



## INSTITUTE OF TRANSPORTATION ENGINEERING OF THE CITY OF PRAGUE

The Institute of Transportation Engineering of the City of Prague (ÚDI Praha) is a specialised organisation, the first of its kind in the Czech Republic, established in 1966. ÚDI Praha is concerned with engineering, design and consulting activities in the field of city transportation and traffic engineering, both for the City of Prague, and for other Prague and non-Prague customers.

Below are the main professional activities of UDI Praha:

- processing of all kinds of transportation and traffic engineering documentation
- creating transport solutions and traffic city planning
- setting of transportation engineering conditions and materials for planning and project documentation of constructions works.
- proposing co-ordinated developments of city transportation system and solution of integrated public transport system
- processing of traffic surveys, investigation and analyses
- creating, operating and up-to-dating of transportation engineering data bank system
- proposing traffic condition improvements
- designing traffic organisation on street network
- projecting traffic calm, designing of residential street and pedestrian zones
- regulating and restrictive measures for motor car traffic and proposals for parking policy
- designing of traffic signal devices, co-ordinated control, centralised control and public transport priority on traffic signals
- developing traffic conditions, transportation constructions and measures from the environmental point of view

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## INSTITUTE OF TRANSPORTATION ENGINEERING OF THE CITY OF PRAGUE



# THE YEARBOOK OF TRANSPORTATION PRAGUE 2001

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Dear Reader,

This year we present a yearbook, which documents basic data about transport in Prague in the year 2001. We can state, that the fall in the number of people carried by public transport has stabilized and there was even an increase by 5 % during last year. Nevertheless this increase did not have any effect on automobile traffic, because the motor-car traffic performance on the city streets also increased by 3 %. Also the number of registered cars increased slightly, although Prague is the city with the highest level of car ownership among European cities.

In the year 2001 it became possible to intensify the pace of construction of transport system especially the metro. The last station of the metro line B which was under construction was completed and the construction of a section of metro line C from *Holešovice* to *Kobylisy* continued successfully. After some pause in the construction of tram routes, new work was started on the tram route to *Barrandov* and a rate of construction of the city streets, namely the western part of the city ring road system was increased. It became possible to complete and put in operation further section of Prague's outer ring road, using the state funds. It is a fatal mistake that it is not possible to continue without delay in the construction of connecting section and thereby complete as soon as possible the outer ring road.

Even in the year 2001 numerous organizational measures were undertaken and gradually implemented, with the aim to ensure a priority of the city public transport and to increase traffic safety as a whole. Special attention was paid to pedestrians and their safety on pedestrian crossings with regard to new law about traffic (Highway Code). Although the number of accidents involving pedestrians increased by 8 % in the year 2001, an overall decrease of 16 % in the number of accidents was reached, which signifies the steepest year to year decline in the past twenty years.

A continuing optimization of organization and management of the municipal road operation, projects of transport engineering measures to lower traffic related accident rate, monitoring and evaluation of transport development and also a systematic adjustment of further development of the overall municipal transport system all belong among the principal tasks of the transport engineering. The Institute of Transportation Engineering of the City of Prague provides services in this field for the needs of the Capital of Prague, and also for other cities and regions.

Dear readers, I would be glad if the information from this yearbook is of service for gaining the necessary overview of the current transport situation in Prague as well as for professional decision-making concerning the transport system of Prague. We will gladly provide more detailed information as well as other data directly at our institute or post them on our internet site **www.udi-praha.cz**.

Ladislav Pivec

Director

May 1<sup>st</sup>, 2002

## 1 BASIC DATA

## 1.1 The Capital of Prague

Selected data on the Capital of Prague as of 31.12.2001

City area Population Job opportunitie	es	 496 1 170 000 cca 780 000	km²
Total road netwo	ork motorways within the city other urban motorways	 3 411 11 76	km km km
Number of bridg specifically,	pes in road network bridges across the river grade-separated intersections underpasses	 583 27 205 121	
Number of tunne	els (total length 3 087 m)	 5	
•	ly passenger cars	 760 726 627 891	
Motor vehicles p in vehicles Passenger cars	s per 1 000 inhabitants	 650	
	r 1 000 inhabitants	 537	
Metro (undergro Tram network specifically, Public Transport	und) network (in operation)  dedicated trackbed t bus network	 49.8 137.5 51 669.5	km %
Traffic lights specifically,	co-ordinated into "green waves" with traffic actuated control with tram priority separate pedestrian crossings	 406 277 156 60 55	
over the whole re		17.1	mill. veh.km
in a year Modal split	age workday		bill. veh.km
(based on all trips public tran car transp	•	 57 43	% %
Traffic accidents traffic accident in		 34 195	
fatal serious slight		 67 452 3 521	
Relative acciden (accidents per 1	t rate million vehicle-kilometres)	 6.1	

## 1.2 Prague compared with the Czech Republic

	Prague	Czech Rep.*	Prague/CZ (%)
Area (km²)	496	78 864	0.6
Population (mill.)	1.2	10.3	11.7
Motor vehicles (thous)	761	5 358	14.2
specifically, passenger cars (thous)+	628	3 789	16.6
Motor vehicles per head (motor vehicles per 1000 persons)	650	521	
(persons per 1 motor vehicle)	1.5	1.9	
Passenger cars per head (pass. cars per 1000 persons) (persons per 1 passenger car)	537 1.9	368 2.7	

<sup>+</sup> see note in chapter 2.1

<sup>\*</sup> as of 30.6.2001



Traffic performance 1990 - 2001 (mill. veh.km/avg. workday 0 - 24 h)

Year	Prague*	Czech Republic+		
1990	7.3	80.9		
2000	16.6	131.2		
2001 17.1		x		
Index 00/90	228	162		
Index 01/00	103	x		

<sup>\*</sup> the whole road network



<sup>+</sup> motorways + highways, class I + II + III, including sections inside Prague

<sup>\*</sup> data not available on 31.3.2002

## 2.1 Development of Motorization and Passenger Car Motorization

The total number of motor vehicles registered within the Prague city area grows steadily. The essential share in the motor vehicle build-up is brought about by passenger cars.

At the end of 2001, there was 1 car per 1.9 inhabitants of Prague. In this respect Prague got ahead of the most motorized large cities in Western Europe, where the value of cars-per-head parameter usually ranges between 2.1 to 2.3 inhabitants per 1 passenger car.



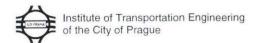
1961 to 2001 personal car motorization (cars per inhabitants)

#### Registered motor vehicles in 1961 - 2001

			Prague			Czec	h Republic (Cz	echoslo	vakia until 197	71)
1	Popul.	All motor v	ehicles	Personal	cars	Popul.	All motor ve	hicles	Personal	cars
Year	(000s)	number	%	number	%	(000s)	number	%	number	%
1961	1 007	93 106	22	44 891	13	13 746	1 326 801		291 680	
1971	1 082	203 519	48	133 129	40	14 419	2 931 629		1 041 137	
1981	1 183	367 007	86	284 756	85	10 306	3 449 300	85	1 872 694	79
1990	1 215	428 769	100	336 037	100	10 365	4 039 606	100	2 411 297	100
1996	1 205	702 966	164	588 968	175	10 309	4 991 607	124	3 349 008	139
1997	1 200	721 962	168	602 246	179	10 299	5 208 529	129	3 547 745	147
1998	1 193	735 504	172	612 128	182	10 290	5 383 765	133	3 687 451	153
1999	1 187	744 125	174	620 586	185	10 278	5 238 776	130	3 695 792	153
2000	1 181	746 832	174	620 663	185	10 267	5 230 846	129	3 720 316	154
2001	1 170	760 726	177	627 891	187	10 288*	5 357 727*	133*	3 788 627*	157

"Personal cars" include vans registered till the end of 1994 (since 1995 vans have been registered in lorries) 100 % = year 1990;

<sup>\*</sup> as of 30.6.2001



Number of motor vehicles per head and cars per head in 1961 - 2001

		Pra	ague		Czech Republic (Czechoslovakia until 1971)				
	Vehicles per head Personal cars per head		Vehicles	per head	Personal c	Personal cars per head			
Year	Veh. per 1 000 pers.	Pers. per 1 veh.	Cars per 1 000 pers.	Pers. per 1 car	Vehicles per 1 000 pers.	Persons per 1 vehicle	Cars per 1 000 pers.	Persons per 1 car	
1961	92	10.8	45	22.4	97	10.4	21	47.1	
1971	188	5.3	123	8.1	203	4.9	72	13.8	
1981	310	3.2	241	4.2	335	3.0	182	5.5	
1990	353	2.8	276	3.6	390	2.6	233	4.3	
1996	583	1.7	489	2.0	484	2.1	325	3.1	
1997	601	1.7	502	2.0	506	2.0	344	2.9	
1998	616	1.6	513	1.9	523	1.9	358	2.8	
1999	627	1.6	523	1.9	510	2.0	360	2.8	
2000	632	1.6	525	1.9	510	2.0	362	2.8	
2001	650	1.5	537	1.9	521*	1.9*	368*	2.7*	

<sup>\*</sup> as of 30.6.2001

## 2.2 Motor Car Traffic Volumes and Traffic Performance

The motor car traffic in cities is a phenomenon which increasingly affects both the people and urban environment as the number of vehicles and the traffic grow. This is especially true in the last decades for our larger cities and particularly Prague. The position of the Capital of Prague in car traffic in the Czech Republic is specific, as evidenced in outstandingly high volumes and vehicle-kilometre values in comparison with other Czech cities or countryside motorways and highways.

The basic aggregated parameter of motor car traffic development in Prague is the traffic performance in vehicle-kilometres (motor car kilometres covered) throughout the whole of the road network. The vehicle-kilometres have been registered by the Institute of Transportation Engineering since 1978, utilizing its own database software IDIS (Information Traffic Engineering System).

In addition to vehicle-kilometres, Prague car traffic development trends are monitored by means of cordon surveys, i.e. periodic traffic counts taken on spots which together make a rounded-off cordon over all the important in-roads entering a defined area. The downtown traffic development is monitored via the central cordon that reflects the two-way traffic volume at the entrances to the greater downtown area as defined roughly by the *Petřín* hill on the west, the *Letná* hill north, the *Rieger* park east and the *Vyšehrad* castle south. The extra-urban traffic development is monitored through the outskirts cordon reflecting the two-way car traffic volume at the entry points of the main arterial roads and motorways into the densely built-up city area. The two cordons' time arrays have been collected and available at the Institute of Transportation Engineering since 1961.

#### Traffic volume on central and outer cordon 1961 - 2001

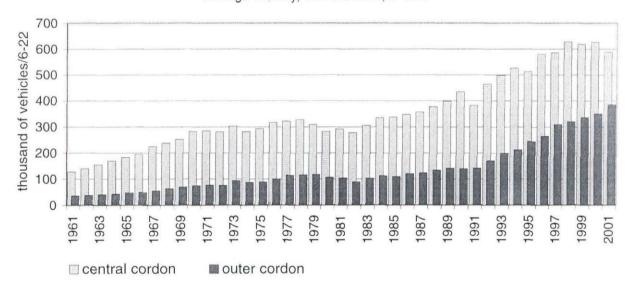
Workday, both directions in total, 6 - 22 h

		Central c		Outer cordon								
	Passenge	er cars	Lorrie	es	All vehi	cles	Passenge	er cars	Lorri	es	All veh	icles
Year	number	%	number	%	number	%	number	%	number	%	number	%
1961	69 000	18	32 000	82	128 000	29	14 000	14	14 000	41	36 000	26
1971	241 000	63	38 000	97	299 000	69	50 000	50	23 000	68	77 000	55
1981	247 000	64	39 000	100	292 000	67	67 000	66	31 000	91	104 000	74
1990	385 000	100	39 000	100	435 000	100	101 000	100	34 000	100	140 000	100
1996	543 000	141	30 000	77	581 000	134	222 000	220	38 000	112	265 000	189
1997	550 000	143	27 000	69	586 000	135	263 000	263	43 000	126	310 000	221
1998	591 000	154	27 000	69	628 000	144	277 000	274	39 000	115	321 000	229
1999	584 000	152	25 000	64	619 000	142	290 000	287	42 000	124	337 000	241
2000	594 000	154	23 000	59	627 000	144	304 000	301	43 000	126	351 000	251
2001	556 000	144	21 000	54	589 000	135	310 000	307	43 000	126	385 000	256

100 % = year 1990

#### Development of traffic on central and outer cordon 1961 - 2001

Average workday, both directions, 6 - 22 h



Since 1991 the number of cars as well as the car traffic volumes in Prague have grown at an explosive rate, unprecedented in Europe, apart from the former east German cities. The increasing trend continued even in 2001 though only outside the downtown area of the city. The growth rate in the past three years decelerated in comparison with the first half of the 1990s.

In the greater downtown area of the city (according to surveys on the central cordon) the car traffic volume has decreased by 6 % when compared to 2000. In comparison to 1990 though, 35 % more vehicles entered the greater downtown area. All the increase following 1990 has been brought about only by passenger cars while the number of lorries on the contrary has decreased by 46 % since 1990.

In 2001, about 295 000 vehicles entered the greater downtown area during an average workday between 6 - 22 h, including 278 000 passenger cars.

In the middle zone of the city, the car traffic volume increased by 2 to 4 % over 2001. As compared to 1990, the traffic has increased on some city roads in the middle zone by three to four times in the past 10 years.

In the outer zone of the city (according to surveys on the outer cordon) the volume of car traffic grew by 2 % in 2001 as compared to 2000. In comparison with 1990, approximately 156 % more vehicles entered Prague from its suburban zone, other state regions as well as from abroad.

179 000 vehicles, including 155 000 passenger cars, entered Prague from its environs during 6 - 22 h average workday in 2000.

The car traffic growth rate differs in various city zones. During 1991 - 2001 the car traffic grew as follows:

an average over the total network	+ 135	%
greater downtown area	+ 35	%
extra-urban traffic (municipal border)	+ 156	%
the middle zone of the city	+ 100	to + 300 %

It was especially the middle zone of the city that saw a rapid increase in traffic. The traffic on some of the roads rose three to four times the figures of 1990 over the last 11 years. The comparatively lower growth in volumes throughout the city centre is influenced by the fact that the traffic demand has reached the capacity of the key junctions during the peak hours on a number of places. That has resulted in an overload which spans across the road network, having lost its previous local character.

