



Congestion Charging Secretariat

Executive Office
City of Stockholm

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Expert Group

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EXPERT GROUP'S SUMMARY

During the Stockholm Trial, so-called “monthly indicators” are presented each month. These indicators are measurements of, for example, car-traffic volumes, car-travel times, public-transport travel, the retail market and pedestrian and bicycle flows. The undersigned have been requested by the City of Stockholm to conduct ongoing analyses and summaries of these measurements. The goal is to provide an overview of the effects of the Stockholm Trial on car traffic, accessibility, public-transport travel and so on. Of necessity, this picture will be preliminary because there is no time for a more wide-ranging analysis of data. The aim, rather, is to provide a preliminary survey of effects while awaiting completion of the much deeper and more comprehensive assessment that has been conducted throughout the spring.

Summary of May 2006 observations

Traffic volumes continued to be much lower than normal. Compared to May 2005, the decline in traffic that can be ascribed to the Stockholm Trial was of about the same size as previous months: 22% less in May,¹ 22% less in April, 23% less in March and 24% less in February (compared to corresponding months in 2005).

Traffic increased with the arrival of spring, which is what normally happens each year. Traffic in both April and May 2006 was distinctly higher compared to earlier months of the Stockholm Trial. The traffic “spring rush” appears so far very similar to spring 2005. Traffic is expected to further increase in June 2006, judging from seasonal variations in previous years.

¹ “May” refers to the period 26April-25 May. All monthly periods begin a week earlier than the calendar month. Winter vacation week, Easter and charge-free days are excluded.

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The rise in spring traffic increased congestion significantly compared to winter months. This could be seen even in April 2006 and the trend continued in May. Apart from the added congestion due to increased traffic, it also appears that an increase in the number of pedestrians and cyclists has further added to congestion. This can be seen, for example, in that congestion increased especially during the afternoon and all day in the inner city. Compared to the latter half of spring 2005, congestion levels this year are significantly lower both in the inner city and on approach roads.

Traffic on Essingeleden bypass increased slightly compared to May 2005, but the increase was relatively small (about 3-5% depending on where on Essingeleden monitoring took place). Travel times on Essingeleden should therefore have increased somewhat compared to April 2005 but the difference is so small that it is difficult to distinguish it from daily variations.

Car traffic and car-travel times – inner city and congestion-charge zone

Traffic effects described below relate to the period 26 April-25 May 2006, excluding charge-free days and Friday following Ascension Day.

- **Car traffic still much lower than normal**

- The number of vehicles passing over the congestion-charge cordon during the congestion-charge period (6.30 a.m.-6.30 p.m.) during the May period 2006 (26 April–25 May, excluding charge-free days and Friday following Ascension Day) was about 22% lower than the number of (estimated)² passages in May 2005.

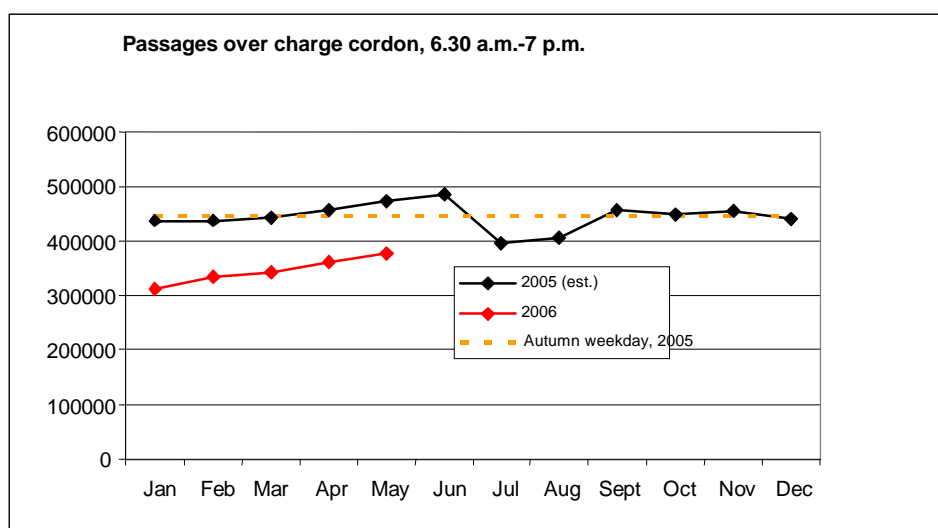


Figure 1. Number of vehicle passages over charge cordon during weekdays, 6 a.m.-7 p.m. (data from the monitoring systems of the Swedish National Road Administration and the City of Stockholm Traffic Office).

- The number of vehicle passages over the charge cordon during the charge period in April³ 2006 was about 22% lower than in April 2005. In March the decline was 23% compared to March 2005, in February 24% compared to February 2005 and in January (9-25 January) about 28% compared to January 2005.

² All traffic figures for spring 2005 are estimated by correcting autumn and April measurements with the yearly variation (measured via selected monitoring sites).

³ April = 26 March-25 April, excluding Easter week. March = 6-24 March (winter vacation week excluded). February = 26 January-24 February. January = 9-25 January.

