

RETA 5937

ADB Technical Assistance Project

Action Plan on Strengthening Inspection and Maintenance in Chongqing, CHINA

XU Shubi

Senior Engineer, Deputy Director
Chongqing Environmental Protection Bureau

Manila • Philippines Feb. 2002

The views expressed in this paper are the views of the author and do not necessarily reflect the views and policies of the Asian Development Bank. The Asian Development Bank does not guarantee the accuracy of the data presented.

Brief Introduction to Chongqing

† Chongqing has become the fourth municipality directly under control of Chinese central government since 1997 and it is located in the west part of China, upstream of the Yangtze River. The area is 82,000 km² with the population of 30 million.

2

Brief Introduction to Chongqing Municipality

- † Located between two mountains, the city proper is divided by the Yangtze and Jialing rivers and is an typical mountain city for its hills and low mountains.
- † By the year 2000, the area of constructed city proper is 190 km² with residents of 2.5 million.

3

Current Traffic and Road Status Situation in Chongqing Proper

- † In 2000, road length covers 2553 km;
- † The average road area per capita is 5.20 m²;
- † With many winding, steep and narrow roads, road infrastructure construction lags far behind vehicle population increase rate, resulting in a striking traffic jam problem.

4

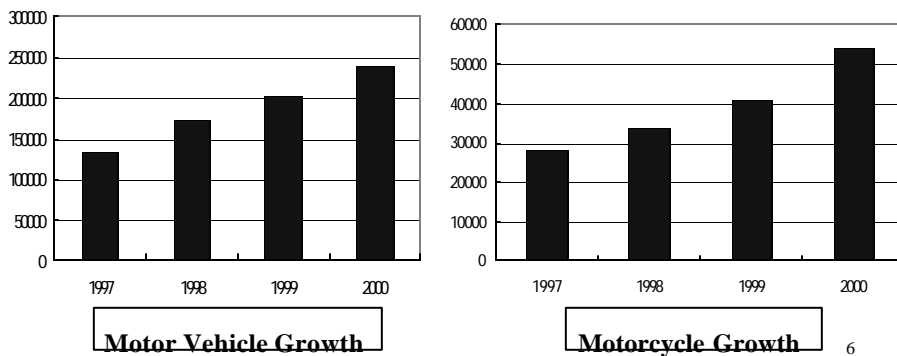
Motor Vehicle Population in Chongqing Municipality

- † An increasing rate of 10-15% of vehicle each year ;
- † In 2000, the vehicle population was 430,000 in the whole city;
- † In 2000, the number of motor vehicle population was about 260,000 in the city proper:
 - † 200,000 for automobiles;
 - 2500 for CNG vehicles
 - † 60,000 for motorcycles .

5

Motor Vehicle Population in Chongqing Municipality

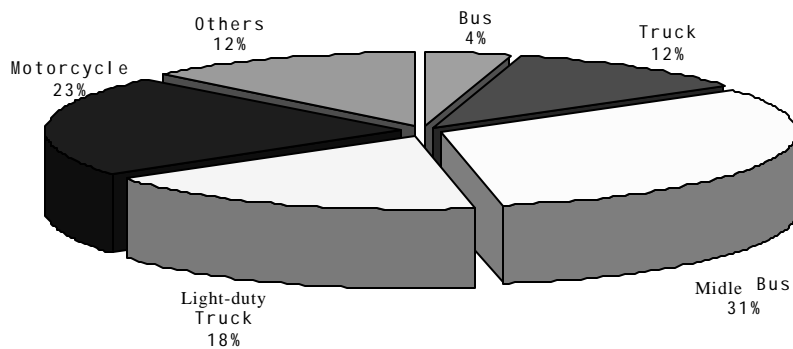
† Increase Trend of Motor Vehicle and Motorcycles in the City Proper