#### Road sections with the heaviest traffic in Prague's road network in 2001 were

- Jižní spojka at the section from 5. května to Vídeňská, where an average of 114 000 vehicles passed through per day (0 24 h), including 12 % transit transport. The transit journeys share of heavy lorries (8 000 per day) was 25 %,
- Barrandov bridge (109 000 cars per day),
- Wilsonova on the bridge over Masaryk railway station (104 000 cars per day),
- Wilsonova at the Wilson railway station (97 000 cars per day),
- Jižní spojka at the section from V Korytech to Zahradní Město neighbourhood (95 000 cars per day).

#### Grade - separated (multi-level) junctions with the heaviest traffic in 2001 were

- 5. Května Jižní spojka (184 000 cars per day),
- Jižní spojka Vídeňská (148 000 cars per day),
- Strakonická Barrandov bridge (135 000 cars per day),
- Bulhar junction (130 000 cars per day),
- Jižní spoika Chodovská (119 000 cars per day).

#### Level junctions with the heaviest traffic in 2001 were

- Žitná Mezibranská (76 000 cars per day),
- Muzeum (72 000 cars per day),
- Anglická Legerova (70 000 cars per day),
- Letenské square (68 000 cars per day),
- Vinohradská Legerova (67 000 cars per day).



#### Average occupancy of cars in 2001 was:

- in the greater downtown area (on the central cordon):

1.36 persons/car

- in the outer zone of the city (on the outer cordon):

1.46 persons/car

on the average all over Prague:

1.42 persons/car

## The car traffic development in the Capital of Prague area since 1991 is characterized with the following basic trends:

In comparison with the first half of the 1990s, when the average daily traffic performance had its annual increase of over 1 million vehicle-kilometres, the growth rate of the year to year daily traffic performance subsided to about 0.5 to 0.6 million vehicle-kilometres between 1998 and 2001. In spite of this abatement in the growth rate, though, the car traffic in Prague is still growing 2.5 to 3 times faster than e.g. in the 1980s (then the year-to-year growth of daily traffic performance amounted to approx. 0.2 million vehicle-kilometres).

The growth rate of car traffic performance in Prague after 1990 in comparison with the 1980s was in the first half of the 1990s more than 5 times higher, while in 2001 approximately 2.5 times higher. Average year to year increments of daily traffic performance on the whole city road network were:

	2000	+ 662 000	vehkm/day
	1999		vehkm/day
•	1998	+ 511 000	vehkm/day
•	1997	+ 998 000	vehkm/day
•	1991 - 1996	+ 1 101 000	vehkm/day per year
	1981 - 1990	+ 192 000	vehkm/day per year

The daily traffic performance has had an overall increase in the past 11 let (1991 - 2001) by 9.8 million vehicle/kilometres per day. It means that during the last 11 years the car traffic in Prague swelled more than in the past century of motoring from the last decade of 19th century until 1990.

The relative rate of traffic performance growth following 1990 is two times higher in Prague in comparison with other regions of the country.

Nearly all the rise in the car traffic in Prague following 1990 is due to passenger cars, as the lorries and buses stagnated. During 1991 to 2001 the traffic performance per vehicle category in Prague went up as follows:

. 107 0/

passenger cars	+ 167	%
lorries and buses	+ 6	%
all vehicles	+ 135	%

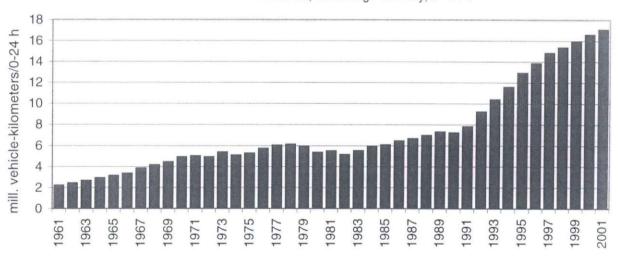
#### Motor car traffic vehicle-kilometres (traffic performance) in Prague in 1961 - 2001

The whole of the road network, an average workday, 0 - 24 h

	All vehicles		Specifically, pas	senger cars	Passenger car share
Year	vehkm (mill.)	%	vehkm (mill.)	%	on traffic performance (%)
1961	2.273*	31	1.273*	23	56
1971	5.061*	69	3.543*	65	70
1981	5.562	76	4.338	79	78
1990	7.293	100	5.848	100	80
1996	13.896	191	12.426	212	89
1997	14.894	204	13.405	229	90
1998	15.405	211	14.001	239	91
1999	15.979	219	14.503	248	91
2000	16.641	228	15.131	259	91
2001	17.121	235	15.585	267	91

<sup>100 % =</sup> year 1990

## Motor car traffic vehicle-kilometres (traffic performance) development in 1961 - 2001 The whole of the road network, an average workday, 0 - 24 h



## 2.3 Traffic flow structure

The traffic flow is made up largely of cars. The car traffic volumes grow due to a rise in passenger car trips while the numbers of cars of other categories in the traffic flow have been at the stand-still or slightly decreasing (on the central cordon since the 1970s, on the outer cordon since the 1980s). The resulting average share of passenger cars in the traffic flow has been rising steadily (the figures are network averages):

	in 1961	56 %
	in 1971	70 %
	in 1981	78 %
=	in 1990	80 %
	in 2001	91 %

<sup>\*</sup> an estimate by volume development trends on the central and outer cordon (traffic performances are monitored in Prague from 1978)

Concerning the local distribution, the passenger cars get the greater share towards the city centre. The share in 2001 was:

in the central cordon

94 %

in the outer cordon

87 %

the network average

91 %.

#### Traffic flow structure in 1961 - 2001 (%)

Workday, both direction total, 6 - 22 h

		Centra	l cordon			Outer	cordon	
	Passenger cars	Motor- cycles	Lorries	Buses (excl. pub. trans.)	Passenger cars	Motor- cycles	Lorries	Buses (excl. pub. trans.)
1961	53.7	19.4	29.4	2.0	38.6	22.1	34.4	4.9
1971	79.3	5.6	13.3	1.8	63.2	8.6	25.1	3.1
1981	84.3	0.4	13.2	2.0	65.1	0.6	30.3	4.0
1990	88.6	0.7	9.1	1.6	72.1	0.5	24.0	3.4
1996	93.5	0.3	5.1	1.1	84.0	0.2	14.2	1.6
1997	93.9	0.4	4.6	1.1	84.6	0.2	13.9	1.3
1998	94.1	0.5	4.3	1.1	86.4	0.2	12.0	1.4
1999	94.3	0.7	4.0	1.0	86.2	0.2	12.4	1.2
2000	94.7	0.6	3.7	1.0	86.5	0.2	12.1	1.2
2001	94.4	0.9	3.6	1.1	86.5	0.3	12.1	1.1

## 2.4 Car traffic variation in time

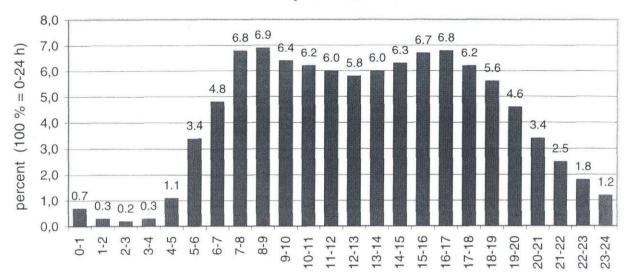
Daily variation in car traffic volumes throughout a workday have the following characteristic features.

- The prevailing portion of the daily traffic performance carries out during daylight (75 % during 6 18 h, or 81 % during 6 19 h), the interval of 6 22 h covering 91 %.
- Following 5 pm, the traffic performance shows a sharp and largely linear drop till midnight.
- The morning peak hour comes at 8 9 h, the afternoon peak hour is between 16 17 h.
- The morning peak hour's share is 6.9 %, the afternoon peak hour's share is 6.8 % (100 % = 0 24 h).
- The differences between peak hour share and morning off-peak share are not very sharp. The off-peak hour 12 13 h makes 5.8 % of the whole day.
- Daily variation in traffic performance of lorries and buses (excluding public transportation) displays a different characteristic from the overall profile. Its peak hour is 8 9 h making 10.1 % of the all-day lorry/bus performance. Following 9 o'clock, there comes a mild decrease without any sag or next peak following. The traffic performance starts coming notably down as early as at 1 pm, with a sharper decline coming about after 3 pm.
- Consequently, the share of lorries and buses in the traffic stream changes significantly during the day:
  - all-day average is 9 %
  - it comes up to 16 % in the morning
  - it comes down to 7 % in the afternoon
  - evening and night values range between 4 to 10 %.

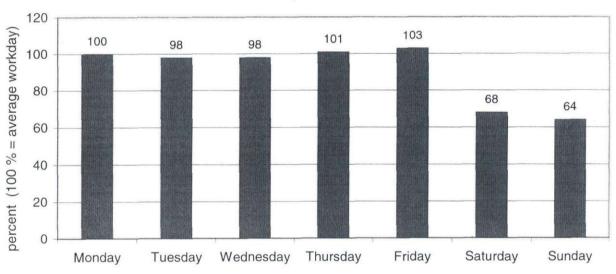


## Variation in time of car traffic in Prague in 2001

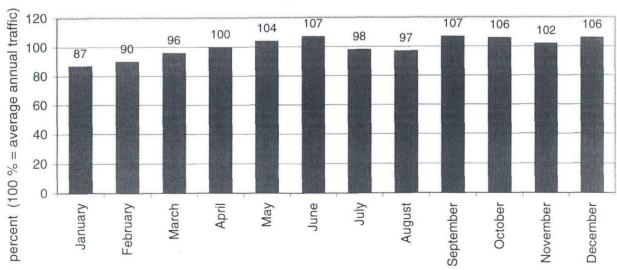
## **Daily variation**



## Weekly variation

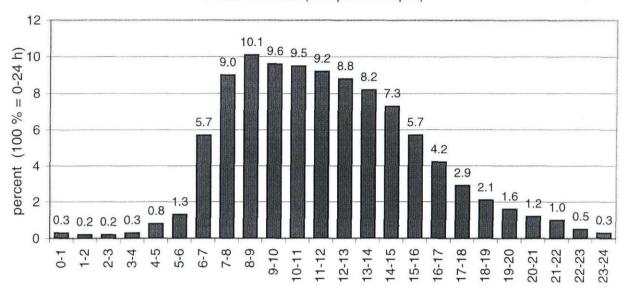


## Yearly variation



#### Daily variation of lorries and buses

Lorries and buses (excl. public transport)



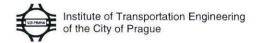
#### 2.5 Weekend car traffic

The Prague Institute of Transportation Engineering's year-to-year survey of the car traffic volumes includes monitoring weekend traffic on the urban outer limits. Weekend departures are carried out on Friday afternoons between 3 to 7 pm, on Saturdays between 8 to 11 am and additionally on Sunday mornings. On the other hand, weekend arrivals concentrate in a narrow band of Sunday return time from 2 to 10 pm. These are also intervals of periodic holiday traffic monitoring during spring survey time on the outer cordon. The Institute has been registering the weekend car traffic since 1973. The fundamental tendencies of the weekend car traffic development differ substantially from workday traffic development, as shown in the following table.

Car average year to year ingrees	Outer cordon, towar	rds Prague
Car average year-to-year increase	(veh./ 14 - 22 h)	rds Prague % 0,5 2 1,7 - 1 4 5
1970s	400	0,5
1980s	1 400	2
1990s	2 000	1,7
specifically, 1998	- 1 000	- 1
1999	4 000	4
2000	6 000	5
2001	1 000	1

Following the marked year-to-year decrease in 1991, brought about by the doubling of petrol prices in 1990, the weekend car traffic reached its former 1990 level again in 1993 to 1994. In the latter half of the 1990s, the traffic showed few vacillations (- 3 to +4%) during the respective years. In all, the weekend car traffic rose by 21% during 1990s, compared with 1990.

The weekend traffic flow is clearly dominated by passenger cars; their share in 2001 was 97 %.



Average passenger car occupancy in weekend traffic in 2001 was 2.17 persons per car.

#### Weekend traffic volumes in 1973 - 2001

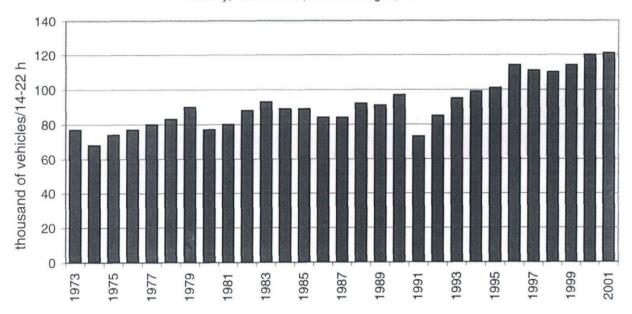
Sunday, outer cordon, towards Prague, 14 - 22 h

	Passenge	er cars	All cars	
Year	973       70 000       74         981       77 000       82         990       94 000       100         996       111 000       118         997       108 000       115         998       108 000       115         999       111 000       118	%	number	%
1973	70 000	74	77 000	77
1981	77 000	82	80 000	80
1990	94 000	100	100 000	100
1996	111 000	118	114 000	114
1997	108 000	115	111 000	111
1998	108 000	115	110 000	110
1999	111 000	118	114 000	114
2000	116 000	123	120 000	120
2001	117 000	124	121 000	121

100 % = 1990

## Weekend transport volume development in 1973 - 2001

Sunday, outer cordon, towards Prague, 14 - 22 h



## 3 PUBLIC TRANSPORT

## 3.1 Prague Integrated Transport

#### 3.1.1 Basic data

Prague Integrated Transport System is organized by Prague Integrated Transport Regional Organizer (*ROPID*), an allowance organization established by the Municipality of Prague.

Prague Integrated Transport (*PID*) System comprises the City of Prague and several communities outside of Prague, which help support operation of bus lines outside the territory of the Capital. The operators include Prague Public Transport Company (*Dopravní podnik hl. m. Prahy, a. s. - DP*) operating the metro (underground), tramlines, funicular railway and most of the bus lines, Czech Railways (*České dráhy, s. o.*) operating the railways and additional eleven smaller bus line operators.

The blueprint for an integrated passenger transport system in and around Prague was ready as early as in late 1970s. The integrated transport system was launched in 1992 with the implementation of an integrated tariff in the first two suburban bus lines. Further development continued with the gradual linking up of railway routes with the integrated system, by increasing the range of suburban bus transport in a number of lines, by increasing the size of the covered territory and the number of communities served by the suburban *PID* buses. Simultaneously, the tariff system also developed, a zoned tariff has been implemented, with the number of tariff zones gradually increasing.