- Compared to May 2005, the decline in May 2006 is equivalent to about 97,000 fewer car passages. It is still not possible to confidently translate this reduction to the number of outward/return journeys.
- **Traffic increased in April-May 2006 compared to February-March 2006 but this was mainly due to the fact the traffic always increases during the spring**
 - Compared to the period “earlier months” (January-March 2006), traffic during May 2006 increased significantly. This was expected, since traffic usually increases with the arrival of spring. Compared to estimated traffic passing over the charge-zone cordon in 2005, traffic in April 2006 was about 4% higher than the average for January-March 2006 (a period with rather uniform traffic volumes). In May 2005 traffic was 8% higher than in January-March 2005 and in June 2005 the comparable traffic increase was as much as 11%.
 - Therefore, bearing this in mind, it can be expected that traffic will continue to increase during the first weeks of June. (In the same way, incidentally, earlier Expert Group summaries have foreseen traffic increases in April and May 2006.)
 - It is not known exactly why spring weather causes an increase in traffic, even though several possible explanations have been suggested: for example, increased secondary travel (errands on the way), increased recreational travel and visits, more visits to weekend homes, and so on, all of which tend not only to increase the amount of travel generally but also increase the number of car journeys.
 - The traffic increase is clearly connected to the spring weather – nicer weather increases traffic. This means that the period for the “spring rush” depends largely on when exactly spring weather arrives. It is therefore difficult to compare single spring weeks in 2005 (or even single spring months) with the corresponding week (or month) in 2006 because the weather can be very different in the two years.
- **The traffic-reducing effect of the congestion tax was the same in both April and May**
 - Comparing month-by-month in 2005 and 2006, the traffic-reducing effect of the congestion tax fell slowly during earlier months (-24% in February 2006, -23% in March and -22% in April and May).
 - It is probable that this is connected with the ongoing development towards equilibrium. Since the traffic reduction is so similar from month to month it seems unlikely that “equilibrium” will differ greatly from the traffic-reduction levels now seen, especially since the April/May 2006 traffic reductions seem to be about the same.

- **Lidingö traffic shows smallest decline - biggest traffic decline on radials with large share of through traffic**

	Charge period (6.30 a.m.- 6.30 p.m.)	Morning peak period (7-9 a.m.)	Afternoon/evening peak period (3.30-6 p.m.)
Entire charge zone	-22%	-19%	-23%
Charge zone – southeast	-23%	-21%	-24%
Charge zone – north	-22%	-18%	-26%
Charge zone – west	-21%	-21%	-23%
Charge zone – south	-23%	-22%	-22%
Charge zone – Li- dingö	-13%	-8%	-10%

Table 1. Percentage reduction of vehicle passages, May 2006 compared to May 2005.

- Traffic to/from Lidingö declined much less than on other radials. The reason is probably that a large part of traffic to/from Lidingö is not subject to the congestion tax.
- The table below shows comparable figures for all the Stockholm Trial months. It can be seen that the trend is reasonably stable over time.

Charge period, 6.30 a.m.-6.30 p.m.	Jan	Feb	Mar	Apr	May
Entire charge zone	-28%	-24%	-23%	-22%	-22%
Charge zone – southeast	-30%	-29%	-27%	-26%	-23%
Charge zone – north	-31%	-27%	-24%	-21%	-22%
Charge zone – west	-26%	-22%	-21%	-19%	-21%
Charge zone – south	-31%	-28%	-25%	-22%	-23%
Charge zone – Lidingö	-18%	-14%	-14%	-9%	-13%
Morning peak period, 7-9 a.m.	Jan	Feb	Mar	Apr	May
Entire charge zone	-22%	-18%	-17%	-18%	-19%
Charge zone – southeast	-24%	-22%	-21%	-21%	-21%
Charge zone – north	-25%	-21%	-18%	-16%	-18%
Charge zone – west	-24%	-21%	-19%	-18%	-21%
Charge zone – south	-25%	-21%	-20%	-18%	-22%
Charge zone – Lidingö	-10%	-7%	-7%	-3%	-8%
Afternoon/evening peak period, 3.30-6 p.m.	Jan	Feb	Mar	Apr	May
Entire charge zone	-34%	-28%	-25%	-24%	-23%
Charge zone – southeast	-34%	-32%	-28%	-26%	-24%
Charge zone – north	-38%	-33%	-29%	-25%	-26%
Charge zone – west	-29%	-24%	-23%	-19%	-23%
Charge zone – south	-38%	-33%	-25%	-22%	-22%
Charge zone – Lidingö	-18%	-14%	-13%	-8%	-10%

Table 2. Percentage reduction of vehicle passages, January-May 2006 compared to January-May 2005.

- **Traffic decline largest in afternoon/evening peak period; traffic also declined in the evening**
 - In percentage terms, the decline is somewhat smaller during the morning peak period and somewhat larger during the afternoon/evening peak period. One possible partial explanation is that during the afternoon/evening there is more leisure travel (visits, entertainment, shopping), for which it is easier to change the destination. Another partial explanation is that during the morning a larger number of travellers are bound by time limitations than during the afternoon/evening.
 - Traffic also significantly declined in the evening after the charge period. The reason may be fewer outward/return journeys by car during

the charge period, resulting in fewer return journeys during evenings after the charge period.

- **Congestion increased in April/May 2006 as the “spring traffic rush” began.**
 - Congestion increased at several places during April/May 2006 when spring at last arrived. The increased congestion is, naturally, due in large part to the increase in traffic with the onset of spring.
 - However, congestion appears to have increased due to other causes, too. That there are reasons for the increased congestion in addition to heavier traffic is apparent from the fact that congestion has not risen uniformly everywhere and that it went up so suddenly at the end of April. A probable factor contributing to the increased congestion may be the larger number of pedestrians and cyclists. This is supported by the longer travel times, especially in the afternoon/evening and in the inner city (both morning and afternoon/evening), while congestion grew more moderately on major roads. This would also explain why travel times were suddenly very high on all routes during 24-30 April – the week the spring weather arrived. Other possible reasons for travel times increasing more than traffic are several short leisure trips; more people using their cars in the inner city because of better access; and a larger number of motorists who only use their cars occasionally.
 - The diagram below shows as reference both congestion on an “autumn weekday” (comparable to congestion during winter and early spring) and congestion in “late spring” (April 11-June 12) in 2005. The diagram shows a “leap” in the reference values: naturally, this is in fact a gradual process of transition (and, moreover, variations between different weeks are high). The “leap” is only used to make the diagram easier to read.
 - The diagram shows that congestion during the morning peak period increased in the inner city and also to some extent on radials even during late spring last year. Congestion levels increased substantially everywhere during the afternoon/evening peak period. Trends discernible in 2006 are the same as those for 2005 but it is too early to draw conclusions because variations in travel times are so high.