6

Motor Vehicle Population in Chongqing Municipality

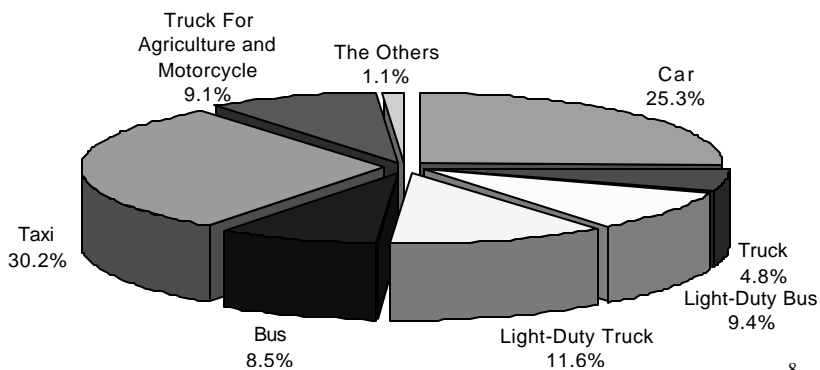
† Registration vehicle category in Chongqing proper in 2000



7

Motor Vehicle Population in Chongqing Municipality

† Composition of motor vehicle running on the road in the city proper in 2000



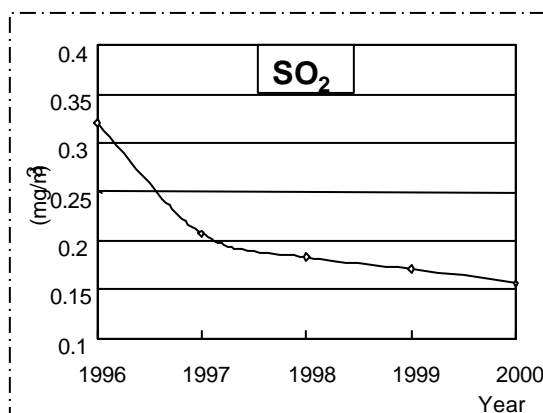
8

The views presented here do not necessarily reflect the views or position of ADB, or its Board of Directors or the Governments they represent. ADB does not guarantee the accuracy of the data included in this file and accepts no responsibility for consequences arising from their use. The term "country" does not imply any judgment by ADB as to the legal or other status of any territorial entity.

Ambient Air Quality Status in the City Proper

--annual variation of average daily SO₂ concentration

† Implementation of “Cleaner Energy Program” in the city proper lead to a great improvement of average daily SO₂ concentration in the city proper.

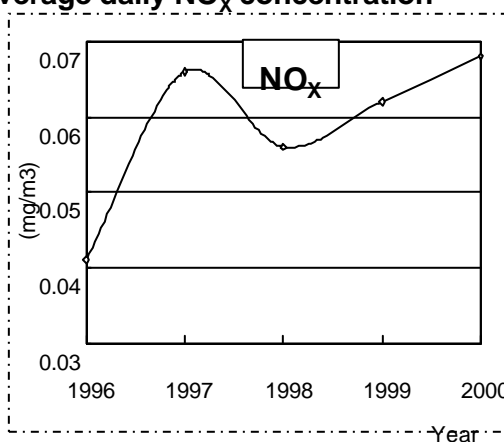


9

Ambient Air Quality in the City proper

--annual variation of average daily NO_x concentration

† In recent five years, the average annual daily concentration of NO_x has increased to 101.3%, and the standard-exceeded rate of the average annual daily increased by 13.4%, which indicates an ever-increasing pollution from vehicle emissions.



10

Ambient Air Quality in the City Proper

--Air Quality Monitoring Results in the City Proper

Air Quality Monitoring result on the Urban Area mg/m^3 (Pb: $\mu\text{g}/\text{m}^3$)

Time	Item	CO	NO _x	THC	TSP	Pb	Cars
	Std.	4.0(???)	0.1(????)		0.3(???)	1.5(????)	
May, 1998	Daily Avg.	9.70	0.67	5.34	0.86	0.99	2928
	Excd Std. (times)	1.43	5.7		1.87		
May, 1999	Daily Avg.	6.59	0.54	3.30	0.97	0.83	3139
	Excd Std. (times)	0.65	4.4		2.23		

Ambient Air Quality in the City Proper

--Effects of Vehicle Emissions on Air Quality

† The contributed shares of vehicle emission to road air pollution in the city proper:

- † CO: 85.8%;
- † NO_x: 86.3%;
- † THC: 36.6%?

12

Current I/M System in Chongqing

--Annual Test for In-Use Vehicles in the City Proper

- † In the city proper, 4 inspection stations, including 9 inspection lines for automobile and motorcycles.
- † Test items: CO, HC for gasoline vehicles, and smoke for diesel vehicles;
- † Any vehicle failed the emission test have to be repaired until they pass the retest.;
- † Annual test carries out once a year;
- † In 2000, the pass rate of the first emission test reaches 90% up.

