



Congestion Charge 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 being conducted throughout the spring.

Summary of April observations

Traffic volumes continued to be much lower than normal. Compared to April 2005, the decline in traffic passing over the congestion-charge corridor that can be ascribed to the Stockholm Trial was comparable to previous months: 22% less in April,¹ 23% less in March and 24% less in February (compared to corresponding months in 2005).

Traffic increased with the arrival of spring. If April 2006 traffic is compared to previous months in the Stockholm Trial, a distinct increase is apparent. The traffic “spring rush” appears so far very similar to spring 2005. Traffic is expected to further increase in May/June 2006, judging from seasonal variations in previous years.

The increase in spring traffic increased congestion significantly compared to winter months. Apart from the added congestion due to increased traffic, it also appears that an increase in the number of pedestrians and cy-

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

clists has further added to congestion. This can be seen 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 April 2005, but the increase was relatively small (about 4-5% depending on where on Essingeleden monitoring took place). Travel times on Essingeleden should 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-traffic times – inner city and congestion-charge zone

Traffic effects described below relate to the period 26 March-25 April, excluding Easter week.

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

- The number of vehicles passing over the charge cordon during the congestion-charge period (6.30 a.m.-6.30 p.m.) during the April period (26 March–25 April, excluding Easter week) was about 22% lower than the number of (estimated)² passages in the corresponding period in 2005.

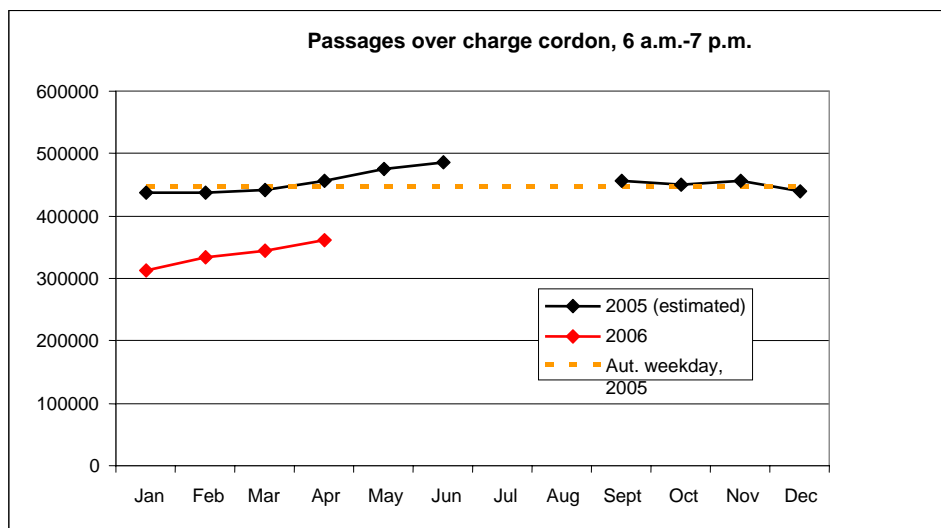


Figure 1. Number of vehicle passages over charge cordon during weekdays, 6 a.m.-7 p.m. (data from the monitoring systems of the Swedish National Road Administration and the City of Stockholm Traffic Office).

- The number of vehicle passages over the charge cordon in March (6-24 March) during the charge period was about 23% lower than in March 2005. In February (26 January-24 February), the decline was 24% compared to February 2005 and in January (9-25 January) the decline was about 28% compared to January 2005.
- Compared to the same period in 2005, the decline is equivalent to about 95,000 fewer car passages. It is still not possible to confidently translate this reduction to the number of outward/return journeys.

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

- **Traffic increased during April but this was largely due to the expected traffic increase in spring. The decline due to the congestion tax has decreased slightly over time, but only slowly.**
 - Comparing month-by-month in 2005 and 2006, the effect of the congestion tax on reduced traffic dropped by about 1% per month (-24% in February 2006, -23% in March and -22% in April).
 - Compared to the period “previous months” (January-March 2006), traffic increased markedly in April. This was expected because traffic usually increases in spring. Compared to estimated traffic over the charge zone in 2005, April traffic was about 4% higher than the average in January-March (a period with relatively constant amounts of traffic). In May 2005, traffic was 8% higher than in January-March 2005 and in June 2005 the corresponding traffic increase was as high as 11%.
 - It is not known exactly why spring weather causes an increase in traffic, even though several possible hypotheses have been made: for example, increased secondary travel (errands on the way), increased recreational travel and visits, more visits to holiday houses, and so on. All these phenomena tend not only to increase the amount of travel on the whole, but also increase the number of car journeys.
 - 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 weeks in 2005 (or even single months) with the corresponding week (or month) in 2006 because the weather can be very different in the two years.
 - Against this background, it is to be expected that traffic will continue to increase in May and for a couple of weeks into June.
 - It is probable that the admittedly slow, but nevertheless marked, decline in the traffic decrease has something to do with the development towards equilibrium still under way. Because the traffic decline is so similar from month to month it is unlikely that the “equilibrium” will be much different from traffic decline levels now seen.