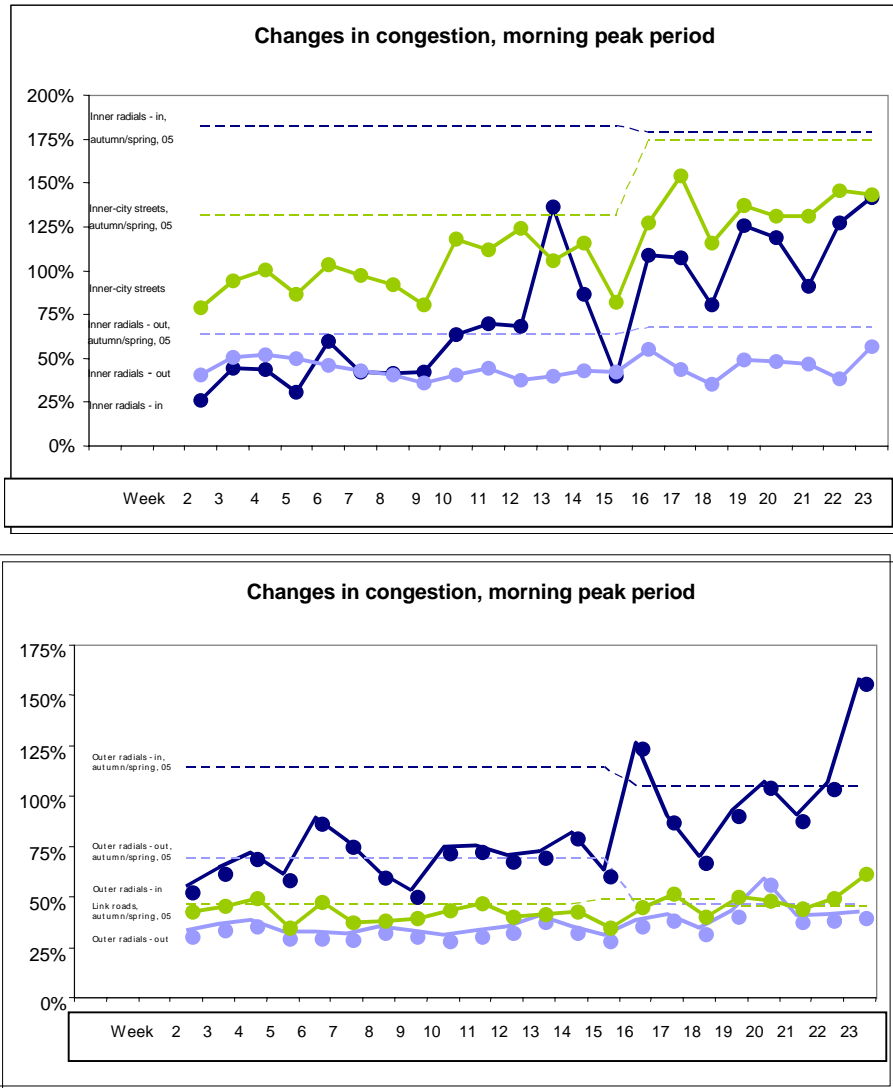


Figure 2. "Congestion" (average travel-time prolongation in percent compared to congestion-free travel time) for different types of road (7.30-9 a.m.). The broken line is the reference value.

Data for June 5-10 covers only two days (Wednesday/Thursday, 7-8 June). The strong increase in travel times on outer radials was due to the fact that traffic moved very slowly on Drottningholmsvägen-Bergslagsvägen (approach to/from Bromma) on these two days, both in the morning and afternoon/early evening.