In 2001 the integrated system was further developed by both launching additional lines radially towards the city, and many lines throughout the region, which improve traffic connections between important regional sites. In particular, they were the following localities: Kralupy nad Vltavou - Brandýs nad Labem - Čelákovice - Úvaly in the north Český Brod-Kostelec nad Černými Lesy in the east, Kamenice - Pyšely in the south as well as Řevnice and Beroun in the south-west. 114 regional bus lines were operating by the late 2001, including 30 lines led completely outside of the territory of Prague.

Number of bus lines operated in daytime traffic (excluding night lines, school buses and disability lines)

Operator	city territory	city-to-region lines	region lines
Dopravní podnik hl. m. Prahy, a. s.	148	20	0
Other operators	6	64	30

Basic data about Prague Integrated Transport (PID) 1996 - 2001

Year	1996	1997	1998	1999	2000	2001
Number of communities served by suburban PID buses	55	69	83	104	159	218
Number of railway stations and stops linked up with PID		181	181	181	190	200
Number of suburban PID bus lines	31	38	48	54	89	114
Transport performance of suburban PID bus lines (million vehkm)	2.552	4.123	5.030	7.994	9.357	12.910
Transport performance of all the PID lines except railway /metro+tramway+ city and suburban buses/ (million vehkm)	152	150	149	156	157	163
Share of travel with PID tickets in the railways integrated into <i>PID</i> (% of the total)	29.1	32.5	35.6	37.2	39.2	43.0

## 3.1.2 Municipal Public Transport

The **Metro** (underground) makes a backbone network of the Municipal Public Transport. The Metro consists of three lines with a total operational length of 49.8 km and 51 stations (including three interchanges). 23 stations have been made barrier-free. The trains travel at an average commercial speed of 35.4 km/h, with the average distance between stations 1 038 m. The Metro share of the number of transported passengers reached 40.8 % of all the passengers using the municipal public transport in 2001. The fleet in operation (excluding the carriages to be repaired, refurbished, scrapped and put to historical depository) records 490 items. In 2001, additional new M1 Metro trains were delivered, increasing the number of new trains to 15 in operation.

The **tramway network** is 137.5 km long. 51 % of the lines run on a dedicated trackbed (a raised embankment or, in places, separate track lanes led outside of road), 49 % of the tracks are in the roadway. The average stop distance throughout the network is 505 m. The trams share 30.6 % of all the transported persons. The tramway fleet in operation records, as of the year end, 941 carriages (excluding historical carriages and the ones to be scrapped) including 47 articulated three - part vehicles and 50 modernized T3 trams.

The **buses** make up a complementary network to the Metro and trams. They provide spread coverage of the area, especially at the outskirts, and selected tangential connections. The operational length of the network within the city territory is 669.5 km with an average distance between stops 681 m. The bus fleet in operation records 1 325 buses including 754 standard types, 225 low floor, 345 articulated buses and 1 articulated low floor. The bus share of the total transported persons is 28.6 %.

The **funicular** railway provides a connection between *Újezd* street and *Petřín* hill (via a mid-point stop, *Nebozízek*). Two carriages with their capacity of 100 persons travel on a 510 m long railway with an average commercial speed 6.12 km/h climbing to the height of 130.45 m. The rope (35.3 mm in diameter) linking the two carriages is moved by electrical power. The funicular transports about 1.5 million passengers a year.

Basic data about Prague Integrated Transport in 2001 (operated by Prague Public Transport Company, DP)

	Metro	Trams	Buses	Total		
Operational network length (km)	49.8	137.5	669.5	856.8		
specifically dedicated trackbed (%)	100	51	-	-		
Operational network length outside Prague (km)		-	137.3	137.3		
Average stop distance (m)	1 038	505	681	-		
Average commercial speed (km/h)	35.4	19.2	25.9	-		
Vehicle-kilometres covered per year (thous)	40 374	46 474	61 696	148 544		
Vehkms covered outside Prague per year (thous)		-	1 366	1 366		
Passengers transported per year (thous)	442 448	332 488	310 560	1 085 496		
Passengers transp'd outside Prague / year (thous)	•		18 843	18 843		
Prague Public Transport Company employees		12	631			
Revenue from tickets (mill. CZK)	2 622					
Operational costs (mill. CZK)		11	097			
Revenue-costs ratio (%)		23	.63			

Development of selected characteristics of public transport

	Operation	al network le	ength (km+)	Average commercial speed (km/h)				sp. Performance on erage workday
Year	Metro	Trams	Buses	Metro	Trams	Buses	Place-km (mill.)	Passengers transported (thous)*
1981	19.3	122.9	545.0	32.2	15.7	23.8	46.7	3 638
1990	38.5	130.5	607.3	34.6	18.7	23.7	57.6	4 186
1995	43.6	136.2	671.4	34.9	19.0	23.3	53.4	3 409
1996	43.6	136.2	724.6**	34.9	19.0	23.8**	54.5++	3 423++
1997	43.6	136.4	745.6**	34.9	18.9	24.0**	54.1++	3 393++
1998	49.8	136.4	759.7**	34.9	18.7	24.3**	54.4++	3 349++
1999	49.8	136.4	797.5**	34.9	19.0	24.3**	56.1++	3 302++
2000	49.8	136.4	812.4**	35.7	18.9	25.2**	56.0++	3 290++
2001	49.8	137.5×	806.8**	35.4	19.2	25.9**	56.8++	3 468++

- The operational length is the total length of regularly operated lines that are open for passengers (i.e. without service tracks, sidings, lay-bays, depots, yards, etc.), measured along the line axis, or street axis with bus lines. With Metro, it is the total length of the lines from terminal to terminal platform midpoint.
- The figure provided by Prague Public Transport Company (DP hl. m. Prahy, a. s.)
- \* The number of transported passengers is shown as number of rides. A ride means using a single means of public transport, each change counting as another ride.
- \*\* incl. suburban PID lines operated by Prague Public Transport Company (DP hl. m. Prahy, a. s.)
- performances and passengers transported by DP hl. m. Prahy, a. s., within the Prague territory

## 3.1.3 Suburban public transport included in PID

The suburban public transport that is included in *PID* (i.e. the transport which extends beyond the territory of the Capital) is provided by railway and bus lines. The railway transport is operated by Czech Railways (České dráhy, s. o.) on all the 10 railway lines entering Prague. The length of the railways throughout Prague territory is 145 km. These lines operate an average of 425 passenger and fast trains on workdays, available for *PID* tariff passengers. They transport an average of 77 200 passengers in both directions. The highest performance have the *Praha - Kolín* and *Praha - Benešov u Prahy* railway lines. On workdays, about 35 000 passengers travel by these lines over Prague territory in both directions daily, using 121 trains which in go in 30 minute intervals during pear hours.

#### The suburban railway sections under the heaviest use throughout Prague (an average workday)

Section	average number of passengers	average number of trains
Praha Masarykovo nádraží – Praha - Klánovice	18 625	61
Praha hlavní nádraží – Praha - Kolovraty	16 629	60

Using a railway connection is very time-efficient for passengers travelling from the suburbs to downtown stations. The travelling times and pear hour interval for the three most important directions is indicated in the following table.

Railway line	pear hour interval	travel time	distance
Praha-Klánovice – Praha Masarykovo nádraží	30 min	20 min	18 km
Praha-Kolovraty – Praha hlavní nádraží	30 min	23 min	17 km
Praha-Radotín – Praha hlavní nádraží	30 min	18 min	13 km

The suburban bus transport included in *PID* consists of 114 lines. These are run by 12 operators including *DP hl. m. Prahy, a. s.,* which is responsible for 20 lines. Out of the total suburban bus *PID* transport performance of 12.91 mill. vehicle-km, the larger portion of 8.64 mill. vehicle-km, i.e. 67 %, was reached outside of the municipal territory. As compared with the previous year, the integrated bus traffic performance increased by 3.553 mill. vehicle-km, i.e. by 38 % while the traffic performance outside the municipal territory increased by almost 49 %. The surveys made in 2000 indicate that over 40 000 *PID* bus passengers a day cross the Prague municipal border in both directions.

## 3.2 Long - distance public transport

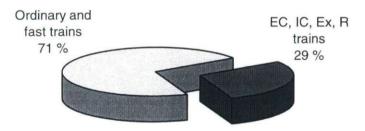
## 3.2.1 Railway transport

The railways offer transport connections between Prague and other locations by means of passenger and long-distance trains. The total of trains includes 24 % intercity and express trains. The municipal territory has 44 railway stations and stops. Czech Railways operate a daily average of 561 train connections across Prague on workdays, in which, as Czech Railways indicate, an average of 109 300 passengers travel in both directions, including suburban travels.

#### Number of passengers transported throughout Prague (an average workday)

Ordinary and	fast trains	EC, IC, Ex a	R trains
avg. number of passengers	avg. number of trains	avg. number of passengers	avg. number of trains
77 200	425	32 100	136

#### Share of train types in passenger transport (an average workday)



## 3.2.2 Bus transport

The bus transport between Prague and other locations is run by many operators based throughout the Czech Republic, some international lines as well as foreign operators. Almost 50 000 passengers travel to or from Prague daily. Out of the rough total of 2 200 connections, the Prague border is crossed daily in both directions in 24 hours of an average workday by 780 long-distance and 80 international connections. The municipal territory has over 200 bus stops and stations. In 2001, the bus station *Roztyly* was moved to a different location.

## 4 TRAFFIC SIGNAL CONTROL

## 4.1 Construction and reconstruction of traffic signals

Traffic signal devices (TSD) continued to be reconstructed and developed in 2001, seeing they are essential for safety and fluency of the road traffic and play a fundamental role in the operational urban traffic control system.

Prague had 406 TSDs by the end of 2001. They include 55 locations with stand-alone pedestrian crossings, most of which are equipped with push-buttons for on-demand only walk signal.

277 TSDs are interlinked in co-ordinated groups with control synchronization in order to provide for smooth flow of vehicles without stopping in front of traffic lights (so called "green waves"). On the territory of Prague in 2001 have been installed 12 new TSDs and 23 TSDs have been reconstructed.

Controllers which do not comply anymore with valid standards have been replaced in 36 TSDs with new microcomputer-equipped types: Signalbau Huber MTC, Eltodo ELS and SITRAFFIC C800 ELS.

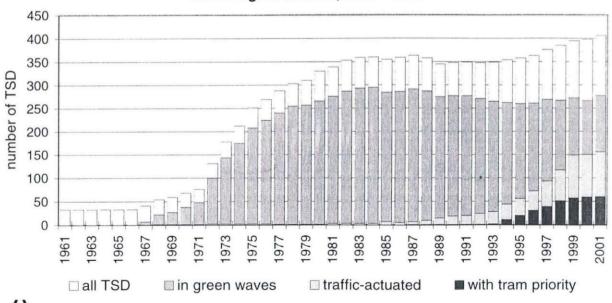
All the constructed and reconstructed TSDs have been equipped with acoustic signal device for the blind on all pedestrian crossings.

Basic data on traffic signal devices, 1961 - 2001

Year	1961	1971	1981	1990	1996	1997	1998	1999	2000	2001
All TSDs	33	76	339	348	366	376	385	395	398	406
specifically, pedestrian crossings	-	9	37	45	49	51	54	55	57	55
in green waves		48	276	277	263	269	267	272	266	277
traffic-actuated		1	3	19	72	93	117	149	150	156
with tram priority		-	-	1	31	39	51	57	59	60

Up to 1998, only TSDs operated by Prague Road and Street Authority (TSK) are included.

#### Traffic signal devices, 1961 - 2001



All newly built and reconstructed TSDs are equipped with traffic actuation by vehicle and pedestrians demand as well as with tram priority.

As of 31.12.2001, the number of tram priority TSDs reached 60, which is 31 % of the total 192 TSDs on the tram lines of Prague. 26 crossroads with simple traffic conditions have an absolute tram priority, other locations have conditional (limited) tram priority. Development of the tram priority in is shown in the following table.

Tram priority TSD, 1993 - 2001

	Year (as of 31.12.2001)								
	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total of TSDs on tramway network	183	183	186	186	187	189	187	188	192
specifically, with tram priority	2	11	20	31	39	51	57	59	60
%	1	6	11	17	21	27	30	31	31

The tram priority has been newly introduced on 6 crossroads, and the priority has been enhanced in on 6 crossroads.

The tram priority has been withdrawn on 5 crossroads due to considerations for traffic fluency across a wider area as well as due to redevelopment.

Tram p	Tram priority TSDs in operation - as of 31.12.2001					
No.	TSD location	No. T	TSD location			
1.010	Národní divadlo	6.147	M. Horákové - U Brusnice			
1.011	Mánes (Masarykovo nábřeží - Myslíkova)	6.148	Patočkova - Střešovická			
1.012	Jiráskovo náměstí	6.149	Patočkova - Myslbekova (A)			
1.035	Křižovnická - Karlova					
1.056	Křižovnická - Kaprova	7.002	nábř. kpt. Jaroše - Letenský tunel			
1.071	Čechův most - Na Františku	7.028	nábř. kpt. Jaroše - Dukelských hrdinů			
1.089	Čechův most - nábřeží E. Beneše	7.125	Dělnická - Jankovcova (A)			
1.106	Malostranské náměstí - Letenská	7.129	Strossmayerovo náměstí			
1.156	Klárov - Letenská	7.130	Dukelských hrdinů - Veletržní			
		7.133	Dukelských hrdinů - U Výstaviště			
2.013	Palackého náměstí	7.137	Argentinská - Plynární			
2.020	Rašínovo nábřeží - Libušina	7.141	Dělnická - Komunardů			
2.021	Výtoň (Rašínovo nábřeží - Svobodova)	7.142	Plynární - Komunardů (A)			
2.022	Svobodova - Vyšehradská (A)	7.155	Letenské náměstí			
2.023	Svobodova - Na Slupi	7.163	Dukelských hrdinů - Kostelní			
2.066	Vyšehradská - Benátská (A)	7.172	Plynární - Osadní (A)			
		7.176	Partyzánská - Vrbenského (A)			
3.304	Táboritská - Ondříčkova					
3.306	Olšanské náměstí	8.220	Sokolovská - Švábky			
3.364	Koněvova - Spojovací	8.251	Elznicovo náměstí - Voctářova (A)			
3.374	Koněvova - Na Vrcholu (A)	8.251	Elznicovo náměstí - Kotlaska (A)			
3.613	Vinohradská - Pod Židovskými hřbitovy (A)	8.251	Zenklova - přechod (A)			
		8.731	Trojská - přejezd tramvajové tratě (A)			
4.401	Bělehradská - Otakarova					
4.418	Podolské nábřeží - Podolská (A)	9.209	Balabenka			
4.419	Podolské nábřeží - Kublov (A)	9.210	Sokolovská - Na Rozcestí (A)			
4.420	Podolské nábřeží - Jeremenkova (A)	9.233	Sokolovská - Na Břehu (A)			
4.450	Kolarovova - Čs. Exilu (A)	9.264	Kolbenova - crossing (A)			
4.469	Modřanská - Údolní (A)					
4.470	Kolarovova - odbočení tramvaje (A)	0.327	Vinohradská - Starostrašnická			
4.628	Modřanská - Branická (A)	0.342	Vinohradská - Za Strašnickou vozovnou (A)			
	* *	0.359	Vršovická - Užocká (A)			
5.582	Nádražní - Nádraží Smíchov	0.622	Švehlova - Práčská (A)			
5.583	Nádražní - U Královské louky	0.632	Černokostelecká - Sazečská			
Total: 60 TSDs, incl. 26 absolute priority TSDs (A)  Total of TSDs on tramway network: 192						

#### 4.2 Traffic control centres

The "Urban Road Traffic Control System" continued to be implemented in 2001. The main traffic control centre is installed in the building of Public Transport Central Control in Na Bojišti street. It is administered by Prague Road and Street Authority (TSK hl. m. Prahy) and operated by Police of the Czech Republic. TSD control systems VRS, MIGRA and ADT as well as the tunnel control KERBERUS are in operation in the control centre.