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%	-18%	-24%
Charge zone – south-east	-26%	-21%	-26%
Charge zone – north	-21%	-16%	-25%
Charge zone – west	-19%	-18%	-19%
Charge zone – south	-22%	-18%	-22%
Charge zone – Lidingö	-9%	-3%	-8%

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

- The decline was biggest from the south-east (Danvikstull), followed by the southern, northern and western radials. The most likely explanation for the differences between south-east, north/south and west is that they reflect the proportion of through-traffic: traffic from the west moves to a lesser degree *through* the inner city than traffic from the south, north and, in particular, south-east. From the south-east, the Södra Länken bypass tunnel makes it relatively easy to avoid the inner city.
- 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
Entire charge zone	-28%	-24%	-23%	-22%
Charge zone – south-east	-30%	-29%	-27%	-26%
Charge zone – north	-31%	-27%	-24%	-21%
Charge zone – west	-26%	-22%	-21%	-19%
Charge zone – south	-31%	-28%	-25%	-22%
Charge zone – Lidingö	-18%	-14%	-14%	-9%

Morning peak period, 7-9 a.m	Jan	Feb	Mar	Apr
Entire charge zone	-22%	-18%	-17%	-18%
Charge zone – south-east	-24%	-22%	-21%	-21%
Charge zone – north	-25%	-21%	-18%	-16%
Charge zone – west	-24%	-21%	-19%	-18%
Charge zone – south	-25%	-21%	-20%	-18%
Charge zone – Lidingö	-10%	-7%	-7%	-3%

Afternoon/evening peak period, 3.30-6 p.m.	Jan	Feb	Mar	Apr
Entire charge zone	-34%	-28%	-25%	-24%
Charge zone – south-east	-34%	-32%	-28%	-26%
Charge zone – north	-38%	-33%	-29%	-25%
Charge zone – west	-29%	-24%	-23%	-19%
Charge zone – south	-38%	-33%	-25%	-22%
Charge zone – Lidingö	-18%	-14%	-13%	-8%

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

- **Traffic decline largest in afternoon/evening peak period. Traffic also declined in 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 at the end of April as the “spring traffic rush” set in.**
 - Congestion increased at several places during the final weeks of April, with the arrival of spring.
 - The increased congestion is, naturally, due in large part to the increase in traffic with the onset of spring.
 - However, congestion appears also to have increased for other reasons. That there must be reasons for the increased congestion other than an increase in traffic is apparent from the fact that congestion has not increased uniformly everywhere and that congestion increased 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 increased travel times, especially in the afternoon/evening and in the inner city (both morning and afternoon/evening), while congestion increased more moderately on major roads. This would also explain why travel times were suddenly very high on all routes during 24-30 April 2006 – 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 increased access; and larger numbers 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 10-June 11) in 2005. The diagram shows a “leap” in the reference values: this is, of course, the result of a gradual transition (and variations between different weeks are also high). The “leap” is only used to make the diagram more legible.
 - 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 in the afternoon/evening peak period. The same trends are discernible this year as for 2005 even though it is too early to draw conclusions because the variations in travel times are so high.