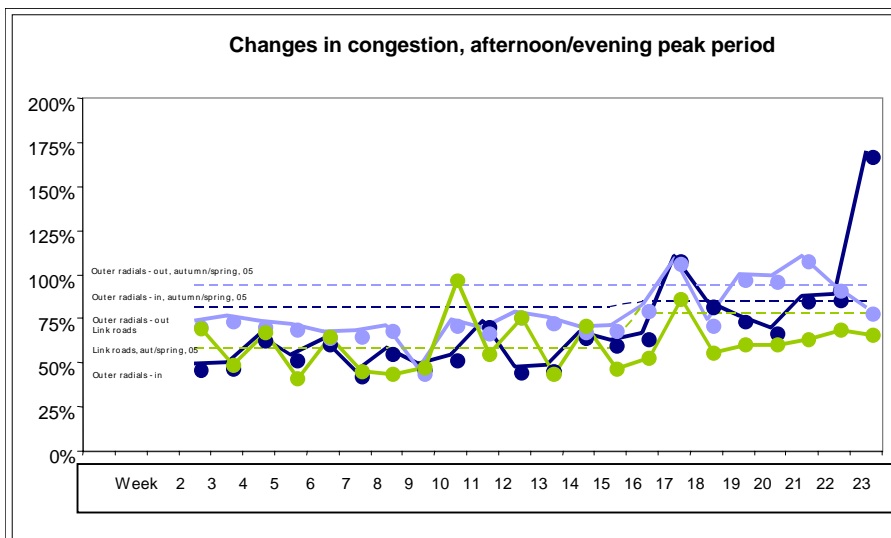
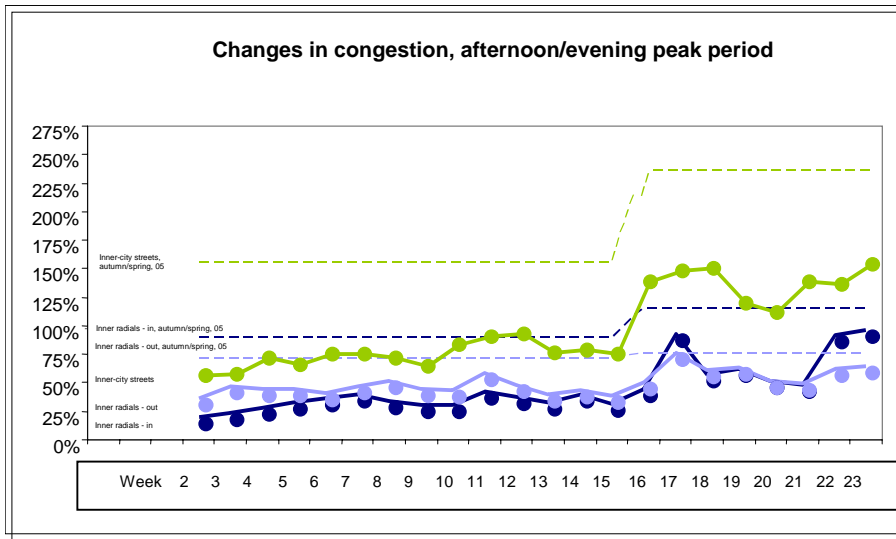


Figure 3. "Congestion" (average travel-time prolongation in percent compared to congestion-free travel time) for different types of road (3.30-6 p.m.). The broken line is the reference value.

Car traffic and car-travel times - E4 motorway, Essingeleden, Södra Länken bypass tunnel

Traffic effects described below relate to the period 26 April-25 May 2006, excluding charge-free days and Friday after Ascension.

- **Car traffic on Essingeleden was a little higher in May 2006 than in May 2005, but the difference is minor**
- Car traffic on Essingeleden was slightly higher in May 2006 compared to May 2005 (see table, below). However, the increase is relatively minor - traffic on Essingeleden varies by a few percent, up or down, from week to week. But seen over a longer period, average traffic in May 2006 was about 3-5% higher than in May 2005, depending on which monitoring sites are compared

	Jan	Feb	Mar	Apr	Maj
Frösundabacke	-3%	3%	2%	2%	1%
Gröndalsbron	1%	4%	4%	5%	5%
Tomtebodakurvan	1%	2%	1%	4%	3%
Södra Länken	20%	20%	19%	18%	14%
Södertäljevägen at Midsommarkransen	-4%	-1%	-2%	-1%	0%

Figure 4. Percentage change in number of vehicle passages per 24-hour period on E4 and Södra Länken, 2006 compared to 2005.

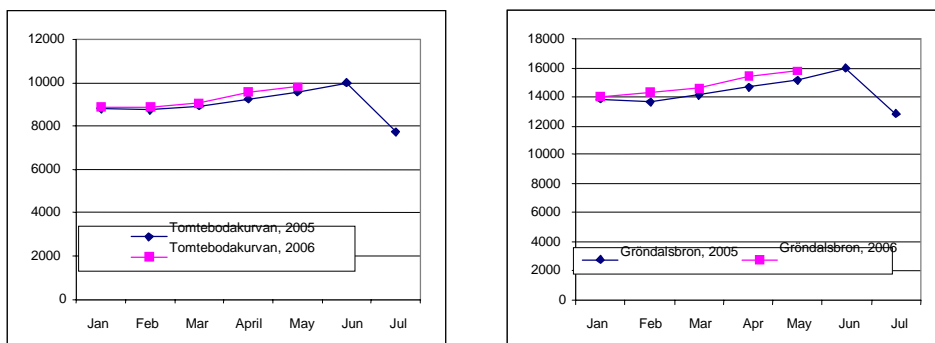


Figure 5. Number of vehicle passages per 24-hour period on Essingeleden, month-by-month, 2005 and 2006.

- Traffic on the E4, north and south of the inner city (the table shows Frösundabacke and Södertäljevägen at Midsommarkransen, respectively) was generally unchanged compared to May 2005.

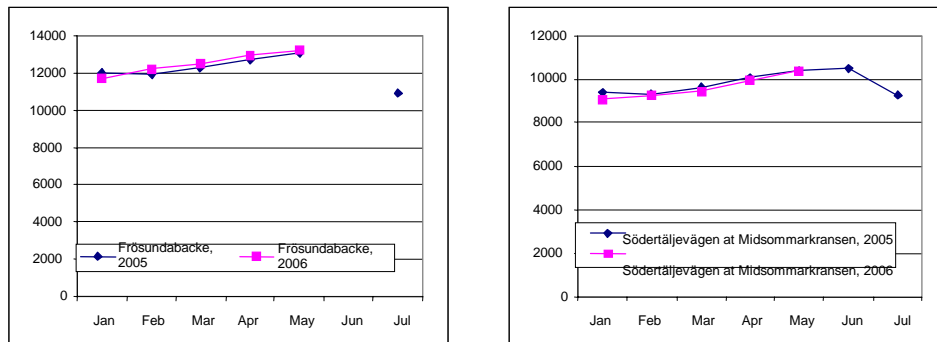


Figure 6. Number of vehicle passages per 24-hour period on E4 (south and north of the inner city, respectively), month-by-month, 2005 and 2006.