13

Current I/M System in Chongqing

--Roadside Test for In-Use Vehicles

- † Roadside test to be done by traffic policeman and environmental monitoring staff and there are 4 test sites;
- † Monitoring items: check HC, CO and smoke emissions ;
- † If failed to the test, the driving permit will be suspended by traffic policeman, until the vehicle pass the emission retest.

Statistic Results of Roadside Test from 1998 to 2000 in Chongqing

Year	Vehicles tested	Vehicles Passed	Pass rates [%]
1998	12269	7298	58.1
1999	10027	6072	60.6
2000	10767	6791	63.1

Current I/M System in Chongqing

--Current Status of Maintenance Sector for In-Use Vehicles

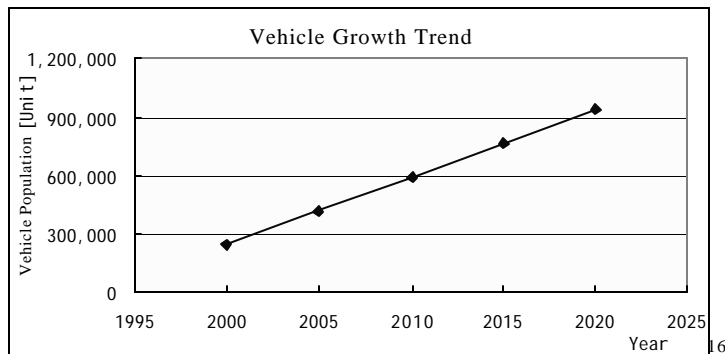
- † About 1000 repair workshops in the city proper;
- † Motor vehicles which are found to exceed standard by roadside test have to go the designated site for maintenance. There are about 10 maintenance enterprises which can basically assure the maintenance quality of emission performance.

15

Future Predication of Vehicle Population

--Motor Vehicle Development Trend

- † Comparing with the year 2000, the population of vehicle in the city proper will be double by 2006 and 3 times more by the year 2020.



The views presented here do not necessarily reflect the views or position of ADB, or its Board of Directors or the Governments they represent. ADB does not guarantee the accuracy of the data included in this file and accepts no responsibility for consequences arising from their use. The term "country" does not imply any judgment by ADB as to the legal or other status of any territorial entity.

Forecast of Vehicle Emissions

--Forecast of Vehicle Emissions in Chongqing proper

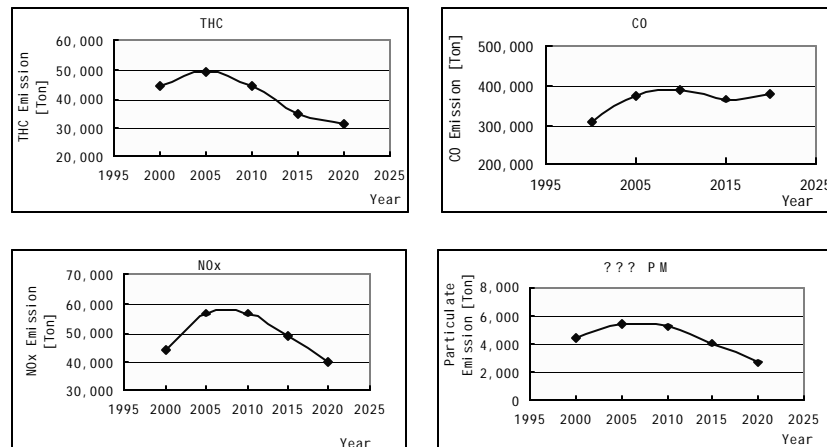


Fig. 6-2 Forecast of Total Emissions

17

Future I/M Action Plan in Chongqing Municipality

--Proposal of Future Emission Standard for In-Use Vehicles

- † Different standards and tests will be applied to vehicles with different ages and technical specifications.
- † The following emission tests are in consideration:
 - ⌘ *No-load short test*
 - *Idle / fast idle test*
 - *Idle / fast idle tests with lambda (?) test*
 - ⌘ *Steady-state loaded tests (ASM);*
 - ⌘ *Transient loaded tests (IM 195 or Vmass);*
 - ⌘ *Remote Sensing System ?*