27 TSDs from area 1 - *Holešovice* have been connected to the **VRS 2100** control since the end of 2000 while in 2001 additional 14 TSDs from area 5 - Centre have been added. Currently, time-depended signal plan selection is used; traffic-responsive control is prepared. All new signals have traffic-actuated control based on vehicle, pedestrian and tram demands. Data can be collected and archived from traffic detectors.

The **MIGRA** regional control serves the area 3 - *Smíchov*. Currently, 20 traffic signal junctions are controlled, with additional 18 TSDs considered to be integrated. So far, the traffic is controlled by time-depended signal plan selection.

The **ADT** control processes 69 TSDs. Specifically, 51 of them are located in the city centre. Its control is performed by extending phases of the so-called structural signal plan by means of stopping points. Additional 18 TSDs comprise a co-ordinated group along the *Evropská* street.

The main traffic control centre is also responsible for the traffic control in the *Strahov* and the *Těšnov* tunnels.

The main traffic control centre also provides a TV monitoring of critical spots on the road network via rotary or stationary TV cameras. There are 76 cameras throughout the Prague network.

Also P + R (Park and Ride) system on the western side of the city has been included in the main control centre network. The car-parking information system shows the number of vacancies before the parking is reached.

Variable-message information boards have been installed in several localities of the city. These texts inform drivers on important current traffic changes in the area (congestions, accidents, traffic situation). Data and information are transmitted wireless via GSM.

A Prague **Telematic System** is a project that was launched in 2001. Telematic, or intelligent traffic systems utilize computing and communication technologies to process urban traffic. A telematic system integrates subsystems that have so far worked independently; it also enhances operations with data of the interconnected systems. This enables for the traffic to be controlled efficiently and run safer, as well as for the individual participants to get better informed. A design of the Prague Telematic System was developed in 2001. It is the first comprehensive design of an intelligent traffic system not just in Prague, but in the nation. It specifies its limits, functions (with individual function descriptions), data flow, links to other subsystems and its physical arrangement. In order to be implemented, it is necessary that the municipal authorities co-operate with each other and with private enterprises more closely. Individual functional units will be built from 2002, keeping in view the overall system architecture. The Prague Telematic System implementation being a long-term run must be introduced in stages.

## 5.1 Traffic arrangements in the centre of Prague

A number of new local arrangements were implemented downtown in 2001. The most significant of them are:

- a pedestrian precinct was made in Vodičkova street between Palackého street and Wenceslas Square including the tram stop redevelopment and a detachable bollard
- demarking a residential area around the Wenceslas Square Vodičkova Jindřišská crossroads and the adjacent section of Wenceslas Square towards Mustek, then in Veleslavínova street between Křižovnická street and Aleš embankment
- entry for vehicular traffic limited to access to U Lužického semináře street
- setting maximum speed to 30 km/h in Pohořelec and in Vojtěšská street, to 20 km/h in Karoliny Světlé street (from Krocínova street)
- change of direction for vehicular traffic in Opatovická, Řeznická and V Kotcích streets
- new roundabout on the intersection of Široká Vězeňská V Kolkovně Dušní streets
- Vinohradská street closed between Wilsonova and Legerova streets, with minor traffic arrangements in Legerova street related to protection of the Radio Free Europe building.

## 5.2 Traffic arrangements outside of the centre of Prague

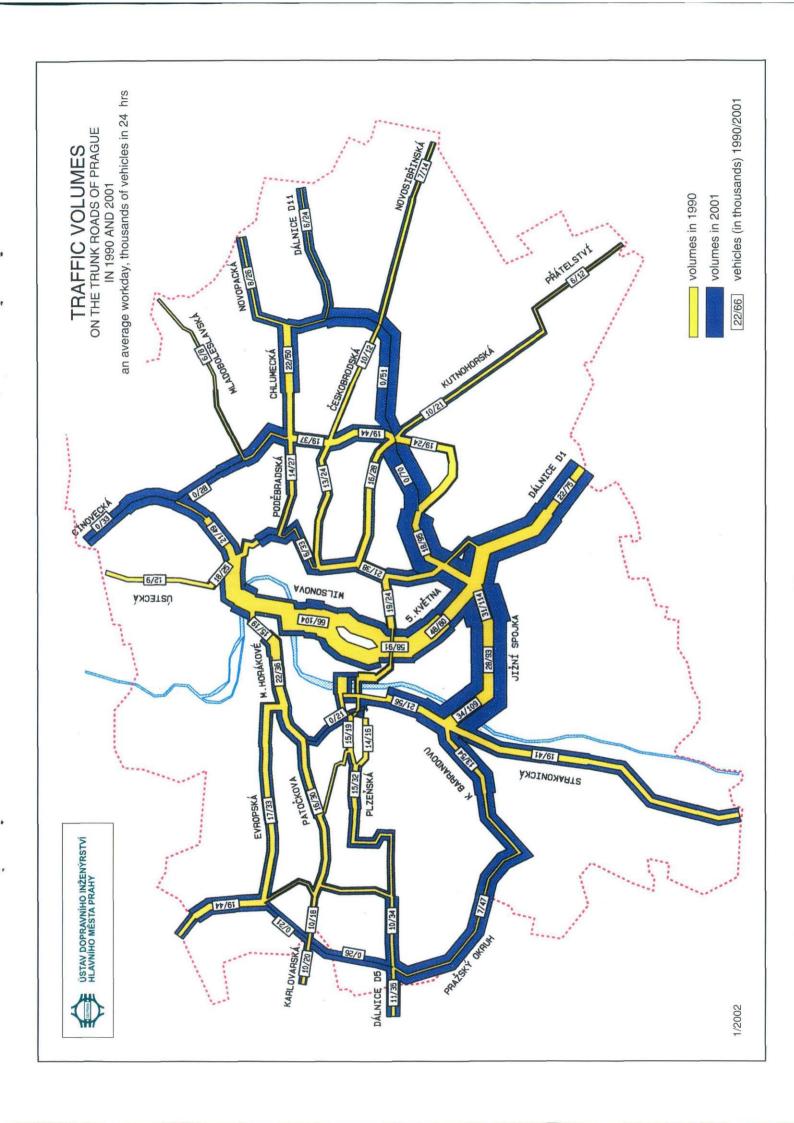
One of the most important change in traffic outside of the Prague city centre was launching another Prague ring (Pražský okruh) stretch from Řepy to Ruzyně later in October 2001. Shortly after the new motorway was opened, its bi-directional traffic volume counted 19 100 vehicles/6 - 22 h workday with markedly high percentage of lorries over 6 tons.

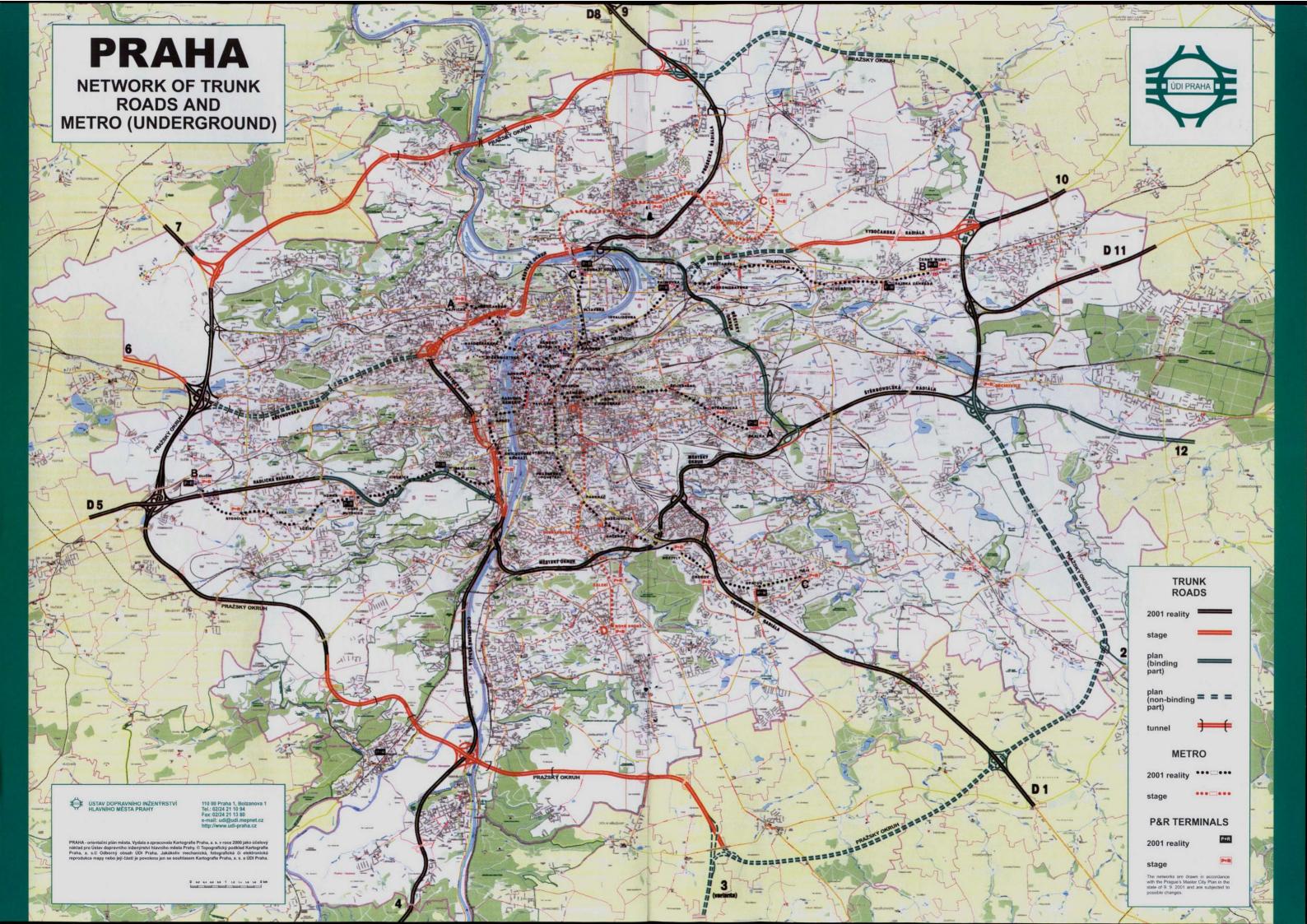
As soon as the new road was available, the traffic volume dropped dramatically in the routes that had been utilized as substitutes for this link, namely on Karlovarská street between the Prague Ring and Drnovská street, as well as on Drnovská street itself. The drop in load on these routes was by over 16 000 vehicles/6 - 22 h at some places. A significant and visible decline in load occurred also on Evropská street near Ruzyně, mainly in downtown direction; it was by approximately 4 000 vehicles/6 - 22 h.

Important re-arrangements have also been made in the Prague 5 district. A Smíchov Mini-Ring was put in operation late in October. It consists of unidirectional traffic westward through the streets V Botanice, Kartouzská, and eastward through Ostrovského, Vltavská streets and Hořejší embankment. This traffic change required two new lanes on Hořejší embankment, minor redirections in some streets inside the Mini-Ring, pedestrian crossing adaptations on the main roads, adjustments in junction traffic signals as well as road marking alterations. Simultaneously, a pedestrian precinct was made in sections of Plzeňská, Nádražní and Štefánikova streets.

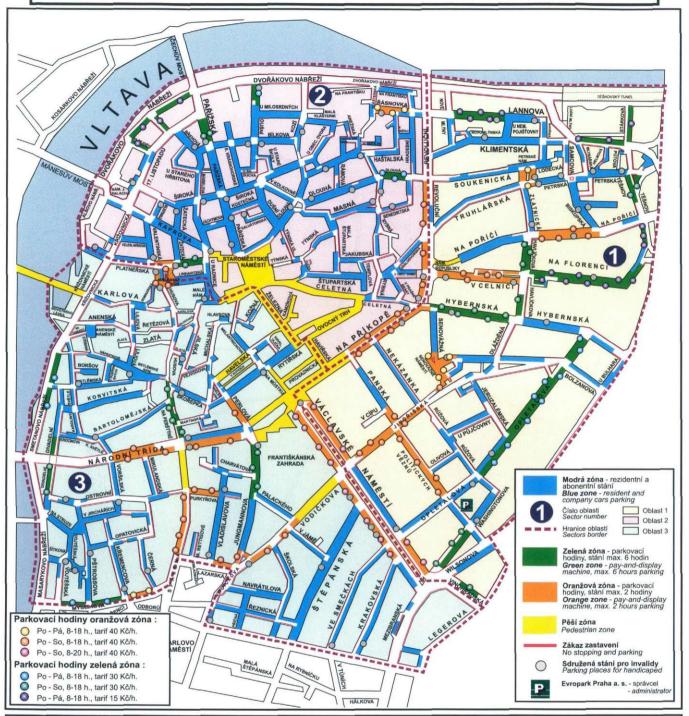
Traffic was also modified in Zličín district on Plzeňská street resulting in traffic volume reduction between Jeremiášova and Řevnická streets.

