

Case study: motorcycles in Guangzhou

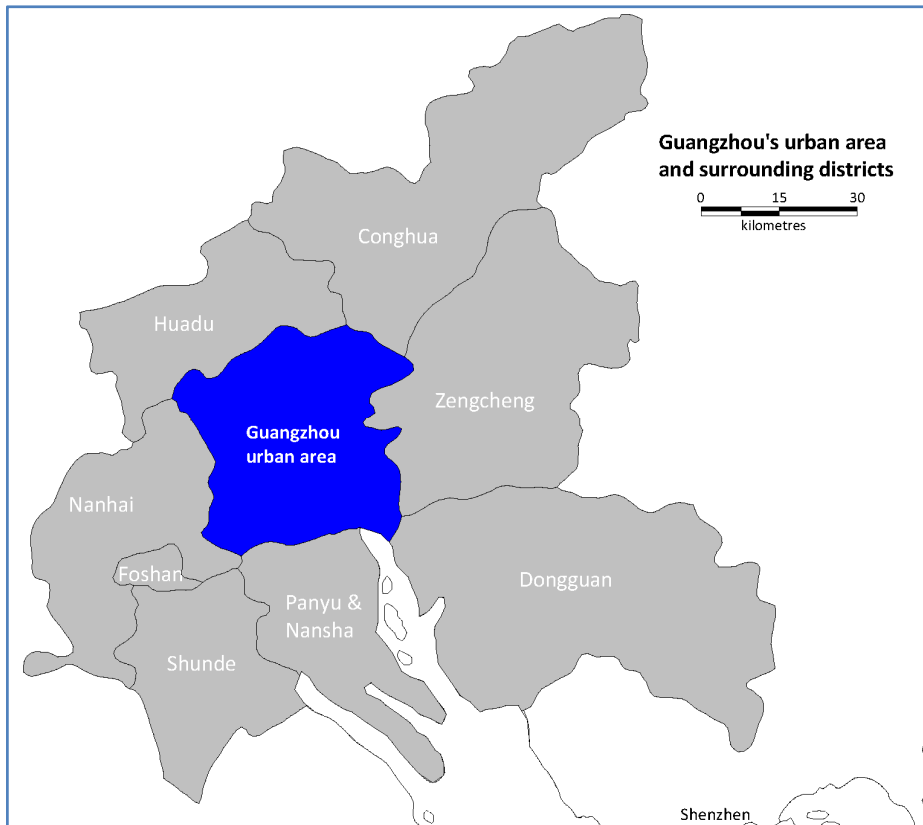
Karl Fjellstrom, ITDP, 15-Sep-08

History and development trend

1980s

In the early 1980s, owning a motorcycle was equivalent in status terms to having an expensive imported car today. In 1978 the number of motorcycles registered in the Guangzhou urban area (see map) was only 3,833. Most of the owners were overseas Chinese who had returned from Southeast Asian countries.





Guangzhou urban area, as discussed in this case study. Note that since 2005 Panyu & Nansha are now included as part of Guangzhou's urban area. However, the motorcycle ban does not yet apply in these two districts.

During the reform and opening-up period in the 1980s, as one of the coastal open cities, Guangzhou's economic activities and the living standards of residents rapidly improved. Motorcycles gradually began to enter millions of households. By 1982 the number of motorcycles registered in the Guangzhou urban area had increased to 8,892, with most of the owners being self-employed entrepreneurs whose wealth was rapidly increasing. By 1988 the number of registered motorcycles exceeded 100,000 for the first time; a growth rate of around 40% per year over a decade.

1990s

Before the 1990s, motorcycles were mainly used as family vehicles. In the early 1990s people began riding motorcycles to carry passengers. The initial motorcycle taxi drivers were mostly local young people and laid-off workers from urban villages. During this period, the number of motorcycles in Guangzhou increased dramatically. Statistics show that in 1992, the number of motorcycles registered in Guangzhou's urban area exceeded 200,000 for the first time. By 1995 the figure had reached 361,016; a growth rate averaging 20% per year since 1988.

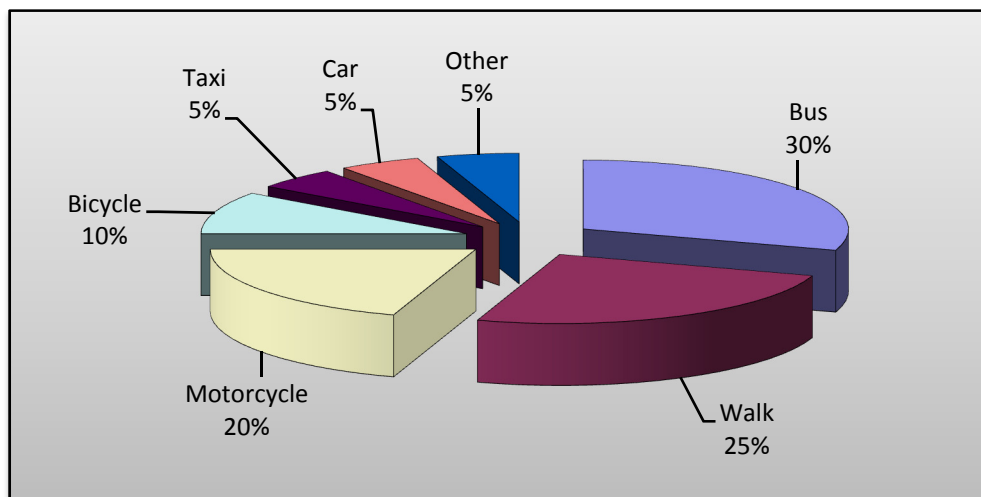
By the mid-1990s the first batch of motorcycle taxis drivers were changing their professions, and a large number of migrants began to join the ranks of motorcycle taxi drivers in Guangzhou. By the late 1990s, over 90% of the motorcycle taxi drivers were migrant workers.

In 1997, the number of motorcycles registered in the Guangzhou urban area reached their historical peak of 401,655. Motorcycles along with buses were at that time the main mode of travel in Guangzhou, supplanting bicycles.

In order to prevent non-locally registered motorcycles from pouring into Guangzhou urban areas, in 1998 Guangzhou undertook policy measures such as providing registration marks, and then stopping and checking the registration marks of motorcycles in the urban areas, and banning motorcycles registered outside the urban area from operating within the urban area. However, the results were poor due to difficulties in providing the registration marks and enforcing the policy, especially during peak hours. Many unregistered motorcycles had begun to show up throughout the urban area by the late 1990s.

