economic crisis at their best – there are introducing anti-crisis actions, consolidating number of employees, reducing the production etc. Therefore it is obvious that many addressed companies did not have time to fill in the extensive SWOT questionnaire.

7. Literature

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