

Pollution from Motorcycle and Control Measures in Guangzhou, CHINA

Guangzhou Environment Monitoring Centre

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Abstract:

It is convenient and popular in Guangzhou to use motorcycle as transportation means, which also becomes a especial local feature. According to the statistics on vehicle, the number of vehicle reached 657,482 by the end of 1999, among which 385,375 was motorcycle. It was estimated that the percentage of air pollutants emitted from motorcycle were as following CO 19%, HC 19%, NO_x 3%.

The paper will discuss pollution from motorcycle and introduce control programs in Guangzhou, such as emission factors, emission contribution, I&M. In the end, will introduce the technical measures for motorcycles in near future.

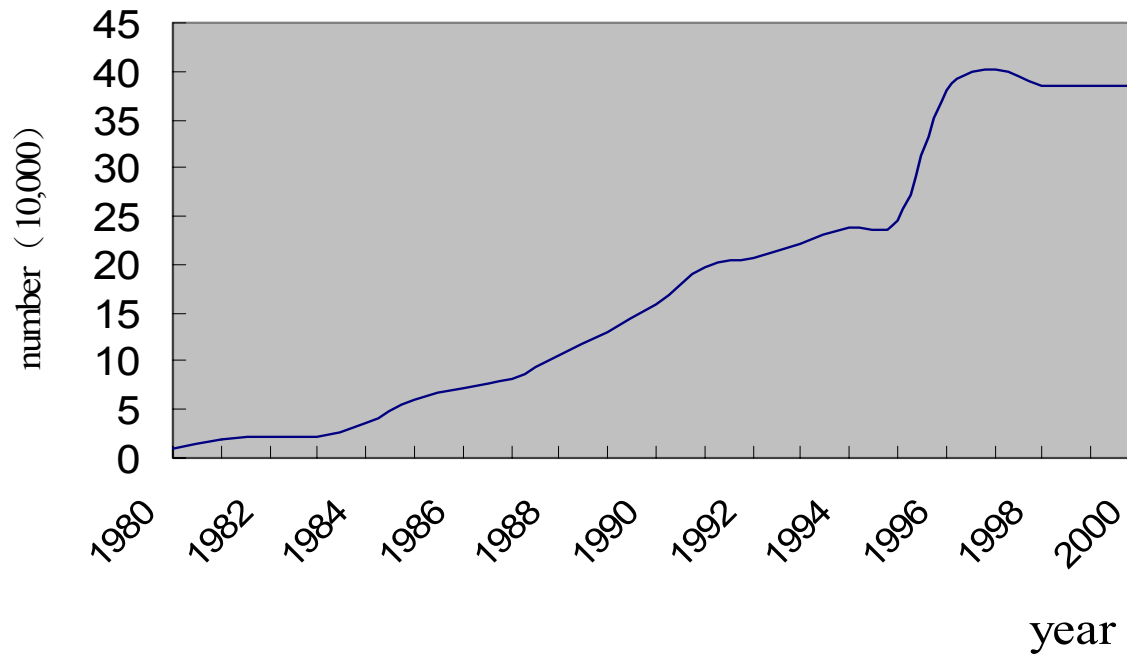
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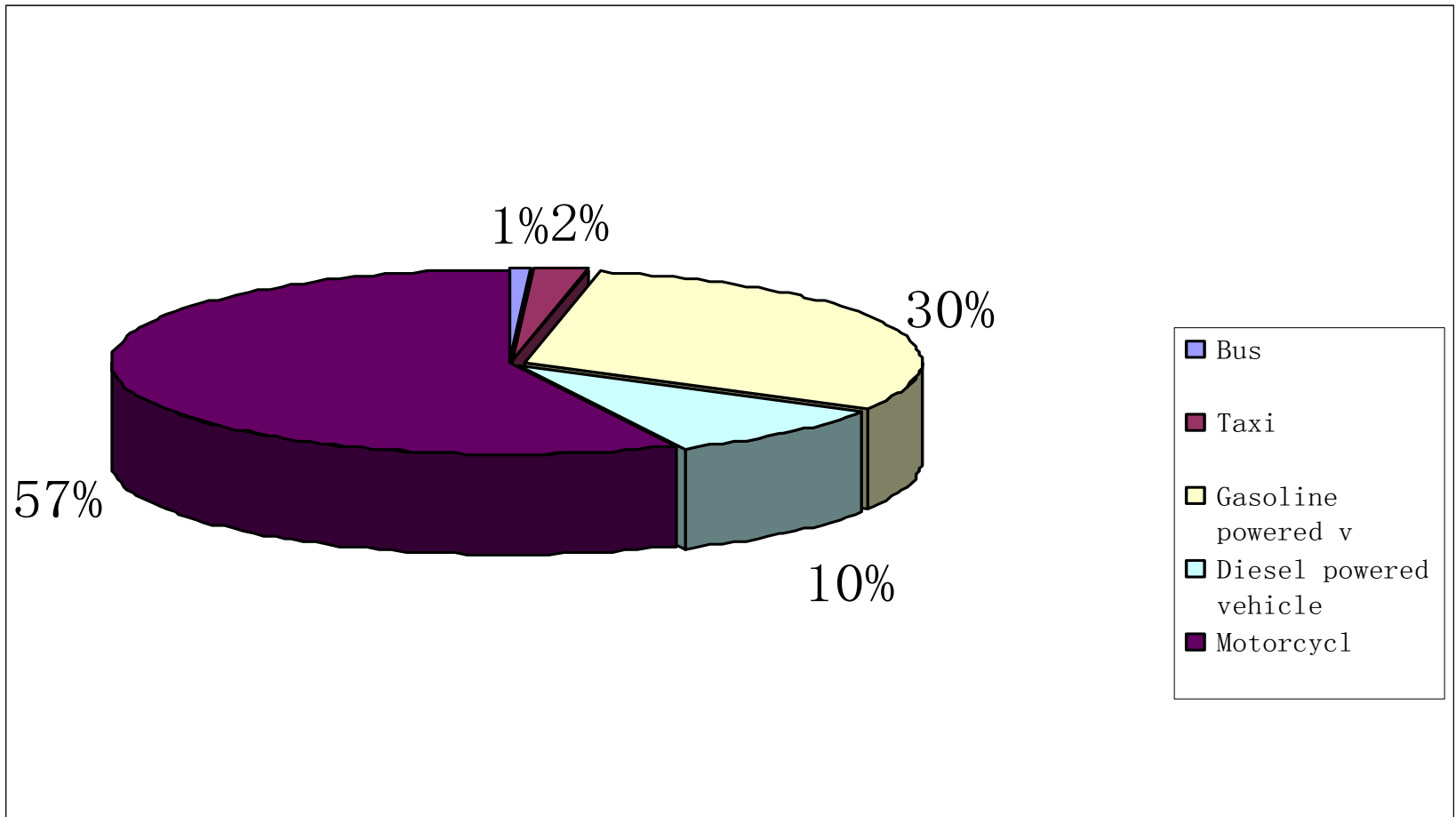
The Number of Motorcycles in Guangzhou, CHINA