Early 21st Century

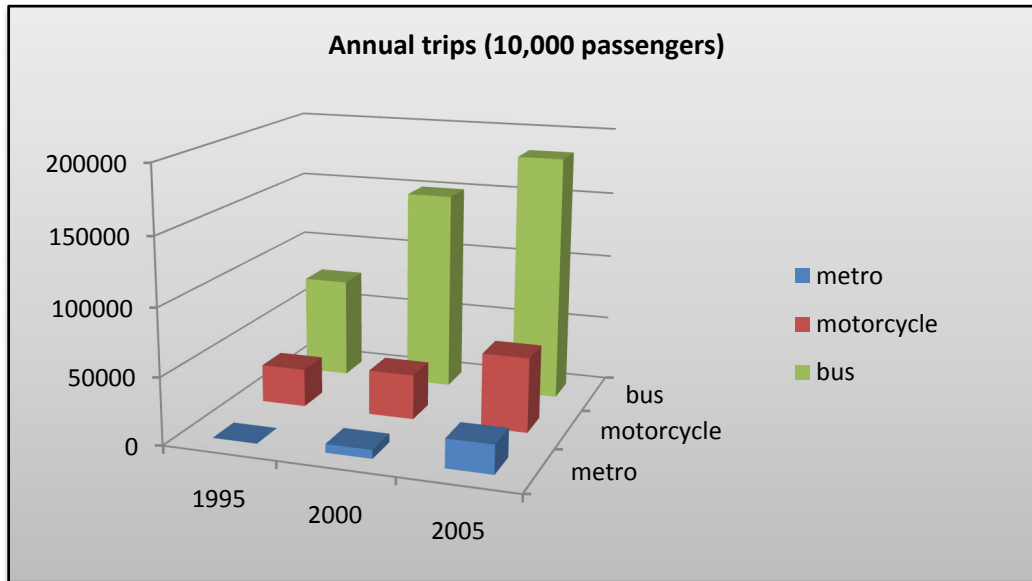
By the early 2000s the estimated inventory of motorcycles in the Guangzhou urban area was 790,000. The number of motorcycles operating on roads was estimated to exceed 500,000, although there were only 260,000 motorcycles registered by the Guangzhou government. In 2003 motorcycles accounted for more than one quarter of non-walking trips, second in importance only to buses (see Figure following).



Mode shares in Guangzhou, 2003

Source: GTPRI data

Indeed despite the restrictions, the number of trips by motorcycles continued to rapidly increase up to 2005, as shown in the following figure.



Annual trips in Guangzhou, various years

Source: GTPRI data

Progressive implementation of a citywide motorcycle ban

Reasons cited for developing the ban on motorcycles

Source: Adapted from Guangzhou Civil Service, *Examination of the 10 Hot Spots*, 2008

Faced with very rapid increases in the motorcycle vehicle fleet, the city perceived a number of problems associated with motorcycles .

Noise pollution: noise monitoring found that noise could run up to as high as 80.4 db when a motorcycle passed, and as high as 90 to 100 decibels when the motorcycle was started. This was 31 db higher than a car. This far exceeded the state's regional environmental noise standards of 55 decibels, and the road traffic environment noise standards of 70 decibels.

Air pollution: According to a survey of the city environmental protection department, each new motorcycle discharged 0.1% ~ 0.2% carbon monoxide and 100~2100 parts per million hydrocarbon when it was idling. Investigation showed that motorcycles accounted for 15.2% of carbon monoxide air pollution, and as high as 30.4% of hydrocarbon pollutants, more than the sum of goods vehicles and buses.

Traffic crashes and fatalities: motorcycles had become the number one killers in accidents in Guangzhou. In the first half of 2003 there were a total of 3,044 motorcycle crashes in the city, with 363 people killed, an average of 2 deaths per day. The number of deaths involving motorcycles accounted for 43.61% of all traffic deaths.

Illegal motorcycle taxi operation: restrictions on motorcycle taxis were repeatedly unable to be implemented, which not only disrupted the regular passenger transport (taking demand away from buses and regular taxis), but also raised many potential safety and security problems.

Impact on traffic order: Motorcycle running order was perceived by the traffic police as chaotic, with traffic infringements becoming more frequent and serious. These included lack of registration and documents, driving without a license, not wearing safety helmets, and so on. This was perceived by the traffic police as having a negative impact on the 'normal traffic order'.

Impact on the image of Guangzhou: There was a perception amongst policy-makers that cities with more intensive use of motorcycles were less modern. Hence there was a perception that motorcycles were adversely affecting the image of Guangzhou as an international metropolis.

Theft and security: According to official statistics, from January to October 2003, 9,320 motorcycle snatch thefts happened in the city, accounting for 47.1% of the total number of snatch cases. This amounts to 31 cases of snatch thefts per day. (A motorcycle snatch theft typically involves a motorcycle approaching a pedestrian from behind or from the side, with a pillion passenger grabbing a bag or handheld valuables before the motorcycle accelerates away.)

Reasons for banning motorcycles that were not commonly cited

One of the major negative impacts of motorcycles, which interestingly was not cited as one of the justifications behind the ban on motorcycles, was the impact they had in the narrow confines of Guangzhou's extensive narrow alleyways. Bulky, noisy, aggressive and often polluting motorcycles made these already-congested alleyways unpleasant and unsafe (see photos).





Motorcycles in the many hundreds of kilometers of narrow alleyways throughout Guangzhou had a major detrimental impact on the quality of the pedestrian environment, with their noise, speed, space requirements, emissions, and security threats. These pedestrian environments are also vital public spaces of the city. This negative impact is difficult to quantify, but the improvement in walking conditions throughout the city after the motorcycle ban were so great that this pedestrian space improvement is probably the main benefit of the policy.

Motorbikes in alleyways in Guangzhou

In addition, motorcycle taxis tended to congregate at bus stops and metro station exits, acting as feeders for the public transport system (see photos). This provided a useful service, but with strong negative side-effects on the pedestrian environment. The motorcycle taxi drivers tended to park and to drive on walkways, in areas around bus stops that were already often congested with pedestrians, vendors, people waiting for buses, and so on.