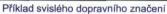
Traffic fluency and safety was enhanced by means of further limits on lorries in the left lane of K Barrandovu street from Štěpařská street to Prague Ring as well as in other sections of Jižní spojka street.





## Orientation map of streets with zones of standing for a fee in Prague 1







## Modrá zóna (rezidentní a abonentní

PRAHA 1

parkovacích Určena držitelům karet (obyvatelům s trvalým bydlištěm a podnikatelským subjektům se sídlem nebo provozovnou v zóně placeného stání v pravobřežní části Prahy 1)

#### Příklad svislého dopravního značení



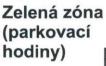
max. 2h

Oranžová zóna (parkovací hodiny)

Určena pro krátkodobé placené stání (max. 2 hodiny). Provozní doba, způsob platby a cena je uvedena na parkovacích hodinách označených oranžovou barvou.

#### Příklad svislého dopravního značení







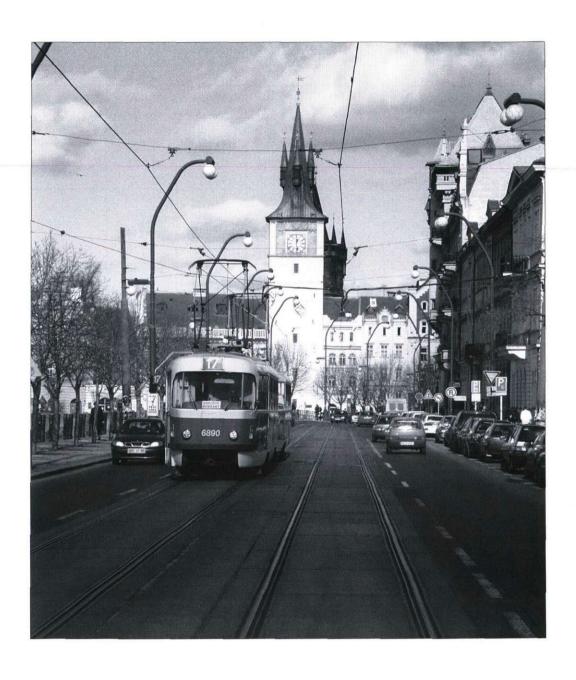
Určena pro střednědobé placené stání (max. 6 hodin). Provozní doba, způsob platby a cena je uvedena na parkovacích hodinách označených zelenou barvou.

## 5.3 Public transport priority

Many constructional and organizational measures were taken apart from tram priority traffic signal control in 2001.

They were mainly further application of so-called tram thresholds laid in the pavement alongside to tram rails (to prevent undisciplined car drivers from driving on tram tracks) in *Národní* street, *Edvard Beneš* embankment, *Strossmayer* Square, *Tyl* Square as well as in *Vodičkova* street, 295 m long in total.

Dedicated bus lane (280 m long) was marked in *U Santošky* and *Ostrovského* street.



## 6 ACCIDENTS IN TRAFFIC

## 6.1 Road accidents

As much as 34 195 accidents happened in Prague in 2001 (16 % less than in 2000), 67 persons died (16 % less) and 3 973 were injured (5 % more). Pedestrians were involved in 1 001 accidents (8 % more), 37 persons died (23 % more) and 973 were injured (5 % more). Pedestrians were culpable of 470 accidents (11 % less), where 16 persons died (14 % more) and 442 were injured (19 % less). The lion's share, however, have the drivers (33 140 out of 34 195 accidents, i.e. 97 %). The most frequent causes of drivers' accidents were failure to give way, incorrect driving and incorrect overtaking. The number of accidents under the influence of alcohol was 1 001 (1 % more).

Accidents, injuries and main causes of accidents

Year	1998	1999	2000	2001	difference 01/00 (%)
number of accidents	42 131	44 192	40 560	34 195	- 16
number of fatal injuries	65	74	80	67	- 16
number of serious injuries	535	540	521	452	- 13
number of slight injuries	3 568	3 558	3 260	3 521	+ 8
number of accidents with injuries	3 400	3 354	3 133	3 243	+ 4
number of accidents without injuries	38 731	40 838	37 427	30 452	- 19
the driver was culpable, due to	40 842	42 884	39 281	33 140	- 16
- speed	3 026	3 389	2 950	3 298	+ 12
- overtaking	518	465	465	314	- 32
- failure to give way	10 623	11 347	9 863	8 776	- 11
- manner of driving	26 675	27 683	26 003	20 752	- 20
the driver was not culpable	1 289	1 308	1 279	1 065	- 17
- caused due to the road defect	151	204	189	147	- 22
- caused by a pedestrian	609	571	531	470	- 11

The basic trend in accidents in 2001: a drop in the number of accidents and both fatal and serious injuries, a rise in slight injuries as compared to the previous year.

Considering the long-term trends in traffic accidents, it may be concluded that the period from 1960s to 1980s used to have a relatively favourable trend in accident rate as the number of accidents followed approximately the traffic performance and grew slower than the performance.

Since 1990 up to 1999, the basic tendency turned adversely as traffic accidents started to increase more than traffic performance. The total number of accidents in 1991 to 1999 grew by 145 % while the traffic performance increased by only 119 %. The accident risk rate indicated in relative accident rate (the number of accidents per one million vehicle/kilometres covered) also grew due to that. However, in 2000 to 2001 that unfavourable development seems to be interrupted. The number of accidents went significantly down in spite of automobile traffic still increasing, lowering notably also the accident risk rate (expressed in relative accident rate) to about one fifth of the 1990 value.

In 2001 there was an all-Prague average of 6.1 traffic accidents per 1 million vehicle/kilometres covered.

Traffic accidents, injuries and relative accident rate, 1961 - 2000

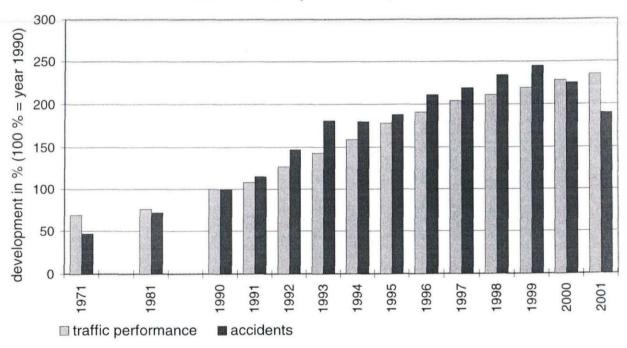
	Total acc	cidents	Fatal in	juries	Serious i	njuries	Slight in	juries	Relative	Traffic performance %	
Year	number	%	number	%	number	%	number	%	accident rate		
1961	5 495	30	63	69	580	157	2 361	84	7.3	31	
1971	8 496	47	123	135	567	154	4 046	144	5.1	69	
1981	13 064	72	81	89	401	109	2 572	92	7.1	76	
1990	18 024	100	91	100	369	100	2 806	100	7.5	100	
1997	39 473	219	90	99	539	146	3 720	133	8.0	204	
1998	42 131	234	65	71	535	145	3 568	127	8.3	211	
1999	44 192	245	74	81	540	146	3 558	127	8.4	219	
2000	40 560	225	80	88	521	141	3 260	116	7.4	228	
2001	34 195	190	67	74	452	122	3 521	125	6.1	235	

100 % = 1990

Relative accident rate = number of accidents per million vehicle-kilometres travelled (average values, total road network)

Traffic performance = vehicle-kilometres travelled, total road network

## Accidents and traffic performance, 1971 - 2001



## 6.2 Traffic education

The Institute of Transportation Engineering of the City of Prague takes an active part in traffic education of adult, children and youth road traffic participants. Most events concerned with prevention of traffic accidents is held jointly with the Ministry of Transportation and Communication and the Central Auto-Moto-Club of the Czech Republic, which has been selected by the Ministry for nationwide upholding of such activities.

In 2001, the traffic education events were funded from the municipal budget with CZK 1 507 000 (including CZK 870 000 for a working relation project of the Institute of Transportation Engineering and Prague Constabulary, "Safe on Foot and Bike") as well as about CZK 300 000 from the funds of the Ministry of Transportation and Communication.

The following programmes of children's traffic education were made in 2001:

- 1. Cyclist Starter Action (Cyclists' Traffic Contest)
- 2. Systematic Training Effort on children's traffic playgrounds (CTP)
- 3. Golden Zebra Programme (traffic education for first four years of primary school run jointly with radio broadcasting)
- 4. Fine arts education programme "Look out, kids, red's on!"

Local and district rounds of the Cyclists' Traffic Contest were held in spring, the all-Prague contest took place in June.

The Systematic Training Effort was run in all the seven Prague districts that have a CTP facility. A CTP is not necessarily required for Prague 1 (few primary schools and easy access to the Prague 2 facility); new CTP project documentation was prepared in Prague 4 district; Prague 5 CTP, after it obtained its approval of construction later in 2001, is now ready to use. In all, 23 150 children went through the training on Prague CTP facilities in 2001.

Jointly with the Police Museum, 15 interactive traffic education events "Magic Lights" were prepared, attended by approximately 1 800 children.

These and other events were held in 2001 for adult road users:

- The 9th annual Driving Skills Spring Cup of BESIP and also Driving Skills Autumn Cup of BESIP took part in April and October, respectively. These are open for motoring public and organized in working relation with Prague Car Orienteering Contest Club.
- The Handicapped Motorists' Auto-Moto-Club and The Prague Auto-Moto-Club of the Deaf helped organize several events, e.g. a safety contest for handicapped motorists in spring and an event "Going without Accident" in October. A separate traffic education contest was prepared for children from children's homes at *Horní Počernice* and *Klánovice*.
- In conjunction with Prague Constabulary, 24 safe driving courses (on slippery film) were arranged. It was intended as winter season preparation especially for driving constables, police and military police.
- 10 TV spots were shot in late 2001 (for TV PRIMA) concerned with traffic accident prevention in Prague.

Note: BESIP = Road Safety Activities Programme of Ministry of Transportation

## 6.3 Measures to enhance traffic security

A number of measures were implemented in 2001 to enhance the security of, especially, pedestrians. They consisted in optimizing the number and/or location of pedestrian crossings, setting BOCH and CITY BLOCK elements, security railings and other minor adjustments on the current pedestrian crossings.

Concrete blocks for pedestrian protection were set in 14 places (e.g. in *Opletalova*, *Rumunská*, *Lamačova*, *Radlická* streets and elsewhere).

Street lighting was strengthened at 46 crossings (junctions), mostly in Prague 11 and Prague 12 neighbourhoods.

Substantial pedestrian security arrangements were made in

- Radimova street (prohibited standing of vehicles along the inner edge of the turn, maximum speed reduction to 30 km/h, setting transverse speedhumps, completing the road marking and upright traffic signs as well as re-shaping the Radimova x Sartoriova junction through delimiting carriageway surface).
- Trojská street (close to Pod Havránkou at Trojská x Pod Havránkou junction and the Kovárna bus stop, in front of the primary school and the Svatopluk Čech grammar school at the pedestrian crossing and the Čechova škola bus stop as well as in front of the Praha Trója Neighbourhood Authority and the kindergarten at the pedestrian crossing and Kazanka bus stop), where maximum speed was reduced to 30 km/h, transverse speedhumps were set, the road marking and upright traffic signs were completed.

In order to cut down accident rate in *Vídeňská* street, the junction *Vídeňská* - *Dobronická* was reshaped into a mini-roundabout. Another mini-roundabout was built on *Hviezdoslavova* - *Mikulova* crossroads.

Speedhumps were set in 98 road profiles to have the vehicles slow down, many of them close to schools. The road marking with the symbol "Children" (A12) was installed in 9 spots and the corresponding (A12) LED upright traffic signs on additional 12 points. Railings were set on 21 locations.

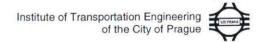
To enhance the car traffic safety in wet weather, treatment for more rough pavement was made in 15 sites. Concrete guard-rails were put in 12 localities.

Additional measuring point to predict ice on road was finished on *Kunratická* connection.

Traffic light violation checking device was put in operation on 5 important Prague junctions in 2001, namely on Černokostelecká - Průmyslová, Kolbenova - Kbelská, Střelničná - Ďáblická, Opatovská - Chilská and Plzeňská - Slánská junctions. Minor traffic engineering measures (upright signs and road markings) were implemented at over 100 urban locations.

Additional permanent speed violation site was installed in K Barrandovu street.

Security measures in 2001 in the framework of City Road Safety programme cost CZK 41.9 mill. in total.



## 7 PARKING

## 7.1 Parking in the city centre

Parking in the city centre is regulated with regard to the scope of demand for parking and the scarcity of parking places.

Regulation is in the meantime thoroughly enforced in the territory on the right riverbank of Prague 1 (approx. 3 km²), and by a form of "Zones of standing for a fee" (ZPS).

Rules for parking inside *ZPS* have been governed by Municipal Regulation No. 42/2000 Coll. since October 2000.

Street sections in ZPS are divided into:

- standing with a time limit, i.e. "orange and green zone", designated for vehicles of visitors,
- standing without a time limit, i.e. "blue zone", designated for the residents (car owners permanently living in *ZPS*) and subscribers (business or private individuals with a residency or a place of business in *ZPS*).

Number of parking places in ZPS:

	short-term (orange and green zone)	2 283	places
-	long-term (blue zone)	6 167	places
-	handicapped	220	places
-	other (reserved standing places for institutions and organizations	328	places

Average occupancy of standing places in ZPS (2001):

-	short-term standing	92.5 %
-	long-term standing	87.5 %

Rate of compliance with the regulations specified in *ZPS* for the utilization of standing places (2001):

-	short-term standing	23.0 %
_	long-term standing	47.0 %

Fees for the utilisation of standing places in *ZPS*:

-	short-term standing (orange zone)	40	CZK/h
-	short-term standing (green zone)	30	CZK/h
-	short-term standing (green zone - border sectors)	15	CZK/h
-	1 <sup>st</sup> vehicle of inhabitants	500	CZK/car/year
-	2 <sup>nd</sup> vehicle of inhabitants	5 000	CZK/car/year
-	3 <sup>rd</sup> and additional vehicles of inhabitants	10 000	CZK/car/year
-	a business vehicle	50 000	CZK/car/year

On the left riverbank of Prague 1 with the area of 2.4 km<sup>2</sup> and capacity of 1.5 thousand parking places, a zone is designated in which only vehicles of residents can be parked outside of reserved standing places and supervised parking places, marked with an approval from the municipal authority of Prague 1.