- **Traffic in Södra Länken increased compared to 2005 but it is impossible to determine how much of the increase was due to the congestion tax**
 - Traffic in Södra Länken has continuously increased since it was opened in October 2004. For example, the increase during January-September 2005 was 17% (average of all monitoring sites).
 - It is impossible to determine to what degree the Södra Länken increase, compared to 2005, is due to the congestion tax, since we do know how much traffic would have increased without it. With the help of a time series, a reasonable estimate could be made if it was not for an accident (causing lane closures) that disrupted traffic along the whole of the Södra Länken-Essingeleden-E4 corridor during October-December 2005.

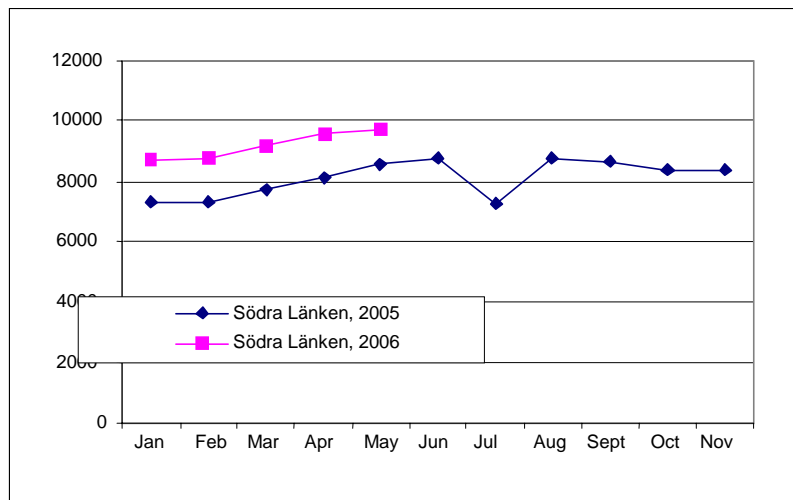


Figure 7. Number of vehicle,0 passages per 24-hour period in Södra Länken, month-by-month, 2005 and 2006. Note: An accident disrupted traffic during October-December 2005.

- **Difficult to prove increase in travel time on Essingeleden compared to 2005.**
 - The high level of congestion on Essingeleden means that travel times always vary greatly from week to week, even though traffic volumes are more or less unchanged. Variations in road conditions and weather make it difficult to draw conclusions as to how travel times have changed compared to 2005 when looking at shorter periods of time.
 - It would be reasonable to conclude that the increase in traffic (admittedly very minor) on Essingeleden would result in increased travel times, all other factors being equal. However, variations in travel times from day to day and week to week are so great that it is difficult to reliably demonstrate any clear increase in travel times compared to the corresponding period in 2005. For some periods and directions, travel times were longer in 2005 than in 2006 – and in other periods the opposite was the case.
 - Just as on other routes, traffic and therewith congestion increased during April 17-30 and thereafter, with the arrival of spring. Increased congestion in the afternoon/evening on Essingeleden northwards seems somewhat higher in 2006 than in 2005 but it is impossible to draw any reliable conclusions because the variations are so high.
- **Traffic increase in Södra Länken led to increased travel times compared to 2005**
 - Travel times in Södra Länken are longer than in 2005, especially westwards in the morning and eastwards in the afternoon. This was expected since traffic increased strongly during the past year. It is al-

most impossible to determine how much of the increase in traffic is the result of the congestion tax and how much derives from a general increase in traffic.

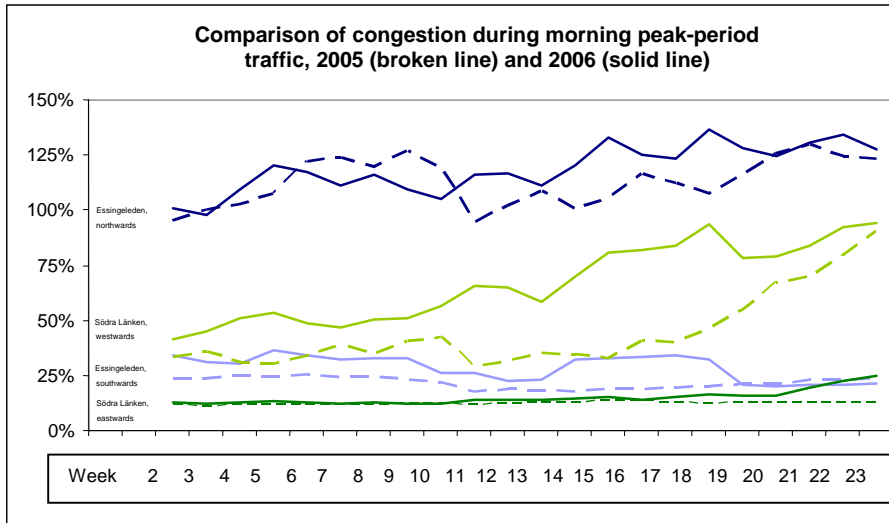


Figure 8. Travel-time prolongation in percent on Essingeleden and Södra Länken (7.30-9 a.m.), average per week (moving mean value). The broken line is the reference value.