Motorcycle taxis on walkways in the vicinity of bus stops and metro stations

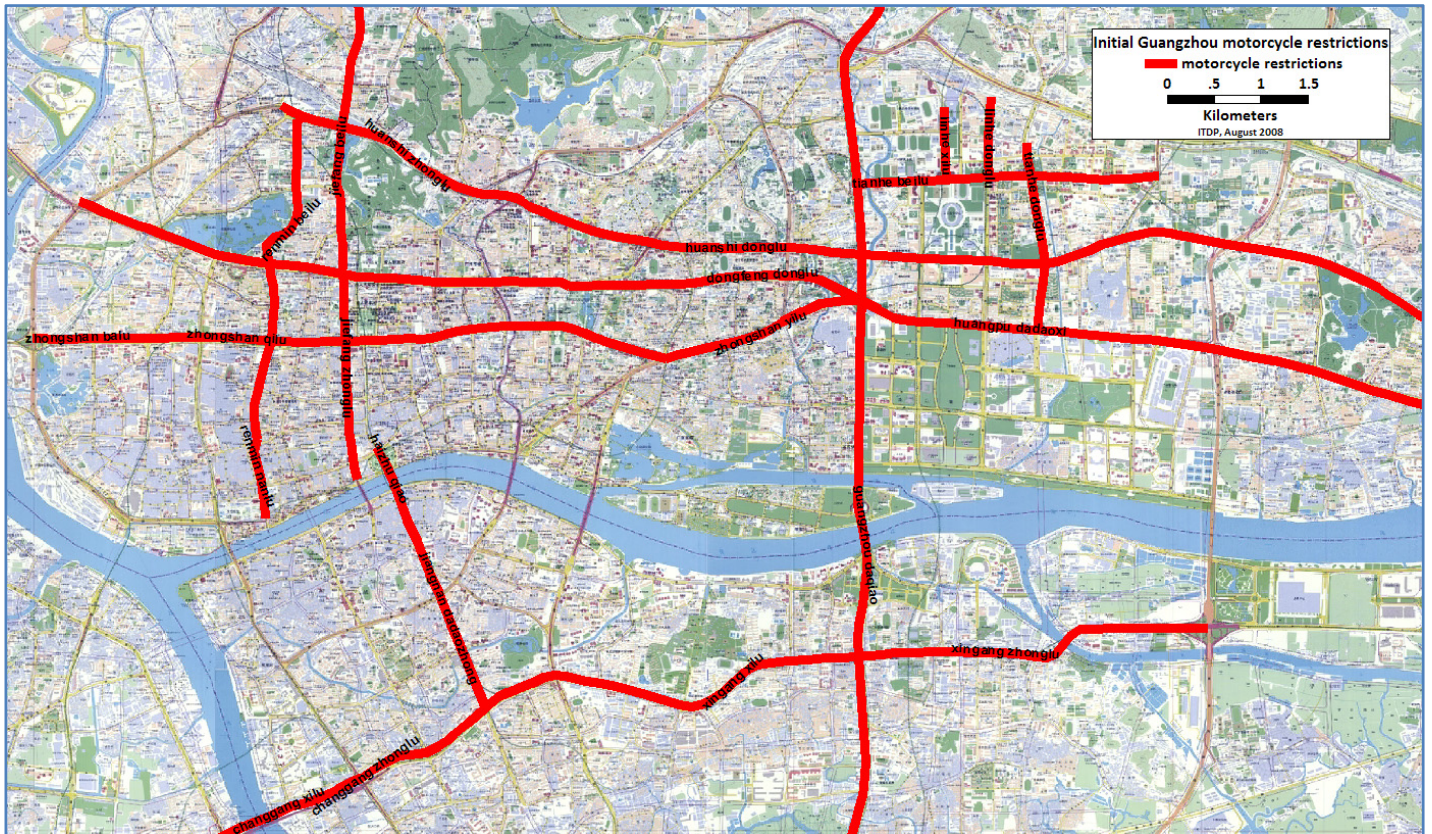
Gradual implementation of the ban on motorcycles during the 1990s

Major landmarks in the gradual implementation of the motorcycle ban in Guangzhou are outlined following:

- In October 1991 the Guangzhou Public Security Department announced that restrictions on motorcycle registrations would be applied, and that from 7:00am to 7:00pm motorcycles not registered in the city were not allowed to operate within the eight Guangzhou urban districts. From 14 October 1991 it was stipulated that only 500 motorcycle registrations would be accepted each month.
- **From 1995 no new motorcycle registrations were accepted in Guangzhou.** Only motorcycle scrapping, updating of registration information, and replacement of lost registration marks was carried out.
- On 2 June 1996 Guangzhou's 9th five year development plan called for vigorously developing public transport, strictly limiting the pace of development of motorcycles, and restricting the running of motorcycles on some streets.
- On 16 March 1998 Guangzhou permanently halted the checking and provision of motorcycle registration marks in the urban area, and stopped processing motorcycle scrapping, updating of registration information, or claims for loss of registration markings.
- In 1999, motorcycles not registered in the urban area were totally prohibited from operation within the city; ie. for 24 hours each day.
- From 10 November 2000, motorcycles and three-wheelers registered outside the respective areas were prohibited from operating within an additional four areas outside the main

Guangzhou urban area: Panyu District, Huadu District, Zengcheng City, and Conghua City, (see map above) for 24 hours each day.

- In 2001 the Guangzhou city government set up a working group on restricting and banning motorcycles. This working group was tasked with coordinating between various relevant departments, and with gaining participation from the whole society.
- On 1 January 2002 the *Guangzhou City Motorcycle Scrapping Management Regulation* came into force. This regulation stipulated that motorcycles which were registered more than 15 years ago must be scrapped, except for motorcycles which met current emission standards. Motorcycles which could not achieve national roadworthiness conditions were also required to be scrapped.
- On 5 December 2002 the Guangzhou City Public Security Bureau announced that registration of motorcycles in two adjoining districts (Panyu and Huadu) and cities (Conghua and Zengcheng) would be restricted from 10 December 2002.
- On 6 January 2003 the Guangzhou city government executive meeting revised the *Guangzhou City Motorcycle Scrapping Management Regulation*, stipulating that the expiration date for motorcycles and three-wheelers would be adjusted to 10 years and 8 years respectively. The revised regulation was to come into force from 19 February 2003.
- On 1 April 2003 the Guangzhou City Public Security Bureau issued an "announcement on the implementation of mandatory motorcycle scrapping." Motorcycles were allowed to be used for a maximum of 10 years after first registration, and three-wheelers no more than 8 years. Any motorcycle registered before 1 January 1990 must be scrapped immediately, without postponement. Motorcycles registered between 1990 and 1993 must be scrapped by 1 October 2003.
- On 30 March 2004 the Guangzhou municipal government issued an "Announcement on Restricting Motorcycles Running on Road Sections in Some Urban Regions", restricting motorcycles in the downtown area. This was put into practice in three phases:
 - The first phase from 1 May 2004 banned motorcycles each day from 9:00am to 4:30pm, and again from 8:30pm to 5:00am the next day, from running on Dongfeng Road, Huanshi Road, Tianhe Road, Zhongshan Avenue, Huangpu Avenue, Zhongshan Rd, Tianhe North Road, Changgang Road, Xingang Road, Jiefang Road, Jiangnan Avenue, Guangzhou Avenue, Linhe East Road, Linhe West Road, and Tianhe East Road (see map following). (Note that an earlier ban had already been applied, in 2002, in Renmin Rd.) The Transportation Bureau opened 11 new night bus routes to meet passenger demand affected by the ban.
 - The second phase, from 1 January 2006, banned motorcycles from running on Dongfeng Road for 24 hours each day.
 - The third phase, from 1 January 2007, banned all motorcycles from the urban area, 24 hours each day.