## 7.2 Car parks in the city centre

Currently, the following car parks are available in the larger city centre:

Public car parks	
Site	Capacity
Václavské garáže	95
Národní divadlo	216
Parking Palachovo náměstí	453
Intercontinental Hotel	200
Parking Kotva	300
Parking Marriott	480
Garáže Opletalova	90
Garáže Helios	520
Hlavní nádraží - Bolzanova	371
Renaissance Hotel	90
TV tower	98
Želivského (Don Giovanni)	150
Olšanská (next to the cemetery)	160
Olšanka (hotel)	100
Congress centre	1 090
Zlatý Anděl	400
KOC Nový Smíchov	2 000

Reserved car parks	
Site	Capacity
Na Florenci (Česká typografie)	140
Na Florenci (ČSOB)	90
Petrská - Obchodní centrum	290
Block betw. Soukenická and Klimentská	100
Celní Dvůr	100
Politických vězňů	90
Senovážné náměstí	120
Myslbek	320
Holan Centrum	180
Vladislavova	90
Lazarská - Vodičkova	90
Štěpánská	190
Na Rybníčku	90
Kateřinská	250
Na Bojišti	138
Rubešova (TRANSGAS)	90
Lublaňská (MVČR)	220
Šafaříkova - Bělehradská	90
Lucemburská	84
Vinohradská (SONY)	97
Koněvova (Raiffeisen)	68
Ondříčkova	154
Prokopova	72
Parukářka	326
Total	3 479

Total	6 813

## 7.3 The rest of the city territory

An all-Prague car park total is not available. It is estimated that the total capacity is approximately 160 000 standing places. Apart from the sites listed in the previous section, 188 sites are registered with car parks (including battery garages) that offer capacity of 10 360 places (they are mostly reserved car parks).

Additionally, 324 sites with off-street parking capacity of 35 178 spaces (the list keeps updating) are also in the urban territory.

## 7.4 Park and Ride places, P + R

In 2001 the combined transportation system P + R operated 11 P + R parkings with the capacity of 1 289 places. Their utilization grew more intensive in 2001 (see the following table):

Number of vehicles in P + R parks in October 1999, October 2000 and October 2001

Site	Capacity			Number	Number of parked vehicles			Avg. number of vehicles per place		
	1999	2000	2001	10/1999	10/2000	10/2001	10/1999	10/2000	10/2001	
Zličín I	94	94	94	3 970	2 973	3 508	42	32	37	
Zličín II	70	70	70	2 006	2 085	2 111	29	30	30	
Nové Butovice	60	60	60	2 313	2 608	2 572	39	43	43	
Radlická	40	37	37	1 274	1 391	1 272	32	35	34	
Skalka	175	175	175	1 702	2 695	2 762	10	15	16	
Opatov	212	212	212	2 934	3 901	5 073	17	18	24	
Rajská zahrada	80	80	80	1 976	2 345	2 837	25	29	35	
Černý Most	300	300	300	7 785	9 649	10 716	26	32	36	
Holešovice	77	77	77	2 835	3 125	3 226	37	41	42	
Palmovka	0	122	122	0	3 224	4 446	0	26	36	
Radotín	0	62	62	0	158	463	0	3	7	
Total	1 108	1 289	1 289	26 795	34 154	38 986	24	26	30	

The greatest rise in numbers of parking vehicles was especially at *Opatov*, Černý Most, Rajská zahrada and Palmovka.

The following table shows a snapshot of morning (11 am) occupancy in selected sites, indicating % of the capacity.

Site	Capacity	11/2000 occupancy	% utilized	11/2001 occupancy	% utilized
Zličín I	94	n/a	n/a	87	93
Radlická	37	36	97	35	95
Opatov	212	120	57	143	67
Rajská zahrada	80	60	75	68	85
Černý Most	300	268	89	272	91
Holešovice	77	75	97	75	97
Palmovka	122	115	94	115	94
Radotín	62	8	13	12	19

The most intensive use comes about in spring and autumn (April to June, October to November).

The sites with a higher reserve capacity continue to be temporarily used for parking of residents, which started in autumn 2000. Currently, 26 places are reserved at *Opatov*, 85 residential places are reserved at *Skalka*. The *Radotín* parking has no specific residential places; it is permitted, however, to use up to 50 % of the capacity (about 30 places) for this type of parking. The monthly rent for individuals is CZK 500.-, for business entities CZK 800.-.

During 2001, preparatory work for building additional P + R sites on the territory of Prague was started. The sites are, in particular, Běchovice, Modřany, Skalka II, Černý Most II



and Zličín III. The construction of Běchovice parking has been finished, the construction of Modřany has begun.



An integral part of an efficient functioning of a P+R system is a vehicle guidance system that provides the drivers the following information: the name of the site, the type of follow-up transport, the current distance from the parking, other P+R sites nearby, the parking occupancy and the follow-up public transport departure times.

The P+R vehicle guidance is either static or dynamic. The static guidance uses traffic signs with constant symbols. To guide vehicles dynamically, P+R use both constant traffic signs and variable-message traffic signs.

Fully dynamic P + R guidance system is currently implemented at Prague entry point from the D 5 motorway to the P + R Zličín I and II, Nové Butovice and Badlická. Information boards show the traffic sign "P + R parking", appended with the vehicle types the parking is designed for, name of the site and the distance. Operating information is provided with a variable symbol informing about the number of vacancies on the parking lots. Directly before one can turn to the particular site, the board supplies a variable message FREE/OCCUPIED.

The other P + R sites which lay outside the entry route are equipped with a simpler dynamic guidance consisting of information boards with a variable message FREE/OCCUPIED, either directly before parking entrance, or as the last sign before the turn to the parking.

The actual departure times of the follow-up public transport is being prepared for the P+R Běchovice (next two train connections are going to be displayed with their actual departure times).

## 7.5 Combined K + R parking

Another type of combined transport that began to be introduced in Prague in 2001 is the K + R (Kiss and Ride). With this passenger-type transport, the travelling companion gets out of the car to continue going by public transport while the driver departs with his car immediately. The most attractive in Prague is taking Metro, that is why portions of the carriageway next to Metro stations get reserved for this type of transport. The standing time is limited to 5 minutes.

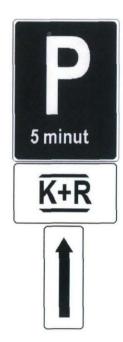
A survey concerning K + R workday demand was carried out close to Metro stations Černý Most, Nové Butovice, Radlická, Kačerov and Opatov. The following table shows the frequency with which persons got out or in the arriving and departing cars:

Numbers of cars and persons in corresponding survey times

Site	Černy	Černý Most		Nové Butovice		Radlická		Kačerov		atov
Time of day	6-10	14-18	6-10	14-18	6-10	14-18	6-10	14-18	6-10	14-18
Persons getting in	89	56	39	52	11	13	56	20	89	45
Number of vehicles	62	44	35	37	9	12	50	19	71	35
Persons getting out	259	202	115	172	47	36	144	164	195	250
Number of vehicles	213	162	108	137	46	29	136	141	156	179

The demand for using the K+R transport is not negligible. Developing that may significantly contribute to reducing car rides throughout the city.

In 2001, places were marked for K + R close to the B line Metro *Radlická* station in both directions and the B line Metro Č*erný Most* in the direction from the centre.





The upright traffic sign - the K + R carriageway edge, and the end of the K + R edge.

## 8 CYCLE TRAFFIC

"The Basic System of Cycle trails on the Territory of Prague" was approved by the resolution of the Municipal Council No. 323 of 14.3.1993. The system design expects 400 km of cycle trails to be gradually built. Its pattern is shaped so that the trails may cover the whole city territory and the cyclist may have minimum contact with heavy vehicular traffic.

The trails are placed as much as possible to street with low volumes of car transport, to roads where the cycle traffic may lead along with pedestrians or to dedicated cycle paths.

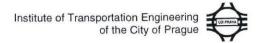
Currently, 180 km cycle trails are demarcated. Out of this total, 60 km is led along carfree roads with pedestrian traffic, along available paths in parks and woods or on ways newly built specifically for cycling and walking.

By 2001, the following urban system cycle trails have been implemented and used in Prague:

- Florenc Anděl, length 4 km
- Ovocný trh Letná, length 2 km
- Újezd Letná, length 3 km
- Florenc Spojovací, length 5.5 km
- Anděl Malá Chuchle, length 6 km
- Spojovací Dolní Počernice, length 7 km
- Malá Chuchle Radotín, length 4.5 km
- Dolní Počernice Xaverov, length 4 km
- Malá Chuchle Prokopské údolí, length 6 km
- Braník Chodov, length 8 km
- Chodov Újezd, length 5 km
- Letná Sobín, length 14 km
- Trója Letná, length 5.5 km
- Nové Butovice Lužiny, length 2 km
- Radotín Vrané nad Vltavou, length 8 km
- Císařský mlýn Vypich, length 9 km
- Císařský mlýn Liboc, length 8 km
- Podolí Modřany Komořany (section Vyšehrad U Kempinku), length 3.5 km
- Podbabská Prague border (section V Podbabě Kamýcká), length 1 km

The stages of cycle effort implemented in 2001:

- section Na Slupi street linking Folimanka park with the right riverbank track, length 220 m.,
- track Hostavice Dolní Počernice Štěrboholy Dubeč Kralovice Prague border (a track 1 section of Praha - Brno national cycle track) - /Nedvězí/, length 15 km of marked cycle path leading mainly on 3<sup>rd</sup> class roads,
- section Horní Počernice Klánovice (a section of Praha Nymburk national cycle tracks 1 and 14 linked), length 1 600 m.,
- the left riverbank trail along the *Berounka* river toward *Lahovice*, a section of the 1<sup>st</sup> stage (the 3<sup>rd</sup> and 4<sup>th</sup> sections), 630 m long,
- bike stands were installed at 10 Metro stations.



### 9 PEDESTRIAN TRAFFIC

Walking is the most natural and most frequent mode of man motion. Walking opens and closes every trip by any transportation means. An estimated 23 % of all intra-urban trips is made only on foot.

The greatest number of pedestrian journeys is done inside the multifunction central urban area, most notably over the Prague 1 neighbourhood. Of all the intra-urban pedestrian trips (made without any means of transportation), 23 % of the journeys have their origin or destination in Prague 1, while additional 9 % of pedestrian trips is done exclusively within this area, i.e. does not cross the border of the neighbourhood. It is then almost a third of all the pedestrian journeys in Prague that concern the Prague 1 neighbourhood.

The Institute of Transportation Engineering concluded a series of verification surveys concerning peak volumes in pedestrian traffic on an average workday along selected streets inside the Prague 1 neighbourhood, periodically made from as early as 1963 in 10 to 15 year intervals. In springs and autumns of 1999 - 2001, hour volume peaks in pedestrians were established on almost 240 street profiles throughout the Prague 1 neighbourhood and some adjacent areas.

The following table compares the results of the survey with the values found earlier for streets grouped by their prevailing function (shopping, tourism, traffic):

Pedestrian traffic volumes in selected street profiles in 1980, 1990 and 2000 - 2001

Function	Street	Section	1980	1990	2000 - 01
	Václavské náměstí	Vodičkova - Na Příkopě	11 400	16 000	7 380
	Vodičkova	Palackého - Václavské náměstí	7 400	6 400	4 710
	Jindřišská	Václavské nám Panská	5 700	6 250	3 320
SHOPPING	Národní	Spálená - Jungmannova	4 150	9 000	5 350
	Na Příkopě	Panská - Nekázanka	9 350	12 600	4 890
	Revoluční	Truhlářská - Soukenická	3 800	4 300	1 670
E E	Na Poříčí	Revoluční - Havlíčkova	5 100	4 450	1 650
호	Rytířská	Perlová - Na Můstku	2 550	2 800	1 760
ਨ	Spálená	Lazarská - Myslíkova	3 550	3 400	2 050
	Ječná	Salmovská - Lípová	1 000	1 200	1 280
	Žitná	Příčná - Školská	950	1 000	740
	Tylovo náměstí	Rumunská - Jugoslávská	1 900	3 100	1 650
	Havlíčkova	Na Poříčí - V Celnici	2 800	2 100	1 540
	Vítězná	Újezd - Šeříková	1 500	1 150	940
	Karlův most		2 070	2 600	3 450
	Karlova	Seminářská - Husova	1 070	2 400	2 890
	Staré zámecké schody		690	600	1 980
	Pohořelec	Úvoz - stairs to Strahovské nádvoří	790	1 400	1 680
N	Hradčanské náměstí	u Vojenského muzea	1 040	1 200	1 280
88	Mariánské hradby	u Hradu - tram stop	180	180	420
. To	Jelení	U Prašného mostu - U Brusnice	130		150
	Široká	Pařížská - E. Krásnohorské	800	-	1 000
Ì	Pařížská	Jáchymova - Staroměstské nám.	2 150	2 900	1 230
ĺ	Celetná	Králodvorská - U Prašné brány	2 950	2 950	2 930
	Karlova – Jilská	u Malého nám.	1 400	2 000	3 840

Function	Street	Section	1980	1990	2000 - 01
	Michalská	Vejvodova - Hlavsova	1 080	1 000	980
Σ	Loretánská	Loretánské nám U Kasáren	620	1 900	1 530
RIS	Úvoz	Pohořelec - below Strahovský klášter	170	250	230
TOURISM	Karmelitská	Harantova - Prokopská	900	900	1 020
	Na Můstku	Provaznická - Rytířská	2 500	8 050	5 450
	Na Perštýně	Národní - Martinská	2 200	2 500	2 790
	Palackého most		1 250	350	350
	Jiráskův most		600	250	200
	Štefánikův most		780	150	210
	Pod Bruskou	path under the bridge	890	100	140
	Dvořákovo nábř.	around the President hotel	530	400	380
	U Obecního domu		900	1 250	890
	Rašínovo nábřeží	Trojanova - Resslova	870	600	370
	Masarykovo nábřeží	Náplavní - Myslíkova	1 750	550	730
	Resslova	Na Zderaze - Dittrichova	800	950	420
	Karlovo náměstí	Odborů - tram stop	4 800	2 200	1 230
	Karlovo náměstí	Ječná - Žitná	1 650	1 500	1 020
	Ječná	Ke Karlovu - Melounová	940	1 450	1 350
	Žitná	Krakovská - Ve Smečkách	1 370	1 250	660
2	Mezibranská	u Čelakovského sadů	640	1 300	320
TRAFFIC	Sokolská	Žitná - Ječná	750	750	560
Ŧ	Sokolská	nám. I. P. Pavlova - Na Bojišti	900	900	1 050
	Legerova	Anglická - nám. I. P. Pavlova	1 850	1 500	350
	Legerova	Rumunská - I. P. Pavlova	500	500	510
	Washingtonova	Politických vězňů - Václavské náměstí	1 150	1 500	1 250
	Růžová	Opletalova - Washingtonova	200	200	260
	Wilsonova fly-over	Národní muzeum - Václavské náměstí	2 300	2 300	1 460
	Politických vězňů	Jindřišská - Opletalova	1 600	1 200	1 030
	Opletalova	Politických vězňů - Václavské náměstí	2 000	2 300	1 440
	Opletalova	Růžová - Jeruzalémská	2 200	750	1 100
	Opletalova	Bolzanova - Hybernská	1 850	700	1 300
	Na Poříčí - Na Florenci	arcade	800	1 300	920
	Těšnov	Petrská - Na Poříčí	2 000	500	560
	Sokolovská	Ke Štvanici - Metro vestibule	1 400	1 950	2 020
	Křižíkova	Na Florenci - Ke Štvanici	1 460	1 000	1 020

The comparison of peak volumes of pedestrian traffic in 1990 and 2000 - 2001 leads to conclusion that an overall decrease in peak pedestrian volumes has occurred in the last 10 years mainly in Prague 1:

- on predominantly shopping streets by about 43 %,
- on predominantly traffic streets (e.g. bridges) by about 20 %.