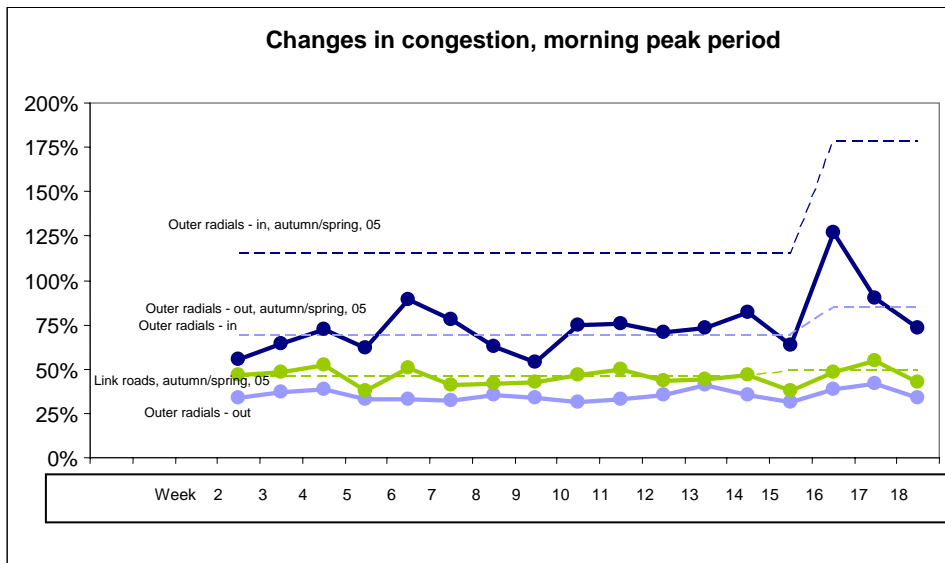
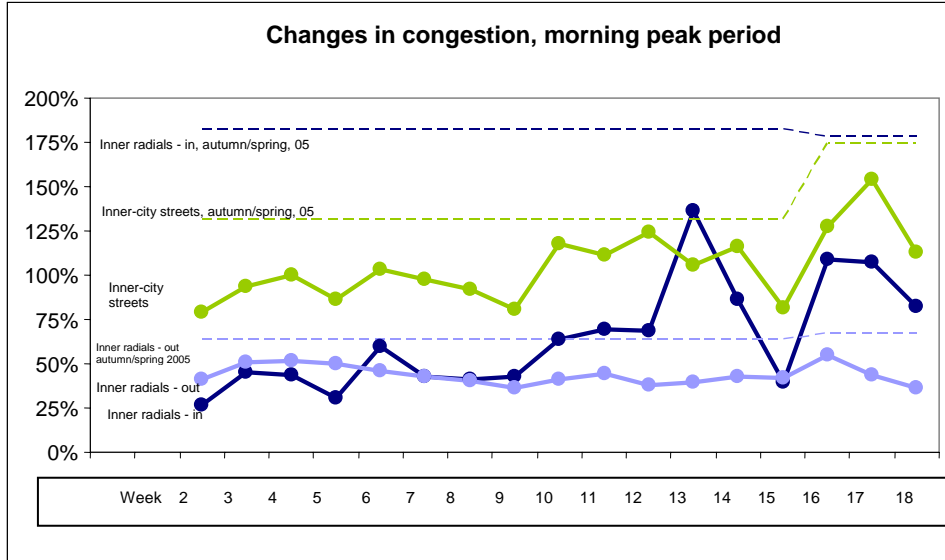


Figure 2. "Congestion" (average travel-time prolongation in percent compared to congestion-free travel time) for different types of road (7.30-9 a.m.). The broken line is the reference value.