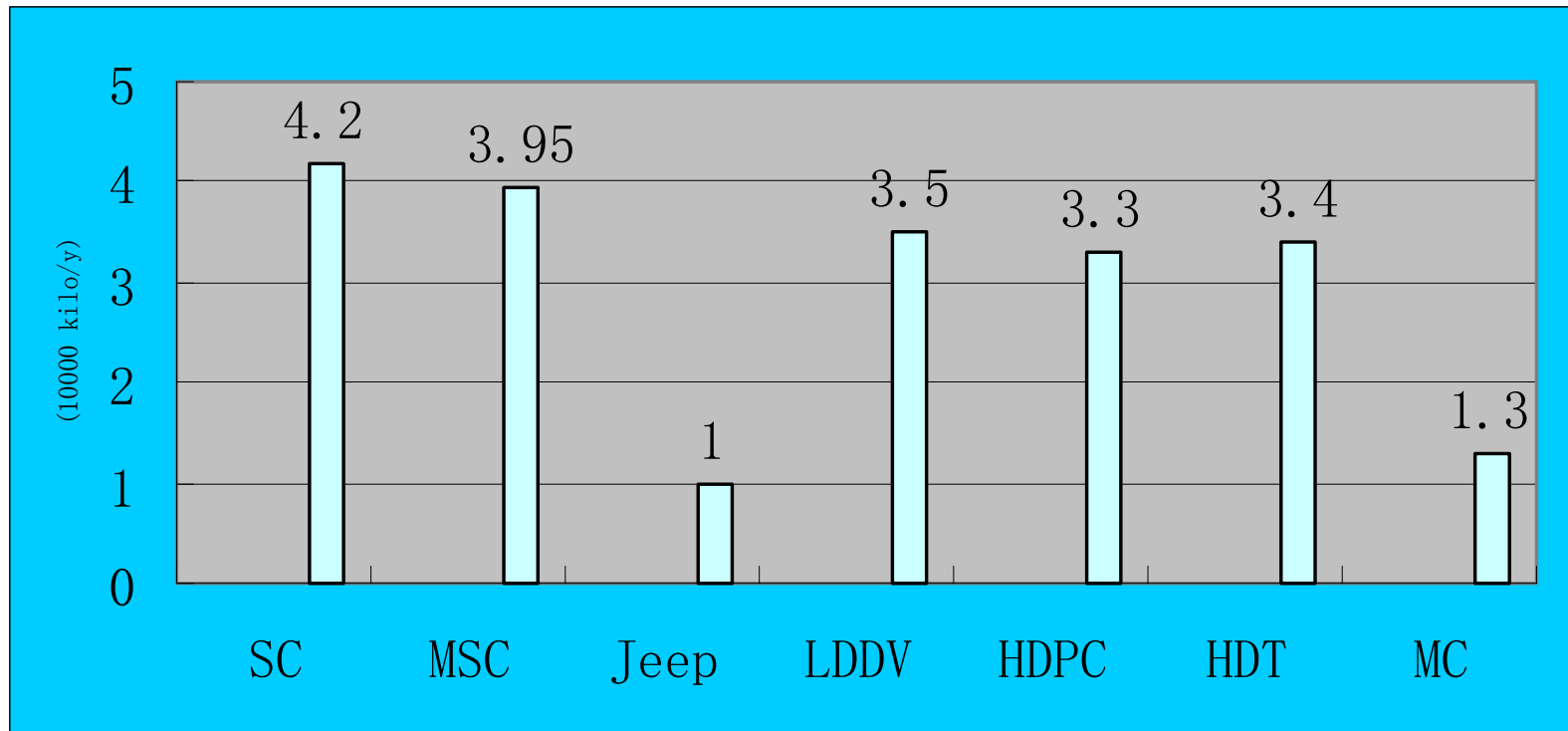
The characteristics of two-wheeled motorcycle in Guangzhou