An exception are tourist routes, especially on the Prague Castle - Staroměstské Square axis.

The Prague historic core pedestrian traffic survey results obtained in 1999 - 2001 are shown in graphics inside this yearbook.



### 10 AIR TRANSPORT

Air passenger and freight transport is conducted mainly at the *Praha - Ruzyně* airport. The other three Prague airports are usually used for other special purposes. The airport has three take-off and landing runways, two of them equipped for instrument traffic with the maximum capacity of 36 movements (take-offs and landings) of aircraft per hour. The airport overall annual transport capacity is 6.2 million passengers. The airline companies operating on regular lines range from 28 to 35 companies, with about 30 companies operating charter lines also. Regular direct connections are provided to almost 70 world destinations, including daily connections to cities of Europe. The number of New York links, which also used to have an every day service most of the year, was reduced following the September 11<sup>th</sup> 2001. The international position of the *Praha - Ruzyně* airport follows from the following comparison.

The volume of passengers at selected airports (mill. passengers/year)

Airport	1994	1995	1996	1997	1998	98/94 %
Chicago O'Hara	66.47	67.25	69.15	70.39	72.49	109.1
London Heathrow	51.37	54.13	55.73	57.87	60.36	117.5
Frankfurt Rhein-Main	34.38	37.40	38.02	39.61	42.08	122.4
Paris Ch. de Gaulle	28.36	28.00	31.43	35.10	38.47	135.6
Amsterdam Schiphol	23.07	24.86	27.26	31.02	33.95	147.2
Roma Fiumicino	19.91	20.71	22.71	24.62	25.00	125.6
Madrid Barajas	18.22	19.57	21.27	23.12	24.92	136.8
Bruxelles National	11.24	12.50	13.36	15.82	18.40	163.7
Stockholm Arlanda	12.77	12.71	13.88	14.95	16.15	126.5
Copenhagen Kastrup	13.67	14.31	15.59	16.61	14.49	106.0
Vienna Schwechat	7.52	8.37	8.95	9.59	10.49	139.5
Lisboa	6.32	6.01	6.19	6.63	7.76	122.8
Praha Ruzyně	2.75	3.21	3.80	4.36	4.63	168.4
Budapest Ferihegy	2.87	2.94	3.31	3.62	3.94	137.3
Warsawa Okecie	2.38	2.74	3.09	3.55	3.82	160.5
Bratislava M. R. Štefánika	0.14	0.19	0.25	0.28	0.32	228.6

Source: Transportation Yearbook 2000 of the Czech Ministry of Transportation and Communication (ICAO)

The total volume of cleared passengers at the four international airports in the Czech Republic (*Praha*, *Brno*, *Ostrava*, *Karlovy Vary*) rose by 9.9 % as against 2000, while the volume of cargo (goods and mail) dropped by 3.7 %.

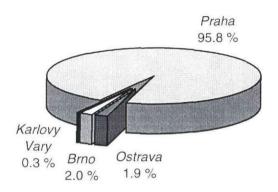
Comparing the previous years, when the *Praha - Ruzyně* airport's share on the total volume of air traffic in the Czech Republic steadily increased, the 2001 data reveal certain stagnation. The cargo transport share exceeded by only 1.0 % the level of 2000, and the passenger transport share by as little as 0.1 %.

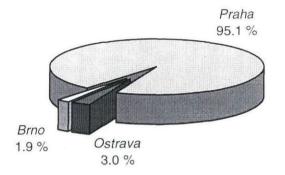
## Share of airports in passenger transport performance

% from the overall volume of cleared passengers

## Share of airports in cargo transport performance

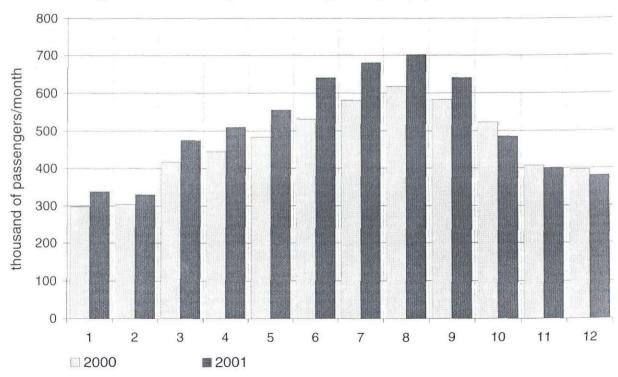
% from the overall volume of cleared air cargo including postal air service





In 2001, 6.1 mill. passengers were cleared through the *Praha - Ruzyně* airport, which represents an increase of 9.8 % compared with 2000. Also 29 571 tons of goods and 4 394 tons of mail were cleared away, so that air cargo transport decreased by 3.7 % as against 2000. Comparing further with 2000, the January - September period showed greater numbers of handled passengers in individual months by 11 to 22 % of those in 2001. In the remaining months of the year, the figures plummeted due to the New York terrorist attack on September 11<sup>th</sup>, making the total number of air travellers during those months 5.6 % less the values of 2000. A fall-off in passengers cleared was registered at most European airports in this period. Comparing with September 2000, the numbers of cleared passengers were lower in September 2001 also in Munich and Vienna by the same figure of 3.6 %, in Frankfurt by 7.2 % and London Heathrow as much as 13 %. The downturn was felt at *Praha - Ruzyně* airport as late as October (- 8.2 %) and was smaller than e.g. in Vienna (October - 13.1 %).

#### Passengers cleared through Praha - Ruzyně Airport, by month, 2000 - 2001

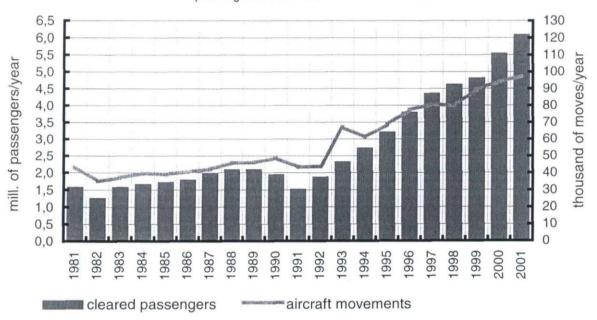


The number of aircraft movements in 2001 was 97 542 moves/year, which is by 3 425 moves/year more than in 2000 (+ 3.6 %). The lower relative increase in the number of aircraft movements than the numbers of cleared passengers indicates that the airlines' trend to intensively utilize greater capacity aircraft still continues.

After 1991, which was in passenger transport the weakest since 1982, the number of cleared passengers began to grow rapidly so that 1993 exceeded the airport's all-time high (approximately 2.2 mill. passengers/year in 1978 - 79). Simultaneously, the aircraft movement numbers also grow. Air cargo transport, however, during 1991 - 2001 in comparison to 1981 - 90 still keeps low by about 20 % (an average of 28 600 tons/year as against 35 400 tons/year).

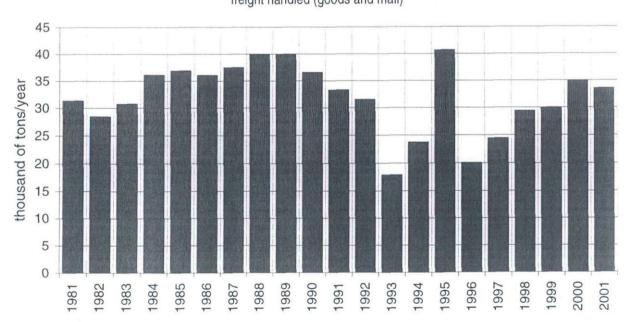
#### Development of the Praha - Ruzyně airport volumes

passengers cleared and aircraft movements



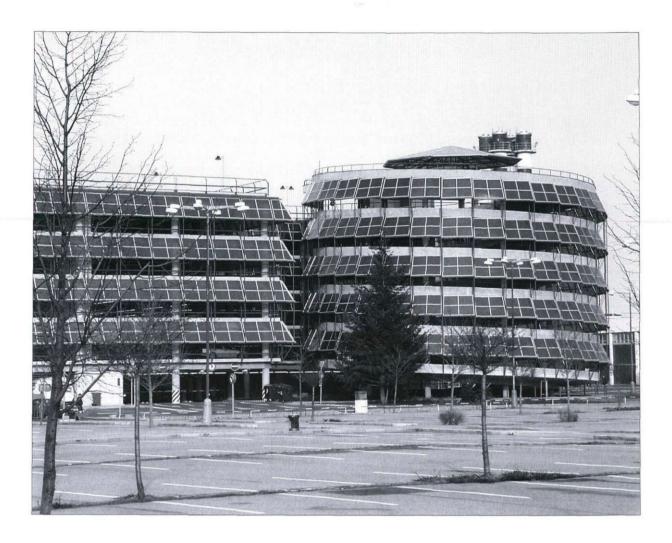
#### Development of the Praha - Ruzyně airport volumes

freight handled (goods and mail)



The origin and destination of the aircraft passengers and companions in Prague is 60 %.

The *Praha - Ruzyně* airport is found approximately 11 km away from the city centre where a downtown air terminal is located. Connection to the airport is provided for air travellers by a special commuter bus service. Additionally, the airport is serviced by urban public bus transport that runs radially to *Dejvice* line A Metro station, tangentially via *Břevnov* and *Motol* to *Jihozápadní Město* housing estate. The majority share of airport-to-city passenger transport is provided by passenger cars.



The total number of lay-by and parking places in the north airport grounds (i.e. around the main terminal building) offered to public, airport employees and airport-based companies, was increased in 2001 by the construction of new garages with the capacity of 3 026 stalls to a rough total of 5 500 stalls. Over 2 900 stalls is currently open to the general public while another 322 stalls is reserved for car rental companies. The new parking facility provides an open-air parking place able to receive 24 coaches.

### 11 RIVER TRAFFIC

Shipping on the *Vltava* river provides both passenger and cargo transport. The waterway capacity is limited by the capacity of the sluices *Podbaba* (5.2 mill. tons/year) and *Smíchov* (2.8 mill. tons/year).

**Passenger shipping** is mostly of holiday type. Passenger traffic is carried out by several companies that specialize in various sorts of cruises through Prague and boat trips along the lines *Praha - Mělník*, *Praha - Slapy*, *Praha -* Zoological garden. The largest passenger shipping operators are Prague Steamship Company (*Pražská paroplavební společnost, a. s.*) and European Water Transport (*Evropská vodní doprava s.r.o.*).

Pražská paroplavební společnost, a. s., is the oldest one. They obtained their first steamship as early as 1865. Today the company is the owner of 2 parlour steamships and 5 motor ships. The company arranges regular sightseeing and holiday cruises and ordered cruises. They served almost 127 000 passengers in 2001. About 70 % are foreign clients.

Evropská vodní doprava s.r.o., owns 5 passenger motor ships. They operate all the year round, making cruises at regular interval as well as on individual customer orders. The company transported 162 000 passengers in 2001.

Apart from these, there is a number of smaller companies (e.g. BOHEMIA, AQUAVIA, *První Všeobecná Člunovací Společnost*, etc.) that offer cruises and social events on individual orders.

Various carriers including foreign companies operate **cargo ship traffic** along the *Vltava* river. One of the carriers is *Evropská vodní doprava s.r.o.*, which provides domestic and international transport of mass substrates, heavy pieces, containers, liquids etc. Their fleet includes 24 vessels, 2 tankers, floating machinery - platforms for construction or other purposes.

Cargo volumes shipped in 1999 - 2001

Sluice	fre	ight handled (to	Ships used (passenger and cargo)			
	1999	2000	2001	1999	2000	2001
Modřany	97 325	108 168	109 282	1 897	1 898	1 852
Smíchov	190 323	197 740	175 941	20 305	27 716	22 291
Mánes	10	238	360	3 919	3 747	3 434
Štvanice	185 768	201 712	176 936	4 794	5 775	5 735
Podbaba	356 008	370 037	374 692	1 649	1 897	1 851

The most heavily utilized sluice on the waterway is the *Smíchov* sluice, with the capacity of 46 cargo ships a day.

Three harbours are found on the municipal territory. They serve to reload various freight. The most important is the *Holešovice* harbour, which is presently the most utilized one due to its diverse transshipment relation: water-road and/or water-railway. The harbour has also its container transship point. The other harbours are *Smíchov* and *Radotín*. The *Radotín* harbour will gain in significance as soon as the southern segment of the Prague Ring Road is built. Apart from harbours, *Rohanský ostrov, Holešovice* and *Sedlec* serve as places of reloading inside Prague. Occasionally, makeshift transit sheds are set on the banks and embankments of the *Vltava* river as needed.