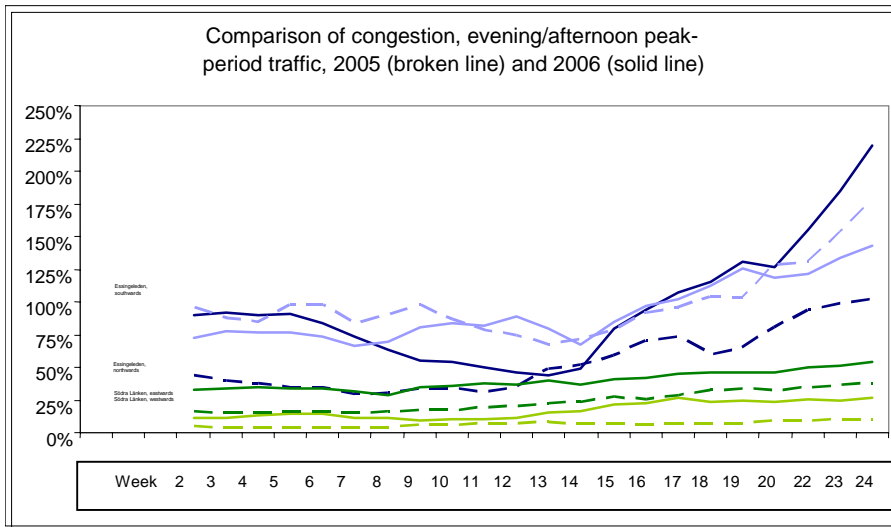


Figure 9. Travel-time prolongation in percent on Essingeleden and Södra Länken (3.30-6 p.m.), average per week (moving mean value). The broken line is the reference value.

Public transport

- **The number of public-transport passages to/from the inner city increased by 71,000 in May 2006 compared to May 2005.**
 - According to estimates³ made by Stockholm Transport (SL), there were 71,000 additional passages per day to/from the inner city, a 9% increase.
 - This is the biggest increase recorded to date during the period of the Stockholm Trial - thus, as regards public transport, no falling-off of the effects of the congestion tax can be seen, rather the opposite.
 - To/from the inner city, the mode of transport that increased most - 12% - was bus traffic.
 - For SL traffic as a whole, the number of passengers boarding per day rose by 155,000, a 7% increase.
 - All increases stated above are in comparison with May 2005. Only part of these increases, however, can be attributed to the effects of the congestion tax.
 - On the Underground, it was not possible to meet the growing number of passengers with an increase in train frequencies. As a result, when travel increased the number standing passengers rose. In May 2006, however, congestion fell compared to April 2006. On the Blue Line there continued to be many standing passengers - 10% during the morning peak period in May 2006 - while on other lines the percentage of standing passengers was lower and in line with May 2005.

⁴ For public transport, there is no equipment which automatically calculates the number of all passages, as there is for road traffic. To make these estimates, SL uses calculations carried out on a selected number of public-transport routes. Some aspects of the calculations are rough and therefore include mistakes, while not all routes and departures are counted. The results of the calculations are then weighted against an estimated number of total passengers. Even though this method has been used for many years, and weighting is based on a great deal of experience, the estimates carry significant uncertainty.

Parking

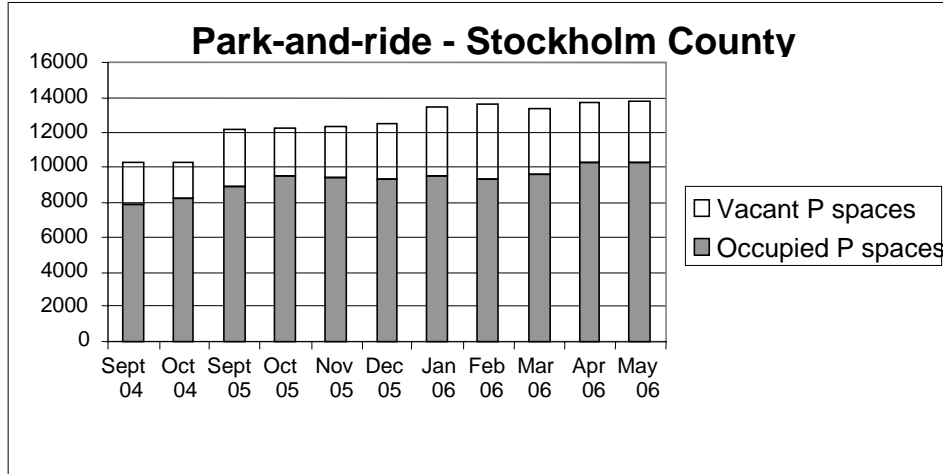


Figure 10. Park-and-ride in Stockholm County. Vacant and occupied spaces.

- Within the framework of the Stockholm Trial, the number of park-and-ride spaces was increased. Between autumn 2004 and autumn 2005, about 2,000 new spaces were added. This appears to have led to increased use of park-and-ride sites - in Stockholm County, about 1,000 more cars were parked each day at park-and-ride sites in autumn 2005 than in autumn 2004.
- In Stockholm County as a whole, there does not appear to have been any further increase in the use of park-and-ride sites after year-end 2005/06, despite the congestion tax and a further 1,000 or so new park-and-ride spaces. The number of parked cars at park-and-ride sites is almost exactly the same if October-December 2005 is compared to January-March 2006 (about 9,400). In April-May 2006 the number of parked cars increased somewhat, but this is probably the result of increased travel as a whole.
- However, the situation regarding the use of park-and-ride sites in Stockholm City is different: During January-March 2006 the number of cars parked at park-and-ride sites increased by about 20% (400-500 cars) compared to September-October 2005. At the same time as the congestion tax was introduced, the number of park-and-ride spaces increased by 800 (up by about 25%) so it is not possible to distinguish between the effects of the congestion tax and additional spaces. Moreover, the possibility that some of these cars were earlier parked at park-and-ride sites at other locations in Stockholm County cannot be excluded.
- For reasons not yet understood, the number of parked cars decreased in May 2006 compared to April 2006.