Roads subject to the initial Guangzhou motorcycle restrictions.

Physical measures adopted by Guangzhou neighborhoods to restrict motorcycles

The following photos show a range of physical measures used in Guangzhou to restrict motorcycles. More photos of various anti-motorcycle and motorcycle restriction measures can be found at the ITDP Photo Library at www.itdp-china.org. The Guangzhou photos are mostly from before January 2007, because after the citywide motorcycle ban came into effect, such restriction measures were no longer needed.

The photos show that as well as the official restrictions on major roads, many local communities also took action to restrict motorcycles in their local streets.



Bicycles can be easily lifted over this barrier in Huangpu Av, motorcycles with much greater difficulty



A motorcycle barrier in Panyu. Blocks of stone are used to easily circumvent the barrier



A railing protruding over the bike ramp combined with stairs for the first few metres allows bicycles but not motorcycles to pass this bridge at the Guangzhou Sports Centre. It was designed by well-known architect Paul Andreu.







































Stairs and steep ramp which are inaccessible to motorcycles






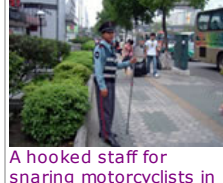
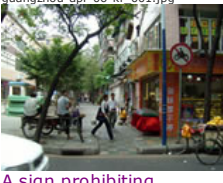























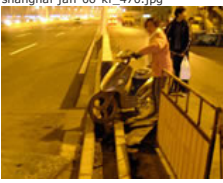







A hooked staff for snaring drive-by motorcycle snatch thieves in Sanyuanli

The following pages contain thumbnails of the 'motorcycle restriction' measures from ITDP's Photo Library.

motorcycles - anti-motorcycle measures

<p>Bangkok JAN-2008 Karl Fjellstrom, ITDP bangkok-jan-08-kf_039.jpg</p> 	<p>Bangkok JAN-2008 Karl Fjellstrom, ITDP bangkok-jan-08-kf_037.jpg</p>  <p>This manoeuvre was difficult and judging by the grating noise damaged the motorcycle. A barrier which was 5-10cm higher would probably have made it impossible.</p>	<p>Bangkok JAN-2008 Karl Fjellstrom, ITDP bangkok-jan-08-kf_036.jpg</p> 	<p>Bangkok SEP-2007 Karl Fjellstrom, ITDP bangkok-sep-07-kf-022.jpg</p>  <p>A steel bar blocks motorcycles from passing</p>	<p>Bangkok JAN-2005 Karl Fjellstrom, ITDP bangkok-jan-05-kf_118.jpg</p> 	<p>Bogota SEP-2004 Karl Fjellstrom, ITDP bogota-29-sep-04-kf_103.jpg</p> 
<p>Changsha JUL-2007 Karl Fjellstrom, ITDP changsha-14-jul-07-kf_085.jpg</p> 	<p>Changsha JUL-2007 Karl Fjellstrom, ITDP changsha-14-jul-07-kf_083.jpg</p> 	<p>Changsha JUL-2007 Karl Fjellstrom, ITDP changsha-13-jul-07-kf_014.jpg</p> 	<p>Changsha JUL-2007 Karl Fjellstrom, ITDP changsha-13-jul-07-kf_006.jpg</p> 	<p>Changzhou OCT-2007 Karl Fjellstrom, ITDP changzhou-oct-07-kf_350.jpg</p> 	<p>Changzhou OCT-2007 Karl Fjellstrom, ITDP changzhou-oct-07-kf_095.jpg</p> 
<p>Changzhou OCT-2007 Karl Fjellstrom, ITDP changzhou-oct-07-kf_092.jpg</p> 	<p>Changzhou OCT-2007 Karl Fjellstrom, ITDP changzhou-oct-07-kf_073.jpg</p> 	<p>Changzhou SEP-2007 Karl Fjellstrom, ITDP changzhou-22-sep-07-kf_080.jpg</p> 	<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_367.jpg</p> 	<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_276.jpg</p> 	<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_188.jpg</p> 
<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_187.jpg</p> 	<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_186.jpg</p> 	<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_108.jpg</p> 	<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_022.jpg</p> 	<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_021.jpg</p> 	<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_017.jpg</p> 
<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_016.jpg</p> 	<p>Changzhou JUL-2007 Karl Fjellstrom, ITDP changzhou-jul-07-kf_007.jpg</p> 	<p>Chongqing JUL-2007 Karl Fjellstrom, ITDP chongqing-16-jul-07-kf_034.jpg</p>  <p>A low steel bar blocks motorcycles from entering Chongqing University</p>	<p>Delhi DEC-2004 Karl Fjellstrom, ITDP delhi-14-dec-04-kf_002.jpg</p> 	<p>Fuzhou AUG-2008 Karl Fjellstrom, ITDP fuzhou-23-aug-08-kf_041.jpg</p> 	<p>Fuzhou AUG-2008 Karl Fjellstrom, ITDP fuzhou-23-aug-08-kf_021.jpg</p> 
<p>Fuzhou AUG-2008 Karl Fjellstrom, ITDP fuzhou-23-aug-08-kf_018.jpg</p> 	<p>Fuzhou AUG-2008 Karl Fjellstrom, ITDP fuzhou-22-aug-08-kf_019.jpg</p>  <p>The bridge in the background has stairs with a railing protruding over the bike ramp on both near approaches, which renders it inaccessible to</p>	<p>Guangzhou MAY-2007 Karl Fjellstrom, ITDP guangzhou-may-07-kf_004.jpg</p> 	<p>Guangzhou NOV-2006 Karl Fjellstrom, ITDP guangzhou-nov-06-kf_105.jpg</p>  <p>A manned motorcycle barrier in Tianzhu</p>	<p>Guangzhou NOV-2006 Karl Fjellstrom, ITDP guangzhou-nov-06-kf_104.jpg</p> 	<p>Guangzhou NOV-2006 Karl Fjellstrom, ITDP guangzhou-nov-06-kf_003.jpg</p> 