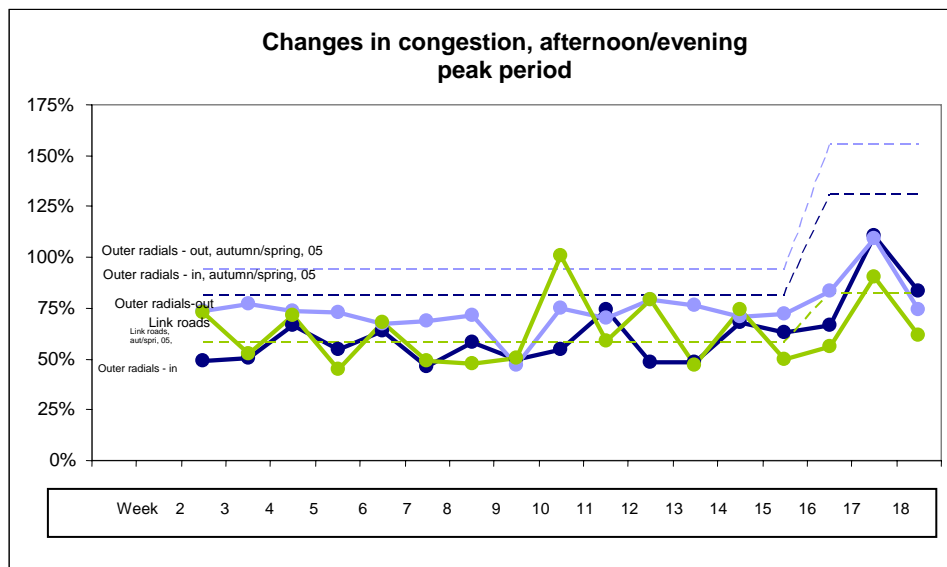
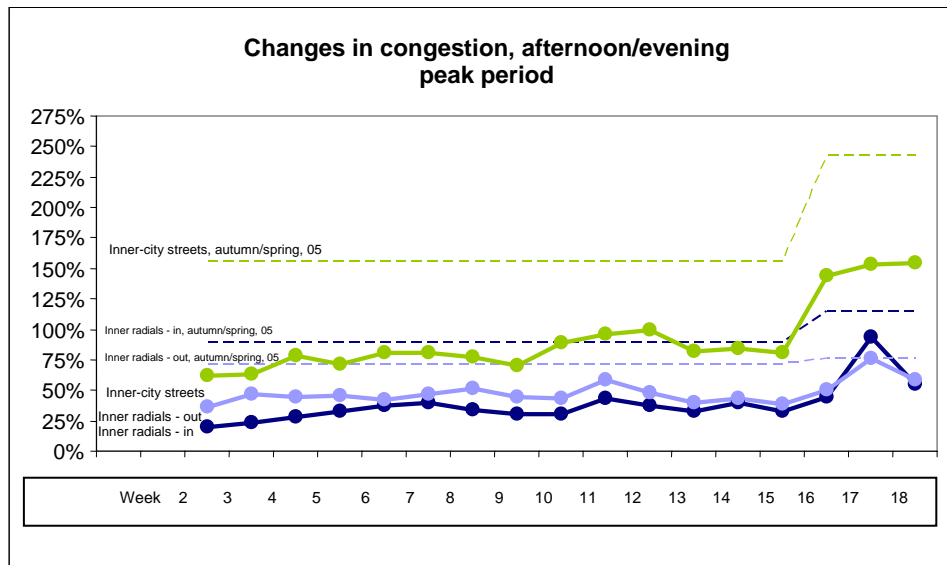


Figure 3. "Congestion" (average travel-time prolongation in percent compared to congestion-free travel time) for different types of road (3.30-6 p.m.). The broken line is the reference value.

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

Traffic effects described below relate to the period 26 March-25 April, excluding Easter week.

- **Car traffic on Essingeleden was a little higher in April 2006 than in April 2005, but the difference is minor.**
- Car traffic on Essingeleden was slightly higher in April 2006 compared to April 2005 (see table, below). The increase is relatively minor - traffic on Essingeleden varies by a few percent, up or down, from week to week. Seen over a longer period, average traffic in April was about 4-5% higher than in 2005, depending on which monitoring sites are compared.

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

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

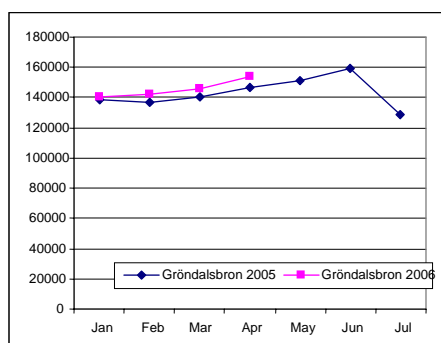
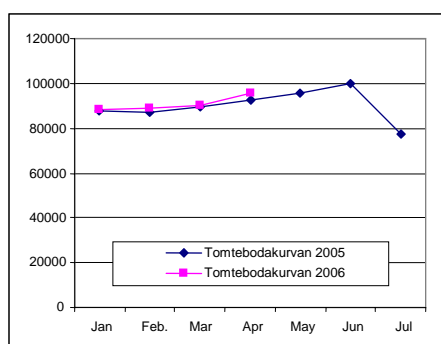


Figure 5. Number of vehicle passages per 24-hour period on Essingeleden, month-by-month, 2005 and 2006.

- Traffic on E4, north of the inner city (the table shows Frösundabacke), increased by 2%, while traffic south of the inner city (the table shows Södertäljevägen at Midsommarkransen) decreased by 1%, both in comparison with April 2005.