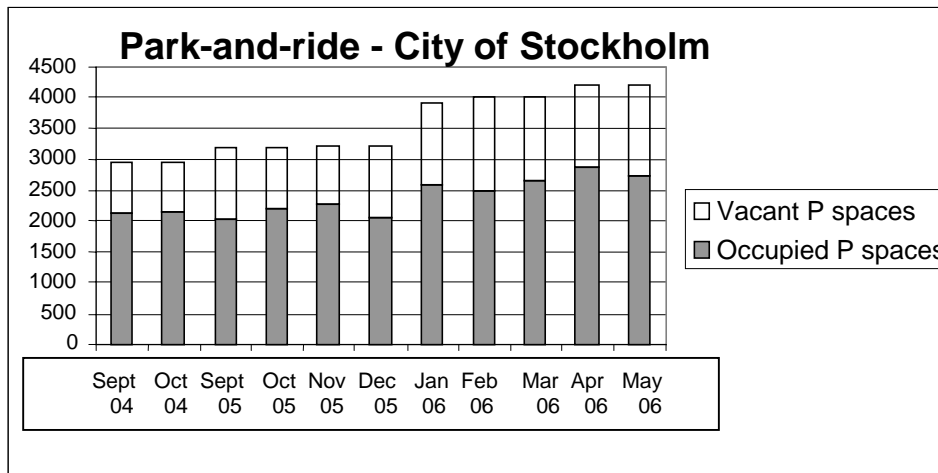


Figure 11. Park-and-ride in the City of Stockholm. Vacant and occupied parking spaces.

- In Nacka Municipality, too, the number of cars parked at park-and-ride sites increased. The increase between September-December 2005 and January-March 2006 was about 70 cars, or more than 10% (it is thus not a question of large volumes). In April 2006, the number of cars parked at park-and-ride sites further increased. A partial explanation is probably an increase in park-and-ride spaces by 140 (20%) during January-March. (In April, the number of available parking spaces decreased somewhat, which explains the drop in vacant parking spaces shown in the diagram.)

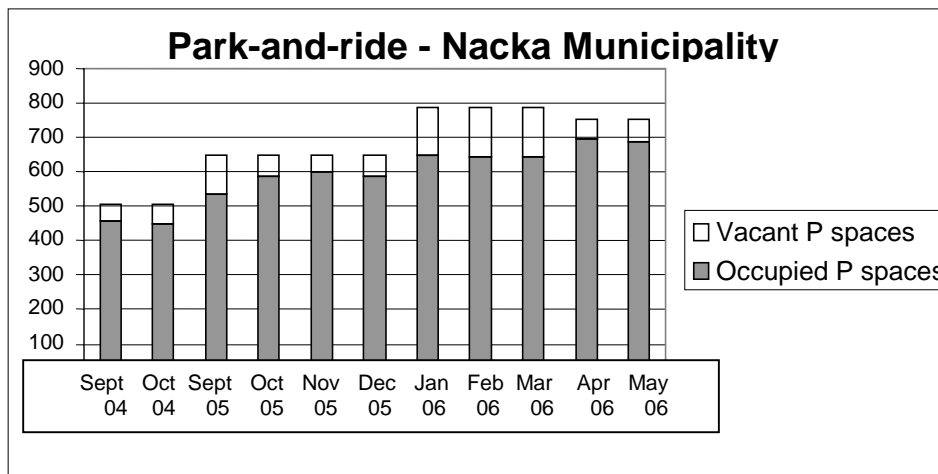


Figure 12. Park-and-ride in Nacka Municipality. Vacant and occupied parking spaces.

Opinions and attitudes

- **The number of Stockholm County citizens who said there is a problem with car-traffic congestion to/from or in the inner city during the charge period decreased significantly compared to the period prior to the introduction of the congestion tax**
 - The number of Stockholm County citizens who said there are *big* problems with congestion decreased strongly while the number who said there are *no* problems increased strongly.
 - The number of Stockholm County citizens who believe there is no problem with road congestion to/from or in the inner city approximately tripled if autumn 2005 is compared to spring 2006.⁵ During May 2006 the number declined compared to April 2006. The number of citizens who believe there are big problems with road congestion to/from or in the inner city decreased by approximately two-thirds, if autumn 2005 is compared to spring 2006.⁶ During May 2006, the number increased compared to April 2006. Thus, during April-May 2006 the trend was that more citizens said that congestion is a problem, which also reflects the result of congestion monitoring in that period. However, the number of citizens who believe that congestion is a problem continues to much lower than in autumn 2005.
 - The number of citizens who answered “don’t know” to the question “How big is the congestion problem” increased from 10% to 30%. This is hardly surprising since the traffic situation has changed radically since the Stockholm Trial began and it is reasonable to assume that a large number of Stockholm County citizens have not had time to test the new arrangement.

⁵ The exact decrease depends on how the “don’t knows” are treated. If “don’t knows” are excluded, the number of Stockholm County citizens who said there are no congestion problems increased from about 10% during autumn 2005 to 31% in January 2006, 39% in February, 41% in March, 39% in April and 27% in May. If “don’t knows” are included, the percentage increased from about 9% during autumn 2005 to 23% in January 2006, 27% in February, 28% in March, 26% in April and 19% in May.