	motorcycles and heavier e-bikes, but accessible to pedestrians and cyclists as well as lighter e-bikes		barrier in Tangxia		
<p>Guangzhou SEP-2006 Karl Fjellstrom, ITDP guangzhou-kf-sep-06_2.jpg</p> 	<p>Guangzhou SEP-2006 Karl Fjellstrom, ITDP Guangzhou-kf-sep-06_1.jpg</p>  <p>Motorcycles blocked, bicycles can pass</p>	<p>Guangzhou JUL-2006 Karl Fjellstrom, ITDP guangzhou-jul-06-kf_053.jpg</p>  <p>A motorcycle barrier in Panyu. Blocks of stone are used to easily circumvent the barrier</p>	<p>Guangzhou APR-2006 Karl Fjellstrom, ITDP guangzhou-apr-06-kf_040.jpg</p>  <p>A railing protruding over the bike ramp combined with stairs for the first few metres allows bicycles but not motorcycles to pass this bridge at the Guangzhou Sports Centre. It was designed by well-known architect Paul Andreu</p>	<p>Guangzhou APR-2006 Karl Fjellstrom, ITDP guangzhou-apr-06-kf_038.jpg</p> 	<p>Guangzhou APR-2006 Karl Fjellstrom, ITDP guangzhou-apr-06-kf_027.jpg</p>  <p>A hooked staff for snaring motorcyclists in Sanyuanli</p>
<p>Guangzhou APR-2006 Karl Fjellstrom, ITDP guangzhou-apr-06-kf_001.jpg</p>  <p>A sign prohibiting motorcycles from entering a pedestrian street</p>	<p>Guangzhou DEC-2005 Karl Fjellstrom, ITDP guangzhou-dec-05-kf_025.jpg</p>  <p>Bicycles can be easily lifted over this barrier in Huangpu Av, motorcycles with much greater difficulty</p>	<p>Guangzhou NOV-2005 Karl Fjellstrom, ITDP guangzhou-nov-05-kf_001.jpg</p>  <p>Stairs and steep ramp which are inaccessible to motorcycles</p>	<p>Guangzhou MAY-2005 Karl Fjellstrom, ITDP guangzhou-may-05-kf_043.jpg</p> 	<p>Guangzhou APR-2005 Karl Fjellstrom, ITDP guangzhou-28-apr-05-kf_066.jpg</p> 	<p>Harbin OCT-2007 Karl Fjellstrom, ITDP harbin-oct-07-kf_222.jpg</p> 
<p>Harbin OCT-2007 Karl Fjellstrom, ITDP harbin-oct-07-kf_145.jpg</p> 	<p>Harbin OCT-2007 Karl Fjellstrom, ITDP harbin-16-oct-07-kf_080.jpg</p> 	<p>Harbin SEP-2007 Karl Fjellstrom, ITDP harbin-01-sep-07-kf_030.jpg</p> 	<p>Harbin SEP-2007 Karl Fjellstrom, ITDP harbin-01-sep-07-kf_005.jpg</p> 	<p>Harbin AUG-2007 Karl Fjellstrom, ITDP harbin-16-aug-07-kf_069.jpg</p> 	<p>Harbin AUG-2007 Karl Fjellstrom, ITDP harbin-16-aug-07-kf_068.jpg</p>  <p>Bicycles can enter, motorcycles cannot</p>
<p>Kunming MAR-2008 Karl Fjellstrom, ITDP kunming-7-mar-08-kf_114.jpg</p> 	<p>Kunming MAR-2008 Karl Fjellstrom, ITDP kunming-7-mar-08-kf_111.jpg</p> 	<p>Kyoto APR-2007 Karl Fjellstrom, ITDP kyoto-24-apr-07-kf_031.jpg</p> 	<p>Kyoto APR-2007 Karl Fjellstrom, ITDP kyoto-22-apr-07-kf_104.jpg</p> 	<p>Kyoto APR-2007 Karl Fjellstrom, ITDP kyoto-22-apr-07-kf_045.jpg</p> 	<p>Macau MAY-2005 Karl Fjellstrom, ITDP macau-16-may-05-kf_056.jpg</p> 
<p>Nanning AUG-2008 Karl Fjellstrom, ITDP nanning-27-aug-08-kf_008.jpg</p> 	<p>Pereira OCT-2007 Duan Xiaomei, GMTDC pereira-oct-07-xd_007.JPG</p> 	<p>Shanghai MAY-2007 Karl Fjellstrom, ITDP shanghai-may-07-kf_079.jpg</p> 	<p>Shanghai MAY-2007 Karl Fjellstrom, ITDP shanghai-may-07-kf_078.jpg</p> 	<p>Shanghai JAN-2006 Karl Fjellstrom, ITDP shanghai-jan-06-kf_482.jpg</p> 	<p>Shanghai JAN-2006 Karl Fjellstrom, ITDP shanghai-jan-06-kf_480.jpg</p> 
<p>Shanghai JAN-2006 Karl Fjellstrom, ITDP shanghai-jan-06-kf_470.jpg</p> 	<p>Singapore DEC-2002 Karl Fjellstrom, ITDP singapore-dec-02-kf_148.jpg</p> 	<p>Wuhan JUL-2007 Karl Fjellstrom, ITDP wuhan-01-jul-07-kf_025.jpg</p> 	<p>Wuhan JUN-2007 Karl Fjellstrom, ITDP wuhan-30-jun-07-kf_003.jpg</p> 	<p>Wuhan JUN-2007 Karl Fjellstrom, ITDP wuhan-29-jun-07-kf_021.jpg</p>  <p>The stairs at the bottom block motorcycles, but allow bicycles to pass</p>	<p>Wuhan JUN-2007 Karl Fjellstrom, ITDP wuhan-24-jun-07-kf_224.jpg</p> 