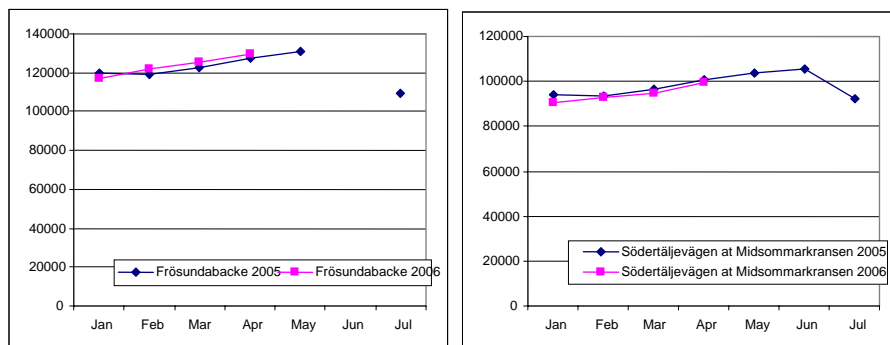


Figure 6. Number of vehicle passages per 24-hour period on E4 (south and north of the inner city, respectively), month-by-month, 2005 and 2006.

- **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 not 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.

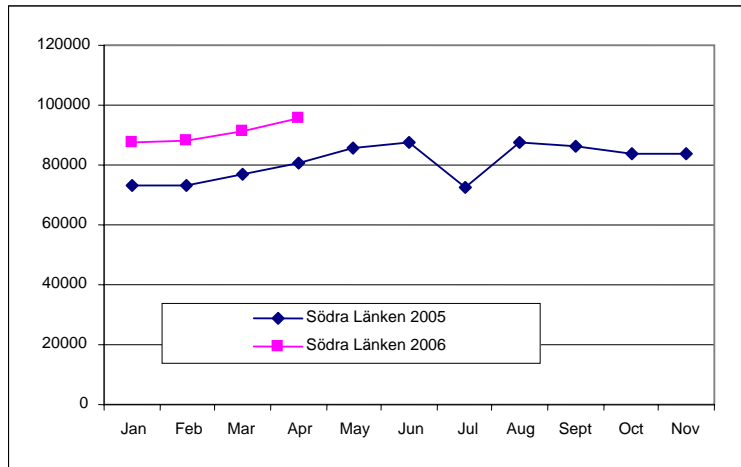


Figure 7. Number of vehicle passages per 24-hour period in Södra Länken, month-by-month, 2005 and 2006. Note: An accident disrupted traffic during October-December 2005.

- **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 time periods.
 - It would be reasonable to assume 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 time from day to day and week to week are so great that it is difficult to show any clear increase in travel times compared to the corresponding period in 2005. For some periods and directions, travel time was longer in 2005 than in 2006 – and in other periods the opposite was the case.
 - Just as on other routes, traffic and congestion increased during April 17-30 and thereafter, with the arrival of spring. Increased congestion in the morning on Essingeleden northwards seems somewhat higher in 2006 than in 2005 but it is too early to draw any conclusions.
- **Traffic increase in Södra Länken led to increased travel times compared to 2005**
 - Travel times in Södra Länken are longer than in 2005, especially eastwards in the morning and westwards in the afternoon. This seems to be due to the significant increase in traffic during the past year. It is almost 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.

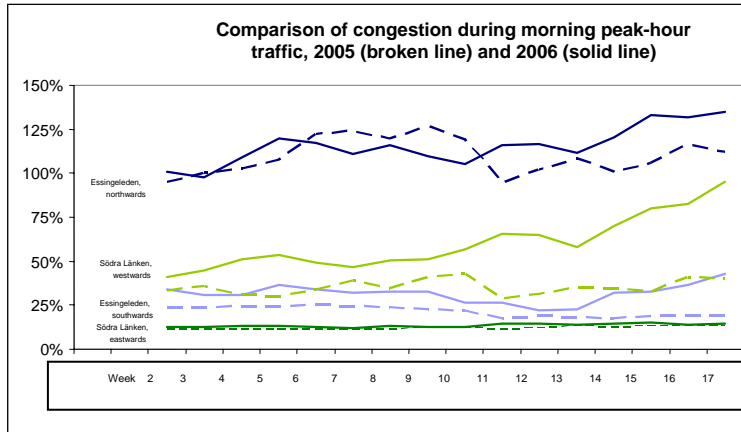


Figure 8. Travel-time prolongation in percent on Essingeleden and Södra Länken (7.30-9 a.m), average per week (moving mean value). The broken line is the reference value.