# 12 TRANSPORTATION INFRASTRUCTURE DEVELOPMENT

## 12.1 Engineering infrastructure

Intensive construction activity kept to be carried out throughout the municipal territory in 2001, concentrating on construction and reconstruction of the urban transportation system. Continued were especially the construction of the ring segment between *Zlíchov* and the *Strahov* tunnel as well as the construction of the Metro line C section IV between *Nádraží Holešovice* and *Ládví*. One tunnel tube has already been successfully sunk in the river bed later in 2001. A special technology was introduced, consisting in casting the tunnel (168 m long, weighing 6 700 tons) on the river bank, later sliding it down into a trench dug in the riverbed, by means of a pontoon, pulling and braking gears system. After the last tramway line (to *Modřany*) six years ago, a new construction has been started up in 2001 for a line *Hlubočepy* - *Barrandov*.

The following constructions were put into service in 2001:

- the B line Kolbenova Metro station, which has improved the traffic service to the Vysočany neighbourhood;
- the Řepy Ruzyně segment of Prague Ring, which cut short the way for vehicles heading from the southwest ring for the road No. I/7 and helped turn down substantially the volumes of vehicular traffic through Drnovská street. Consequently, traffic relations improved in the junction with Karlovarská street (where prolonged congestions used to occur before this particular Prague Ring segment opened) and on the Ruzyně railway grade crossing;
- the ramp from Kartouzská street to Strahov tunnel, which helped improve a complex traffic condition in front of the southern portal of the tunnel and cut short the way from Smichov to the tunnel:
- the extension of *Radlická* street (*Plzeňská Kartouzská* segment), which was built concurrently with the construction of the *Radlická Strahov* tunnel segment of the urban ring in order to re-arrange vehicular traffic in the *Smíchov* neighbourhood;
- the bridge crossing the railway in *Na Zlíchově* street and consequently renewing tram connection to *Hlubočepy* neighbourhood. The bridge is built under the large construction project of the urban ring at the *Zlíchov Radlická* section;
- a converter sub-station at the Metro Háje station, which adds reliability to the traction feeding in the terminal segment of the Metro C line.

The construction of the P+R parking  $B\check{e}chovice$  was completed. From 2002, the facility will make possible for visitors of Prague coming on the I/12 road to park their car close to the  $B\check{e}chovice$  railway station and continue going downtown by train.

Out of the many improvements of the traffic engineering infrastructure that were finished in 2001, the most important are:

- escalators linking the A and the C lines in the Muzeum Metro station;
- Čech Bridge, the bridge where serious construction damage threatened due to faulted proofing of the bridge deck;
- Strossmayer Square, where tramway rails were reconstructed so as to enable trams to turn in all directions;
- Plzeňská street between Mozartova and Radlická streets including the tramline diversion brought about by re-arrangement of vehicular traffic in Smíchov;
- Hořejší embankment, that was expanded to carry two lanes in response to capacity demands
  of the one-way arrangement of the vehicular traffic through Kartouzská and Vltavská streets;



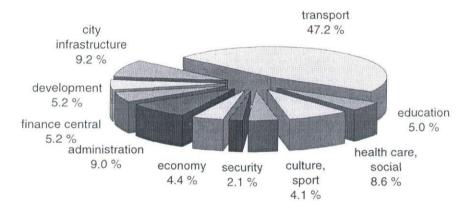
- Jižní spojka and Průmyslová street with ongoing carriageway resurfacing on further segments of the roads;
- Zderazská street, whose width needed to be improved and landslides prevented;
- redevelopment of Vídeňská Dobronická and Hviezdoslavova Mikulova junctions into mini-roundabouts.

## 12.2 Funding the transport and traffic constructions

The urban transport operation and engineering infrastructure in 2001 were covered from the Prague's municipal budget, with only minor share from the national budget and corporate resources of the Prague Public Transport Company (*DP hl. m. Prahy, a. s.*) and other enterprises.

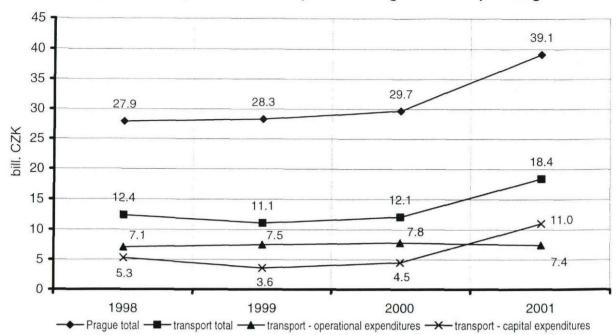
The total planned expenditures of the Prague's municipal budgets in 2001 were CZK 39.1 billion, with specific expenditures in the chapter 03 - Transportation that were CZK 18.4 billion. This share of 47.2 % made transportation the most substantial portion of the spending part of the municipal budget in 2001.

#### The budget chapters sharing in the 2001 budget expenditures

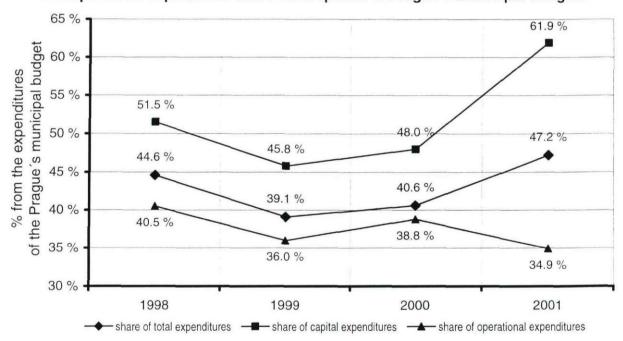


The Prague's municipal budgets were set as deficit with expectation that the planned deficit of CZK 9.8 billion would be covered by the yield from the 2<sup>nd</sup> and 3<sup>rd</sup> issue of bonds, purpose loans of the European Investment Bank and surpluses from 2000. The overall increase in the volume of financial means on the expenditure side of the budget projected notably in the capital expenditures of the chapter 03 - Transportation which expanded and increased its share in the overall capital expenditures planned in the budget significantly in comparison to previous years.

#### Transportation expenditure development in Prague's municipal budgets



#### Transportation expenditure share development in Prague's municipal budgets



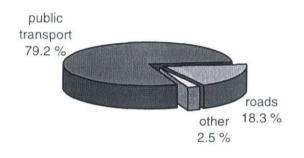
The amount of CZK 18.4 billion earmarked for transportation was subdivided into CZK 7.4 milliard to cover running operational expenditures, and CZK 11.0 billion for capital expenditures.

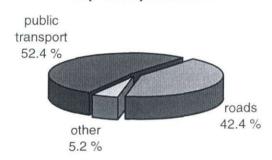
The **operational expenditures** in transportation cover, predominantly, subsidies for public passenger transport in and around the city. The total of CZK 5.87 billion was allotted in the budget for this purpose, including CZK 5.72 billion for the Public Transport Company (*DP hl. m. Prahy, a. s.*) as a subsidy to municipal public transport operation and CZK 0.15 billion for other operators that also participate in the Integrated Passenger

Transport System. Almost CZK 1.4 billion was set aside to cover repairs, maintenance and operation of the roads.

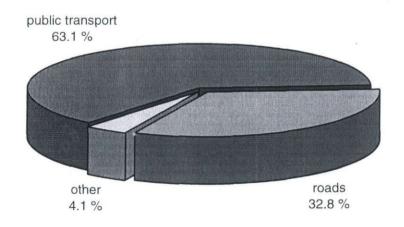
The **capital expenditures** covered mostly investment in development, i.e. construction of new roads, Metro lines and other transportation facilities (61 %) as well as larger repairs and redevelopment of traffic routes, equipment and renewal of technical devices (35 %). Expenditures allotted for improving the condition of public passenger transport prevailed also in this portion of the budget - out of the total CZK 11.0 billion, CZK 5.8 billion was earmarked for public transport investments, CZK 4.7 billion for rebuilding and development of the road network. Expenditures for providing operation, modernisation and development of public transport dominated in the 2001 budget. Their share in the total expenditures in the chapter of transportation amounted to 63 %.

## Structure of expenditures in the chapter "Transport" of the 2001 budget Operational expenditures Capital expenditures



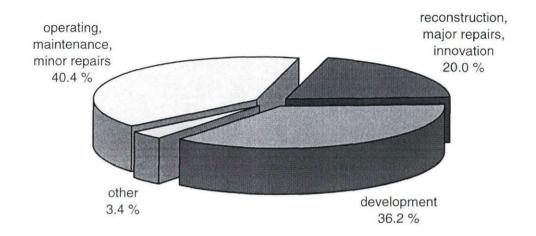


#### **Total expenditures**



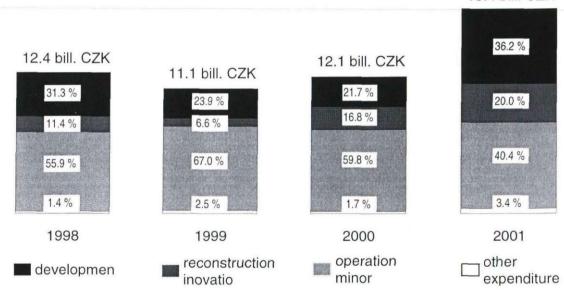
A more detailed analysis of the items listed in the breakdown of chapter 03 Transportation shows that about CZK 7.4 billion was directed toward operation, running repairs and maintenance of the urban transport system, CZK 3.7 billion to provide for larger repairs, redevelopment and renewal of the technical equipment, CZK 6.7 billion was earmarked for investments into development and CZK 0.6 billion for other expenditures needed to keep the traffic system going, including reserves to cover unforeseen expenditures.

#### Structure of total expenditures in the chapter "Transport" of the 2001 budget



#### Traffic expenditure structure development in Prague's municipal budgets

18.4 bill, CZK



The targeted means from the national budget were provided to the Capital of Prague as contributions for repair and maintenance of roads and for the construction of selected road segments, for the construction of Metro (CZK 912 mill.) and purchasing low-floor buses (CZK 22 mill.). The government through the Ministry of Transportation and Communication in the past years already accepted a commitment to gradually build a ring road around Prague. A total of CZK 556 mill. were spent in 2001 for this purpose from the national resources. For the completion of the *Třebonice - Řepy* segment CZK 40 mill. was spent, CZK 500 mill. were invested into the *Řepy - Ruzyně* segment and CZK 16 mill. was spent to prepare the construction of other segments.

Remark: 1 mill. = 1 million = 1 000 000 1 bill. = 1 billion = 1 000 000 000

### 13 EUROPEAN UNION PROJECTS

In 2001, the Capital of Prague and its organizations took part in the solution of a number of tasks that deal with transportation and were advertised by European Commissions.

#### **HEAVEN** (Healthier Environment through Abatement of Vehicle Emission and Noise)

The project focuses on integration of data about traffic, air pollution and noise and on their utilization for operational management of traffic as related to a condition of the environment. The project is dealt with by a consortium of cities: Rome, Berlin, Paris, Rotterdam, Leicester and Prague under the direction of STA Rome. Concerning Prague, those participating in the solution process are *Útvar rozvoje hl. m. Prahy*, *ÚDI Praha* and *Český hydrometeorologický ústav*. The main emphasis in Prague is placed on possibilities of predicting levels of air pollution on the basis of modelling (AIRVIRO) and on the decision-making strategies during traffic management based on the results of model evaluation. The database collects data to model specifically *Holešovice* neighbourhood. In 2001, reports were given on HEAVEN sub-tasks 5.1 and 5.2 concerning architecture of the decision support system, as well as the first report to task 6.1 specifying the main decision modules. Additionally, the HEAVEN development plan was prepared in draft. The project should finish in 2002.

#### MOST (Mobility Management Strategies for the Next Decades)

The purpose of the project is to develop managing means of mobility, analysis of the available management tools, defining policies, strategies, scenarios and their propagation. The solution shared by participants from 16 countries divides into 6 thematic groups. Prague represented by *DP hl. m. Prahy, a. s.*, is engaged in "Centres of mobility and consultation on mobility". The effort in Prague concentrates on improving and unifying integrated information in public transport. It is expected to conclude between 2002/2003 by producing a case study.

## PRISMATICA (Pro-active Integrated System for Security Management by Technological Institutional and Communication Assistance)

The project is worked on by 15 partners from France, Great Britain, Portugal, Italy and the Czech Republic. It is aimed at public transport safety in cities. The Prague participant is *DP hl. m. Prahy*, mostly in the sub-task 3.5 dealing with legal issues related to TV monitoring of traffic, data protection and safety instruments in transportation. In 2001 an analysis of the current condition was made using a questionnaire from 10 European carriers and conclusions were taken concerning the continuation of work. The project is expected to be completed in 2003.

#### **TRENDSETTER**

The project aiming at establishing trends for sustainable urban mobility was approved in 2001 by European Commission as one of the eight tasks of the CIVITAS programme, concerned with saving energies, utilizing clean fuels and improving the environment. The Trendsetter project intends to describe such methods for these purposes that lead to increased usage of public transport, improving systems of haulage, vehicles and infrastructure, potentially also to employing new services that enable sustainable environment in cities. The task is planned from 2002 to 2004. Under the leadership of Stockholm, 17 partners should take part in the solution from Stockholm, Lille, Graz, Prague and Pécs. Prague is going to participate on solving three sub-tasks concerned with operation of lorries, city-buses and bus priority on signal-controlled junctions. *DP hl. m. Prahy, a. s., ÚDI Praha* and *Magistrát hl. m. Prahy* are the three organizations that are responsible for the solution.

This text has been published thanks to the kind support of the following companies: Evropark Praha a. s., Metroprojekt Praha, a. s., Metrostav a. s., Satra, spol. s r. o., Signalbau Huber CZ, s. r. o., SSŽ, a. s., Subterra a. s.

Titul cover page: Input of metro tunnel to *Vltava* near the railway station *Holešovice*. (Photo Josef Husák) Second cover page: Sky view of crossing Prague Ring road and *Evropská*. (Photo Josef Husák) Third cover page: Sky view of crossing Prague Ring road and *Karlovarská*. (Photo Josef Husák)

Yearbook was compiled by Institute of Transportation Engineering of the City of Prague ● Responsible editor: Mgr. Eva Černá ● Datá: ÚDI Praha, České dráhy, s. o., ČSL, s. p., ČSÚ, DP hl. m. Prahy, a. s., EVD s. r. o., Evropark Praha, a. s., PČR, Povodí Vltavy a. s., PPS, a. s., ROPID, ŘSD ČR, TSK hl. m. Prahy ● Production: SOFIPRIN Praha ● Number of copies published: 700 ● Prague 2001





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