<p>Wuhan JUN-2007 Karl Fjellstrom, ITDP wuhan-24-jun-07-kf_222.jpg</p> 	<p>Wuxi MAY-2007 Karl Fjellstrom, ITDP wuxi-28-may-07-kf_006.jpg</p> 	<p>Wuxi MAY-2007 Karl Fjellstrom, ITDP wuxi-28-may-07-kf_005.jpg</p>  <p>Poles designed to stop shopping trolley theft also block motorcycles and nearly stop electric bikes from passing</p>	<p>Wuxi MAY-2007 Karl Fjellstrom, ITDP wuxi-28-may-07-kf_004.jpg</p> 	<p>Wuxi MAY-2007 Karl Fjellstrom, ITDP wuxi-27-may-07-kf_085.jpg</p> 	<p>Wuxi MAY-2007 Karl Fjellstrom, ITDP wuxi-27-may-07-kf_083.jpg</p> 
<p>Wuxi MAY-2007 Karl Fjellstrom, ITDP wuxi-26-may-07-kf_064.jpg</p> 	<p>Xiamen AUG-2008 Karl Fjellstrom, ITDP xiamen-12-aug-08-kf_093.jpg</p> 	<p>Xiamen AUG-2008 Karl Fjellstrom, ITDP xiamen-12-aug-08-kf_011.jpg</p> 			



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Lessons from Guangzhou's successful motorcycle ban

Gradual implementation

From 1991 to 2007, the implementation of Guangzhou's motorcycle ban was not done in a sudden or radical way, but was rather progressively carried out, starting with a range of gradually tightening restrictions and ending with a complete ban. The policy and key strategic decisions were based on investigation and analysis.

The motorcycle ban program was drawn up by the government, but with significant public input and comment. On 15 January 2004, the city government held public hearings on the motorcycle ban, and announced the specific content of urban area motorcycle ban program through news media outlets after the hearings. In February and March 2004 the public security police detachment also commissioned a social conditions and public opinion survey centre to interview 3,000 motorcycle owners, providing detailed information about the characteristics and opinions of motorcycle users and their service conditions. This kind of input helped to provide a more scientific basis for adjustment of the motorcycle ban program.

The motorcycle ban was implemented gradually, separated into three stages over many years, giving the public enough time to adapt. The first phase was to only restrict motorcycles from operating on some roads in the urban area, while allowing motorcycles to run on these roads during the morning and evening peak periods, and at the same time leaving one east-west and one north-south trunk road open without restrictions. The citywide, full time motorcycle ban was not carried out until the final third stage.

Supporting measures

Several supporting policy measures were required to ensure the successful implementation of the citywide motorcycle ban.

Public transport

It was necessary to improve public transport, by ensuring adequate capacity to accommodate the modal shift from motorcycles to buses, and by providing feeder route or other minibus coverage to ensure access along narrow shared streets to bus stops and metro stations; areas previously served by motorcycle taxis.

In practice, these measures were not taken in time for the citywide motorcycle ban. More than 50 short routes accessing narrow streets around bus stops and metro stations were added to the bus route network, but not until a year after the citywide motorcycle ban came into effect. The result was that since the ban, a variety of minibus paratransit services and cycle rickshaws have sprung up to serve the unmet demand (see photos below).



Minibuses have replaced motorcycle taxis in Ruibaoxiang



1 yuan minibuses provide a local service replacing motorcycle taxis in Lijiao



Cycle rickshaws in Guangyuan Xincun



Cycle rickshaws in Lijiao



Lijiao metro station exit, July 2008. The motorized three-wheelers probably have a more severe impact on the quality of the street environment than the motorcycle taxis did. These three-wheeled motor vehicles are illegal, but can still be found deep in the 'wilds' of some of Guangzhou's dense urban villages.

These new cycle rickshaws and minibus services are generally tolerated by traffic police, but have not been legalized. They are therefore subject to arbitrary confiscation (see photo below).



Municipal officials impound cycle rickshaws in Dashadi, June 2007

As mentioned above, more than 50 short bus routes were introduced to help meet demand previously served by motorcycle taxis. Following is a map of route 401, one of these short routes.



One of the new short bus routes replacing motorcycle taxis in the Yuancun district. Note how the route operates exclusively on small streets, including through dense urban villages. Around 50 of these short routes were introduced following the motorcycle ban. They are served by minibuses charging 1 yuan per trip, and each route is typically only 1 to 3km long.



One of the small buses used to meet demand previously served by motorcycle taxis

Compensation for motorcycle scrapping

The "Guangzhou City Compensation Incentive Plan for Motorcycles Scrapped or Moved Out of Urban Areas," required payment of compensation for each motorcycle which was scrapped. By May 2006 more than 5,000 motorcycles had already been scrapped, and the total compensation paid exceeded 6.27 million yuan (US\$920,000); around US\$180 per motorcycle.

Compensation was calculated according to whether the motorcycle was used for less than 10 years, or between 10 and 13 years. (For motorcycles older than 13 years, no compensation was paid.)

For motorcycles used for less than 10 years the compensation was calculated according to the cost when it was brought (according to the receipt) minus the average depreciation over a ten year (120 month) period. For example, consider a motorcycle registered on 15 Oct 1997, costing 15,000 yuan, and being scrapped in June 2006. The compensation is 15,000 yuan - [104 months × (15000 yuan ÷ 120 month)] = 2,000 yuan. If the owner delayed until December 2006, the compensation will be RMB 1,260. If calculation of compensation resulted in a figure of less than 1,260 yuan, this amount (1,260 yuan) was paid regardless, as a minimum. For motorcycles that could still be used, where owners wanted to transfer it to suburban rather than urban use, a compensation payment of 800 yuan per vehicle was provided.

For motorcycles already used for more than 10 years but less than 13 years, if after a check they are found to be still in proper condition, then the 'reward' for scrapping is 35 yuan per month less than 13 years. For example, if a motorcycle was registered on 15 Oct. 1995 and was to be scrapped in June 2006, then the reward for scrapping it would be 980 yuan (35 yuan x 28 months). If the owner delayed scrapping until December 2006, the reward would be 770 yuan (35 yuan x 22 months).

This arrangement provided an incentive for owners to scrap motorcycles sooner rather than later.

Employment support for displaced motorcycle drivers

Several special labor fairs were held to provide support to people previously employed as motorcycle taxi drivers or elsewhere in the motorcycle sector to find new jobs.