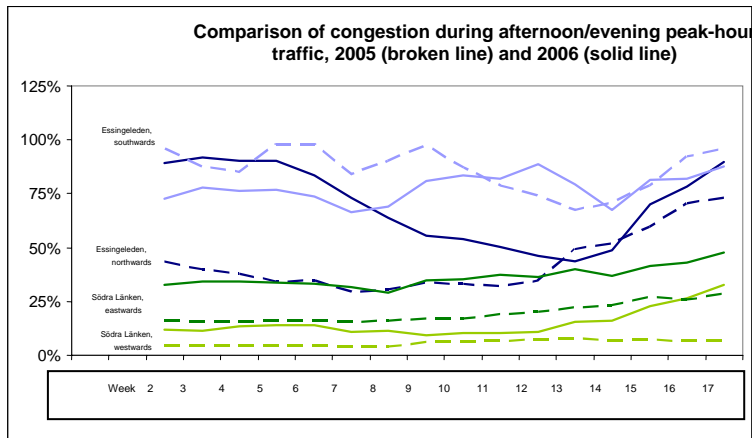


Figure 9. Travel-time prolongation in percent on Essingeleden and Södra Länken (3.30-6 p.m), average per week (moving mean value). The broken line is the reference value.

Public transport

- **The number of public-transport passages to/from the inner city increased by 65,000 compared to April 2005.**
 - According to estimates³ made by Stockholm Transport (SL), there were 65,000 additional passages per day to/from the inner city, an increase of 8%, equivalent to about 30,000 additional passengers.
 - For SL traffic as a whole, the number of passengers boarding per day rose by 140,000, a 6% increase. The increase is greatest on the Underground, with the largest increase of all on the Green Line (14%).
 - If it were not for Easter falling in April 2006, the number of public-transport passengers would have been even higher. The comparison month of April 2005 did not include Easter, so the actual increase in public-transport travel, comparing 2006 to 2005, is likely to be greater than these figures show. Only part of the increase, 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 traffic. As a result, when travel increased the number of standing passengers rose. In April 2006, 12% of morning peak-hour passengers on the Red and Blue Lines were standing. This is significantly higher than in April 2005 – but also significantly less than in November and December 2005 when 20% of morning peak-hour passengers had to stand on the Red Line and 16% on the Blue Line.
 - In April 2006, SL sold more than 10,000 additional monthly travel cards compared to April 2005. During January-March, sales of monthly travel cards showed an even larger increase compared to previous years (about 30,000 additional travel cards per month). It is probable that the difference is due to travellers not buying a monthly travel card in April because of the Easter break - public-transport travel was at least as high as during January-March 2006. A further reason may be the introduction of the new charge system (including a 20-kronor charge).

³ For public transport, there is no equipment which automatically calculates the number of 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.

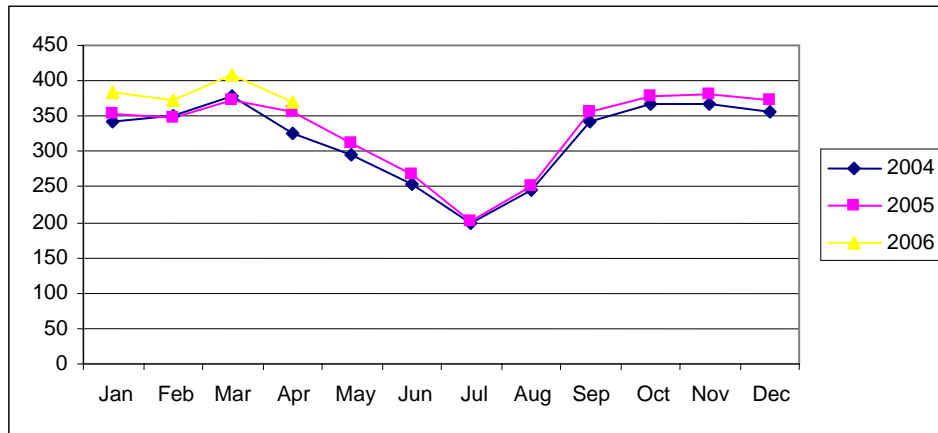


Figure 9. Number of SL monthly travel cards sold (in thousands) per month.