- The two-wheeled motorcycle is so popular that it has become one of the distinguish characteristic of Guangzhou
- The two-wheeled motorcycle's number of Guangzhou increased very fast from late 1980s to early 1990s
- The number of two-stroke motorcycles are very small, by the end of 2000, Guangzhou had 23,000 two-stroke motorcycles, accounting for 5.6 percent of the total.

The proportion of different vehicles in Guangzhou



Average mileage of different vehicles in Guangzhou



The Emission Contribution from Different Vehicles in Guangzhou

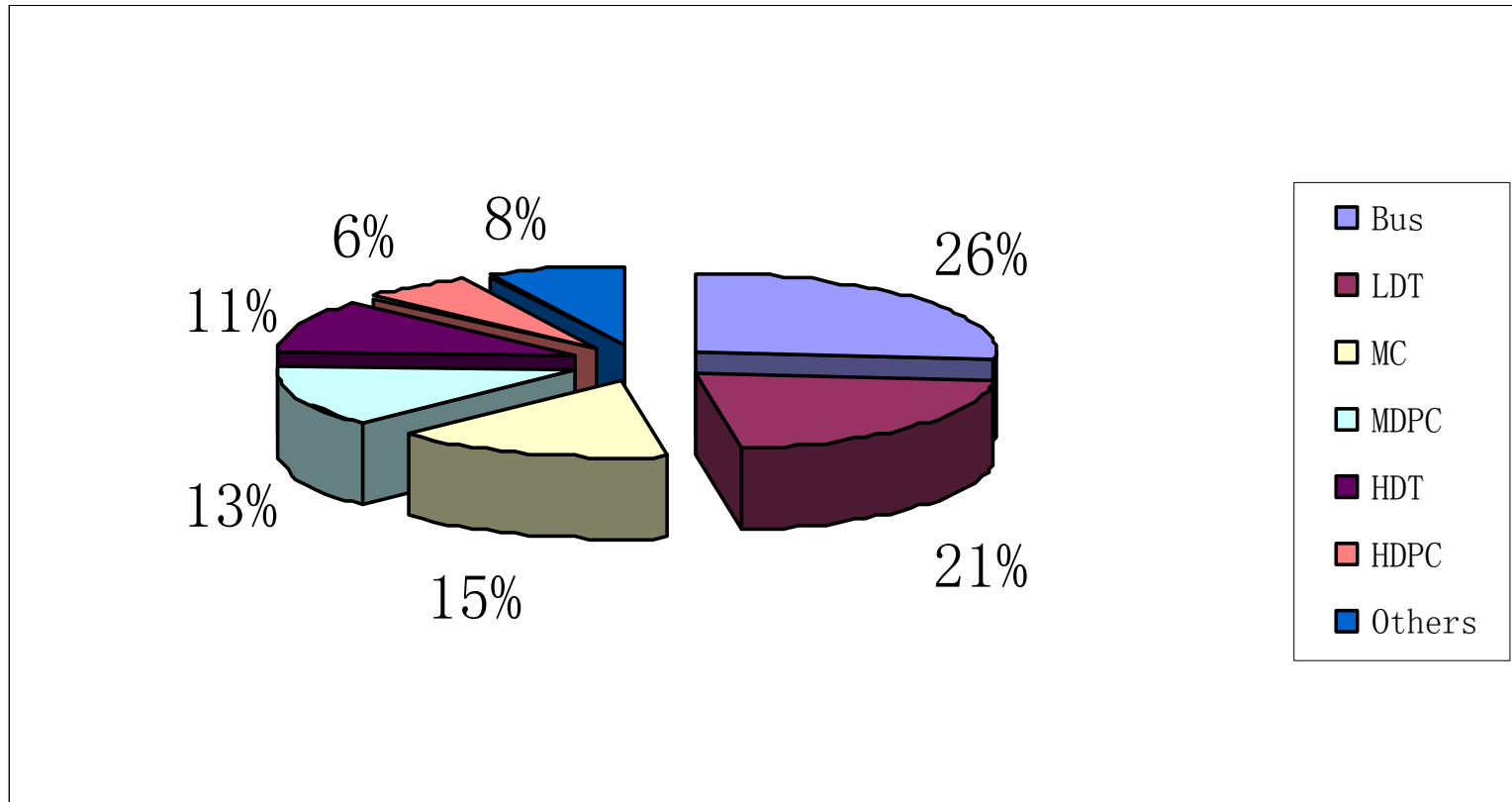
| Item | Taxi | LDV | Bus | HDV | MC |
|---------------------|------|-----|-----|-----|----|
| CO (%) | 28 | 37 | 10 | 6 | 19 |
| HC (%) | 24 | 36 | 13 | 8 | 19 |
| NO _x (%) | 20 | 41 | 22 | 14 | 3 |