Special enforcement measures

Joint arrangements between the Public Security Bureau police, urban management officials, district public security officials and other departments focused special enforcement measures in locations where motorcycle-related problems were prominent. In these motorcycle gathering places, 'collective combat' operations were mounted, including the use of plain-clothes as well as uniformed policemen and officials, mobile equipment inventory, 'ambushes', and other methods to seize illegal vehicles (see photo).



Motorcycles being taken away for scrapping

To address motorcycles on the road, a variety of enforcement measures were taken including setting up checkpoints to investigate, inspect and punish infringing motorcyclists. Illegal motorcycles which attempted to escape or refused to accept inspection invited chasing and interception measures, and so on. Strict punishments were applied for various types of traffic offences, especially when committed by motorcycles.

Selective enforcement in outlying areas

Although motorcycles have been officially banned in the urban area since 1 January 2007, the ban has not been enforced in all areas. There are two types of area where the ban on motorcycles and motorized three-wheelers has not been rigorously enforced:

1. Some dense urban villages in areas with heavy industrial and associated trading activity. An example is the extensive Kecun urban village area in the southern suburbs, which has a large amount of textile industries, and the Lijiao urban village area, also in the south of the city. Motorized three-wheelers and some motorcycles still operate in both areas, mostly as freight transport for textiles or other goods though sometimes also as passenger taxis, though their incidence is far less than before the ban.
2. Some outlying urban villages in areas which though part of the city, still have extensive agricultural activities. An example is the Xinzhou area (see photo below).





Motorcycle taxis outside Wanshengwei metro station, on walkways, and in narrow alleyways in the Xinzhou area, September 2008.

Results of the motorcycle ban

Environmental, security, safety and pedestrian amenity improvements

The motorcycle ban was implemented with wide public support and cooperation, and is widely seen to have achieved a number of positive results:

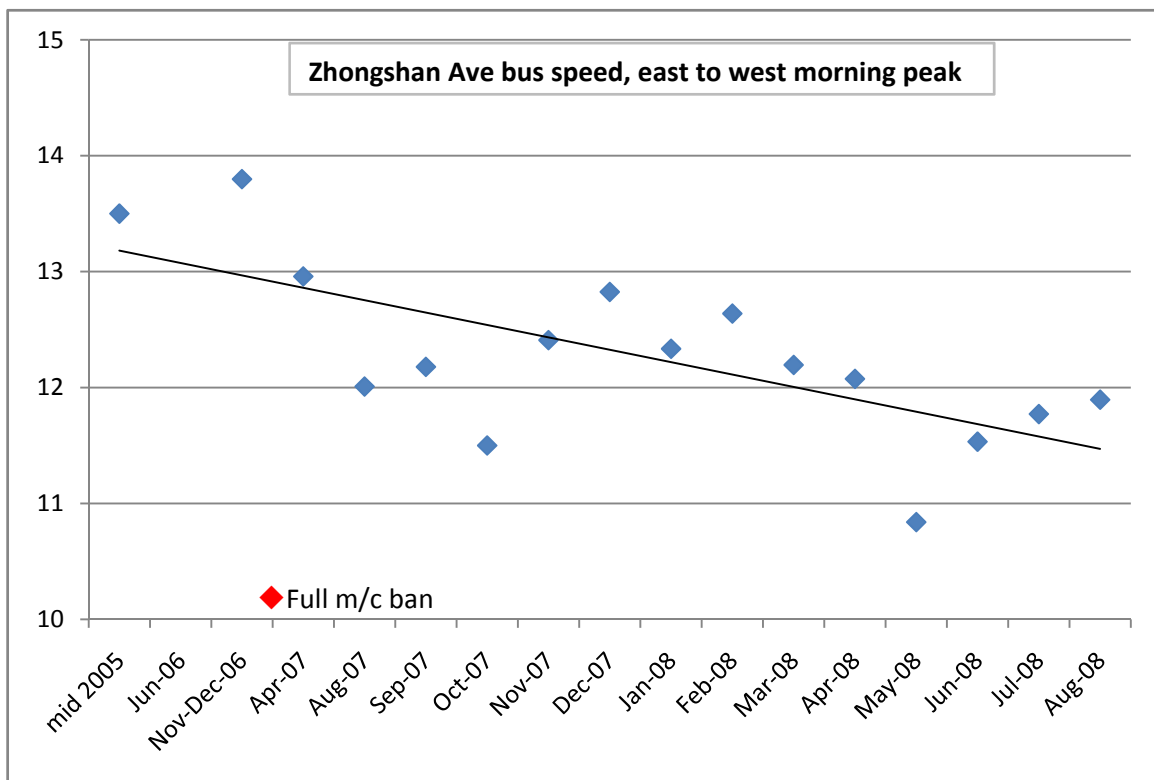
- Noise pollution, especially in narrow alleyways and at night, was greatly reduced, and significant reductions in carbon monoxide, particulates and nitrogen oxide emissions were reported.
- Traffic crashes significantly declined in January to August 2007 (when there were no motorcycles) compared to the same period a year earlier. Crashes declined by 17.5%, deaths by 2.2%, injuries by 20.4%, and property losses by 42.3%.
- In Guangzhou from January to August 2007 there were 52,141 criminal cases, a decline of 15.3% compared with the corresponding period a year earlier. Snatch theft cases declined by 44.3% over the same period.
- The quality of the walking environment throughout the city has been greatly improved.