Parking

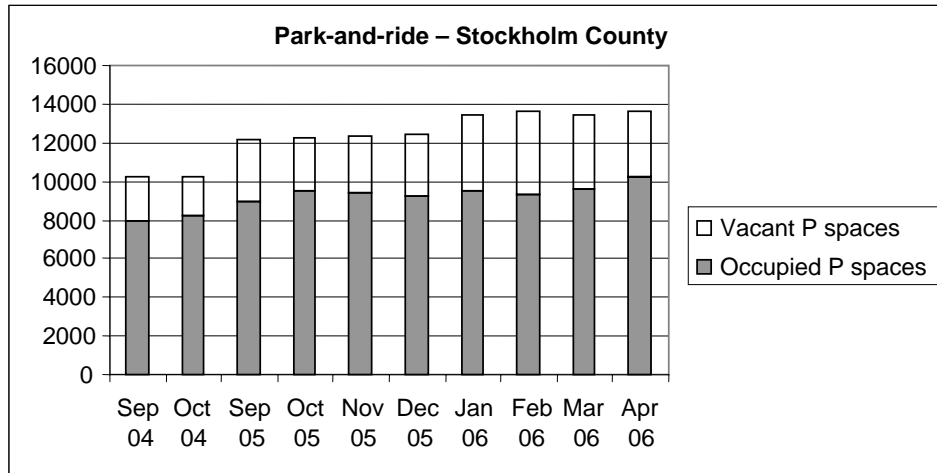


Figure 10. Park-and-ride in Stockholm County. Vacant and occupied spaces.

- 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 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.

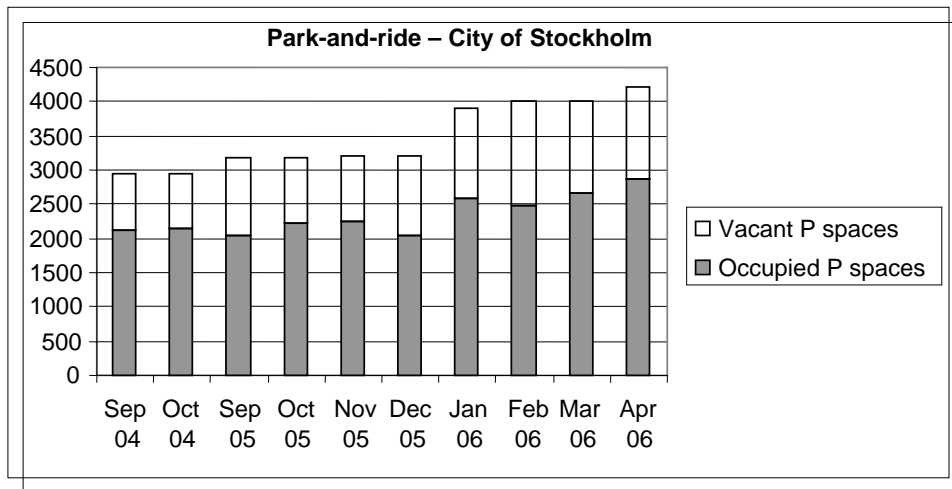


Figure 11. Park-and-ride in Stockholm City. Vacant and occupied parking spaces.

- 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%). (In April, the number of parking spaces decreased again somewhat, which explains the drop in available parking spaces shown in the diagram.)

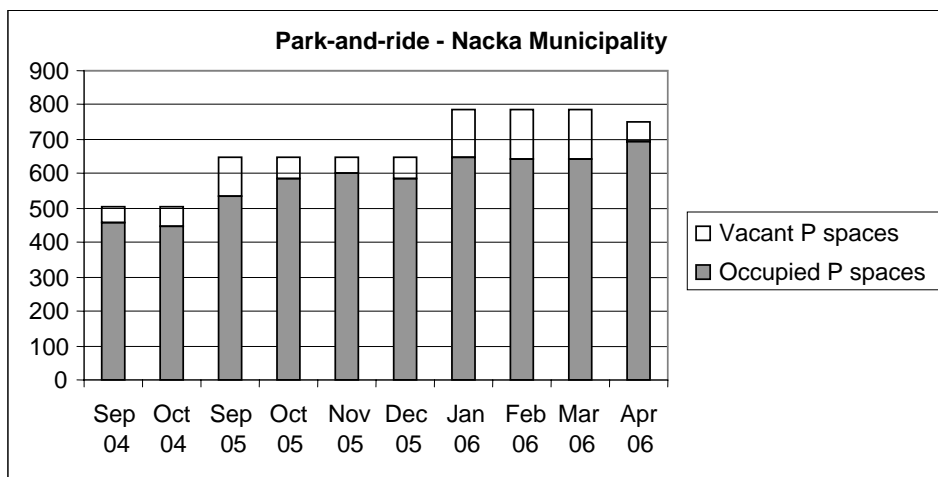


Figure 9. Park-and-ride in Nacka Municipality. Vacant and occupied parking spaces.