Emission factors of two-stroke motorcycle in Guangzhou

| Item | CO(g/km) | HC(g/km) | NO _x (g/km) |
|-------------------------------------|----------|-----------------|------------------------|
| In-use two-stroke motorcycles | 16.13 | 17.54 | 0.03 |
| New two-stroke motorcycles | 10.2 | 12.3 | 0.02 |
| In-use light-duty gasoline vehicles | 44.2 | 5.2 | 1.5 |

- ✓ NO_x emission from motorcycles is very low
- ✓ HC emission from motorcycles is high, exceed the emission from LDGV in used.

The number of complain for vehicle in 2000



The measures to control motorcycle emission in Guangzhou

- Restrict the licenses of motorcycle in urban area to reduce traffic accident and emissions.
- Strengthen road-side test for motorcycle emissions.
- The motorcycle need to be repaired or maintained while failing in the emission tests.

The license of motorcycles is restricted

- From 1992 to 1998, Guangzhou limited the issue of motorcycle license in urban area, Public Security Bureau control the number of new licenses every year;
- From 1998, Guangzhou has provided very few licenses in urban area
- Public Security Bureau is drafting a standard for reducing old motorcycles.

The I/M of motorcycles emission in Guangzhou

- **Inspection**
 - **Annual inspection:** all motorcycle have to be inspected every year
 - **Roadside test:** the police and environmental monitoring engineer inspect motorcycle emission on the road
- **Maintenance:**
 - **Self-conscious maintenance:** the owner maintain motorcycle regularly;
 - **Enforced maintenance:** when the motorcycle fail test in annual inspection or roadside test , the motorcycle have to be maintained

Annual inspection for motorcycle emission

- ✓ All the motorcycles are divided into 12 groups, carry out annual inspection in different month
- ✓ If the motorcycle fail to test, the owner will be charged and the motorcycle be requested to maintain until pass test
- ✓ In order to pass test, most of owner maintain their motorcycle before annual inspection

Roadside test for motorcycle emissions

- Since 1999, Guangzhou has begun to measure motorcycle's emission on road;
- By the end of 2000, 52,000 motorcycles has been tested on road;
- If the motorcycle failed to test, the owner's license will be suspended temporarily. Only when the motorcycle is well maintained and pass the test, do the owner get back the license.

Roadside test for motorcycle emissions

| Year | The total number of motorcycles | The number of test on the road | The number of pass test | The pass rate % |
|-------------|--|---------------------------------------|--------------------------------|------------------------|
| 1999 | 385371 | 16743 | 11575 | 69.1 |
| 2000 | 385476 | 35867 | 19366 | 54.0 |

- ❖ The reason for pass rate going down is no more new motorcycles increased since 1998.

The technical measures for motorcycles in used in Guangzhou

- Four stroke in used motorcycles :
 - Annual inspection and maintenance
 - Install the catalyst converter
 - Install the low pollution carburetor
- Two stroke in used motorcycles :
 - Annual inspection and maintenance
 - Install the catalyst converter

Future policies and the technical measures for motorcycles in near future

- It won't be encouraged to develop motorcycles in Guangzhou
- Speed up to reduce the motorcycles of high pollution
- Tightening emission control standards of motorcycles in used
- On the basis of national emission control standards, which will be promulgated soon, new motorcycles emission will be controlled strictly
- Control smoke emission from two-stroke motorcycles
- Control noise from motorcycles strictly

Thanks !