⁶ Here, too, the exact decrease depends on how the “don’t knows” are treated. If “don’t knows” are excluded, the number of Stockholm County citizens who said there are big congestion problems decreased from about 50% during autumn 2005 to 25% in January 2006, 17% in February, 14% in March, 14% in April and 23% in May. If “don’t knows” are included, the percentage decreased from about 45% during autumn 2005 to 19% in January 2006, 11% in February, 10% in March, 9% in April and 16% in May.

Number of Stockholm County citizens who said there are car-traffic congestion problems with varying degrees of importance

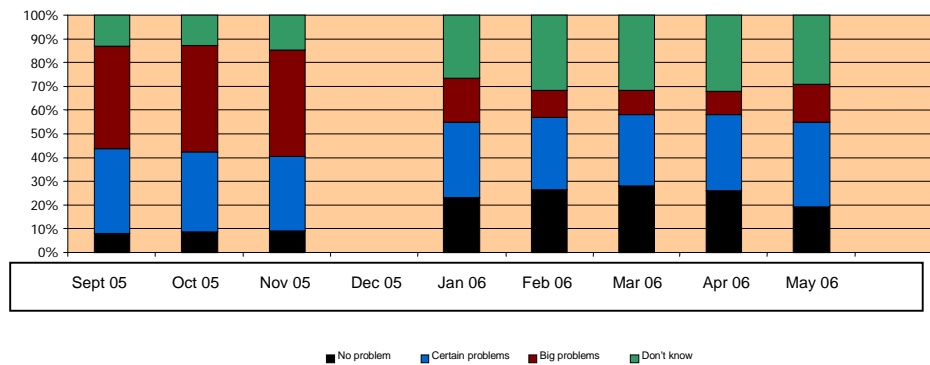


Figure 13. Number of Stockholm County citizens who said there are problems with car-traffic congestion to/from or in Stockholm's inner city during weekdays between 6.30 a.m. and 6.30 p.m.

- Among those who travelled by car over the charge cordon during the *most recent two weekdays*, the pattern was the same and the changes statistically significant. The number of respondents, however, was so small (about 100 per month) that no reliable conclusions can be drawn about the size of the change. With that reservation, it can anyway be noted that the number of persons in the group who said that congestion is a big problem was approximately halved (from 30-40% in autumn 2005 to 10-20% in January-May 2006), while the number of persons who said congestion is not a problem approximately doubled (from 10-15% in autumn 2005 to 25-40% in January-May 2006).
- **A larger number of citizens now say it was a good decision to conduct the congestion-tax trial**
 - The number of respondents among all Stockholm County citizens who said it was a “rather/very bad decision” to conduct the congestion-tax trial has, since the introduction of the congestion tax in January 2006, fallen continuously compared to autumn 2005, when the figure was always about 55%. In March 2006, for the first time, more respondents said it was a “rather/very good decision” than those who said it was a “bad decision” (49% for “good decision” compared to 42% for “bad decision” among all Stockholm County respondents) and the results for April/May 2006 were almost the same: In May, 53% said it was a “rather/very good decision” while 41% said it was a “rather/very bad decision”.
 - Among those who travelled by car to/from the inner city during the charge period during the most recent two weekdays, less than 50% now say it was a “bad decision”. The number of respondents in this group who were negative has decreased significantly from over 60% in January-February 2006 to 53% in March and April 2006 and under 50% in May 2006. The number of respondents in this group that an-

swered “very good decision” increased from about 12-15% in January-February 2006 to about 15% in March/April 2006 and 21% in May 2006. Although the selection was small, the change is statistically significant.

- Among those who live in the inner city,⁷ in May a majority said it was a “good decision” (53% for “good decision” compared to 42% for “bad decision”). The pattern has been about the same since the Stockholm Trial began but during autumn 2005 a majority said it was a “bad decision” (over 50% for “bad decision” compared to about 30% for “good decision”).
- Among those who live outside the inner city, there was in April - for the first time - a majority who said that it was a “rather/very good decision” - 50% compared to 40% who said it was a “rather/very bad decision”. In May this trend continued, with a positive response of 53%. The response from those living outside the inner city has become increasingly positive month-by-month during the Stockholm Trial, after a clearly negative majority in autumn 2005 (34% “rather/very good decision” compared to 57% “rather/very bad decision”).
- Note that the question was formulated to concern whether it was a good or bad idea to conduct the Stockholm Trial, not whether Stockholm should have the congestion tax in the future.

Retail market

- The city sales index in April 2006 increased by just under 6% (in April 2005 the index was 103, in April 2006 109), which can be compared to the corresponding national sales increase of just under 7% (data from the Swedish Research Institute of Trade, HUI).
- There was a strong increase in April despite the fact that Easter negatively affected sales (the Easter week has a positive effect on non-durables and a negative effect on durables).
- The strong increase was due to several businesses opening new premises in existing locations and/or moving or changing the position of existing tenants. The latter contributed to increased sales at the locations.

⁷ About one-third of the population of the City of Stockholm live in the inner city, the remainder living in the western suburbs or south of the Södermalm district.

- The effects of the congestion tax are still judged to be insignificant or very small with regard to inner-city shopping streets, i.e. the retail market in the central Norrmalm district, which can be partly explained

by the fact that inner-city consumers use cars in connection with shopping only to a limited extent.

- As regards small-scale street-level retailing, there is as yet only very preliminary data. How it has been affected by the congestion tax must therefore remain unanswered until mid-June 2006. Such retailers have long been under pressure from expanding department stores and malls in the inner city. The situation is the same in municipalities adjacent to the City of Stockholm. This expansion has been especially striking in recent times, which means the position of small-scale retailers has probably further deteriorated.