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 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 car-traffic congestion to, from or in the inner city approximately tripled if autumn 2005 is compared to February/March 2006.⁴ The number who believe there are big problems with car-traffic congestion to, from or in the inner city decreased by approximately two-thirds, if autumn 2005 is compared to February/March 2006.⁵ There is practically no difference between March and April.
 - The number 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 citizens have not had time to test the new arrangement.

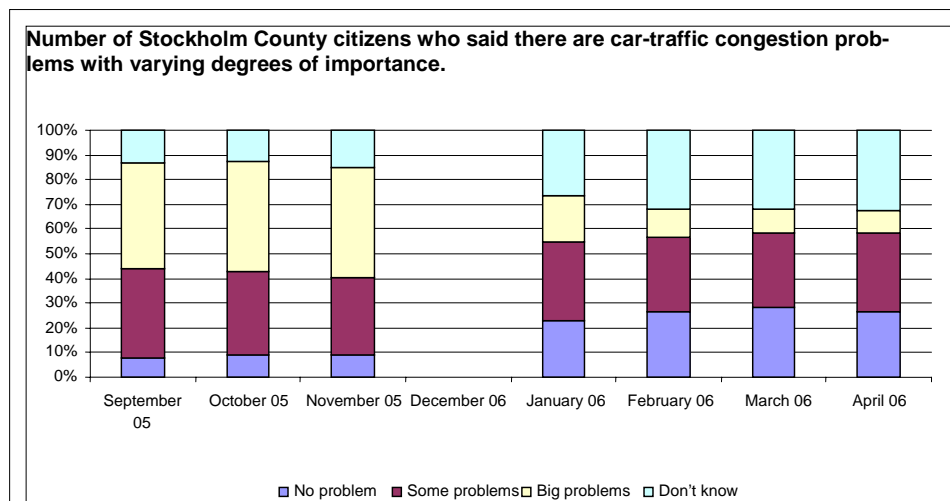


Figure 12. Number of Stockholm Country citizens who said there are problems with car-traffic congestion to, from or in Stockholm’s inner city during weekdays between 6.30 a.m. and 6.30 p.m.

⁴ 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 and 41% in March. If “don’t knows” are included, the percentage increased from about 9% during autumn 2005 to 23% in January 2006, 27% in February and 28% in March.

⁵ 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 and 14% in March. If “don’t knows” are included, the number decreased from about 45% during autumn 2005 to 19% in January 2006, 12% in February and 11% in March.

- 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-April 2006), while the number of persons who said congestion is not a problem approximately doubled (from 10-15% in autumn 2005 to 30-40% in January-April 2006).
- **A larger number of people 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 result in April is almost the same: 51% for “rather/very good decision”, 40% for “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, the majority said it was a “bad decision” but the number of respondents who were negative decreased (significantly) in March 2006, from over 60% in January-February 2006 to 53% in March and April. The number of respondents in the group that answered “good decision” increased from about 35% in January-February 2006 to 41-42% in March and April. Although the selection was small, the change is significant.
 - Among those who live in the inner city,⁶ a majority said it was a “good decision” (54% for “good decision” compared to 40% 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 40% 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”. The response from those living outside the inner city has become increasingly positive month-by-month during the Stockholm Trial, after

⁶ 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.

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 March 2006 increased by 15% compared to March 2005, which can be compared to the corresponding national increase of below 7%.
- The probable explanation for the strong upswing in March in Stockholm’s inner city and nationwide is that March 2005 was a poor month for retail because Easter fell at the end of the month. Easter week has a positive effect on non-durables and a negative effect on durables.
- The strong increase in the city sales index was also due to several businesses opening new premises in existing locations and/or moving or changing the position of existing tenants. Even the latter contributed to increased sales at the location.
- The Swedish Research Institute of Trade (HUI) review shows that retail-market sales in department stores and malls in the entire inner city increased by over 10%. Data shows that the growth of inner-city department stores and shopping centres was almost twice as fast as that of department stores and malls in other Stockholm districts.
- 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.
- There is no available data so far as regards small-scale street-level retailing. 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.