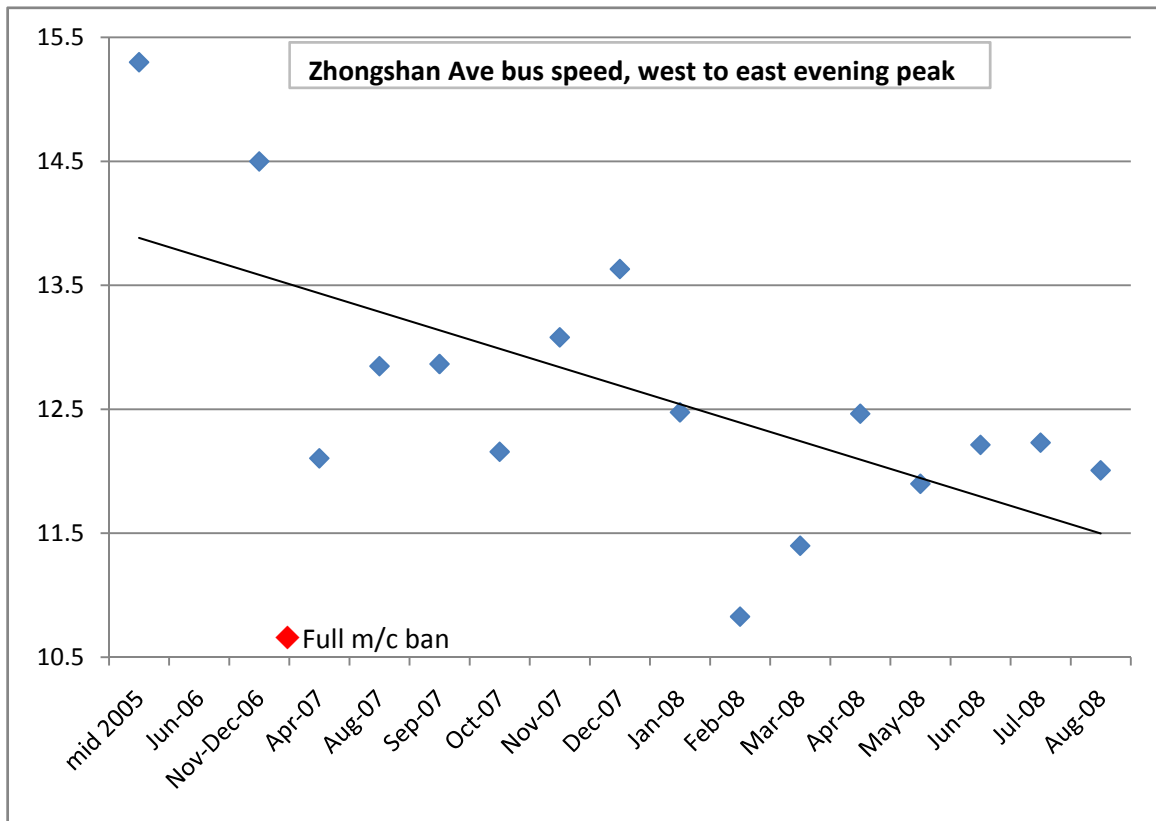
Traffic and mode split impact

Traffic congestion, however, has significantly worsened since the motorcycle ban was implemented, though since car ownership was rapidly increasing regardless of the motorcycle ban, it is not possible to attribute the worsening congestion only to the motorcycle ban. Nearly one fifth of all motorcycle riders shifted to car use immediately after the motorcycle ban came into effect.

The chart below shows average bus speeds along Zhongshan Avenue between Tangxia and Tiyu Zhongxin (6km) over a three year period, covering the time before and after the motorcycle ban was fully implemented on 1 January 2007. A significant drop in bus speeds can be seen between November-December 2006 and April 2007, but considering the overall trend it is difficult to attribute the drop in speeds during 2008 only to the motorcycle ban, for two reasons. Firstly, the motorcycle ban was implemented gradually, so the impact of the ban was dispersed over a long period, rather than felt all at one time. Secondly, it is difficult to isolate the impact of the motorcycle ban on traffic from the rapid increase in car ownership which took place at the same time, and would have occurred even without the ban on motorcycles.

What is less obvious (though a direct result) than the drop in bus speeds is the problem that bus overcrowding has considerably worsened over this period. Surveys show that around 50% of motorcycle riders shifted to buses in the short term. The large increase in bus demand combined with lower bus speeds due to increasing congestion resulted in much higher bus occupancy rates. Bus overcrowding has become a severe problem even during off peak periods. Crush bus loading levels in turn reduce bus speeds by increasing boarding and alighting times per passenger.

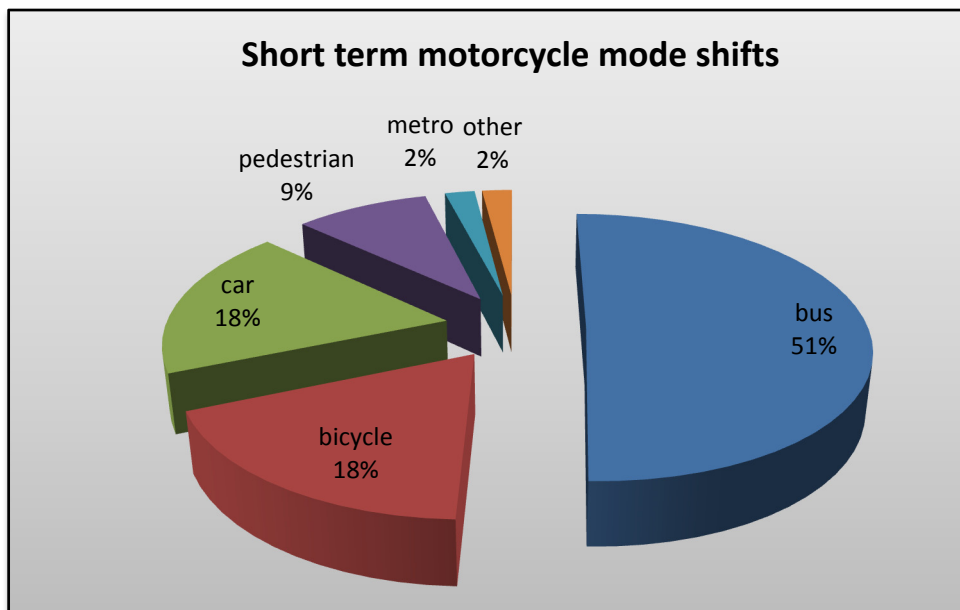




Zhongshan Avenue bus speeds in the peak direction, 2005 to 2008.

Source: ITDP bus speed surveys

The following short term mode shift figures suggest that the impact of the motorcycle ban on worsening traffic may, however, be smaller than other factors such as the rapid increase in car ownership.



Motorcycle mode shifts following the banning of motorcycles in Guangzhou

Although nearly 20% of motorcycle riders shifted to cars, the same percentage shifted to bicycles (in capacity terms similar to motorcycles), and nearly 10% walked. Considered on a per passenger basis, a low occupancy bus may be less efficient than motorcycles in traffic flow, but the buses in Guangzhou already had very high occupancy levels, averaging more than 65 passengers per bus on major corridors even before the ban came into effect. On a per passenger basis, a bus with 70 to 80 passengers (average peak period bus occupancy on major roads in Guangzhou after the motorcycle ban came into full effect) uses less road space than a motorcycle with one to two passengers.