18

Future I/M Action Plan in Chongqing Municipality

--Basic Requirements of Future Emission Test

- † Initial Inspection --Inspection for new registered vehicles**
 - † For vehicles Pre-EURO I, emission test should be conducted individually;**
 - † For light-duty petrol vehicles meet EURO I standards, only visual inspection is needed for emission control devices;**
 - † For diesel vehicles meet EURO I, it also needs free acceleration smoke measurement;**
 - † Initial inspection for those vehicles which meet EUR II will not need.**

19

Future I/M Action Plan in Chongqing Municipality

--Basic Requirements of Future Emission Test

- † Annual Inspection**
 - † For vehicles Pre-EURO I, annual test needs to be continued;**
 - † For vehicles meeting EURO II standard or new vehicles with stricter standard, test frequency can be gradually reduced for new vehicles, and the annual test can be back to normal after its running certain mileage.**

20

Future I/M Action Plan in Chongqing Municipality

--Strengthening I/M Program

- † **Increasing frequency of regular inspection (half-year or quarter inspection) ;**
- † **For those high polluted vehicles, strengthening I/M program shall be used and increase the test frequency:**
 - † **Old vehicles with serious pollution;**
 - † **Vehicles working long time daily (e.g. Taxis, buses, trucks, etc.);**
 - † **Scraped Vehicles:**
According to scrappage standard of vehicles, any vehicle approximate to scrap distance or year should be given a strengthening test.

Future I/M Action Plan in Chongqing Municipality

--Random test and retest after maintenance

- † **Random Tests**
 - † **Roadside Test**
 - † **Remote Sensing System Test**
 - † **Door to Door random test (for vehicle concentrated transportation company etc.)**
- † **Retest after maintenance**
 - † **Any vehicle failed the initial test, road test and annual test is required to conduct maintenance treatment in a deadline, and passed retest.**
 - † **Running on the road will not be permitted without passing the retest.**

Future I/M Action Plan in Chongqing Municipality --Strengthening Maintenance Management

- † **Routine maintenance** must have inspection and maintenance of emission control system available;
- † **Enforced maintenance** for the vehicles failed initial test, annual test and random tests;
- † **Trouble repair** for the vehicles with the combustion and emission system trouble should be repaired timely.
- † Maintenance criteria of emission performance for vehicles to be improved;
- † Conduct training and qualification exam for mechanics;
- † Repair workshops must be equipped with improved emission test equipment.

23

Future I/M Action Plan in Chongqing Municipality --Roles and Responsibilities of Stake Holders

- † **Municipal Environmental Agency**
 - † Main responsibilities cover the organization and implementation of I/M, permit, accreditation and supervision of inspection station for vehicles; report to the public about vehicle emission pollution regularly.
- † **Municipal Public Security Bureau**
 - † Main responsibility covers law enforcement supervision management of vehicle emissions.
- † **Municipal Communication Commission**
 - † Main responsibility covers the supervision management of vehicle maintenance sector.

24

Future I/M Action Plan in Chongqing Municipality

--Roles and Responsibilities of Stakeholders

- † **Other stakeholders involved in I/M action**
- † **Other governmental departments;**
 - † **Vehicle inspection agencies;**
 - † **Air quality monitoring institutions;**
 - † **Academic institutions, universities, academic society;**
 - † **Commercial vehicle companies,**
 - † **Vehicle Manufacturers and Repair Industry**
 - † **Finance agencies;**
 - † **NGO, citizens and the media.**

25

Future I/M Action Plan in Chongqing Municipality

--Strengthening I/M Quality Management

- † **Emission test quality assurance measures:**
- † **Improve criteria and regulations for emission test of in-use vehicle and implement a strict award and punishment system;**
 - † **A mobile supervision and a strict management to inspection institutions carried out by Municipal Environmental Protection Bureau;**
 - † **Inspection bodies must separate from maintenance workshops and inspection bodies is not allowed to undertake maintenance business;**

26

Future I/M Action Plan in Chongqing Municipality

--Strengthening I/M Quality Management

- † **Emission test quality assurance measures:**
 - † **Inspection bodies are required to inspection recording system which connects to information management center ;**
 - † **Set up a public complaint and supervision system;**
- † **Maintenance Quality Assurance Measures**
 - † **Improve maintenance technical standardization and management regulation for vehicle emission;**

27

Future I/M Action Plan in Chongqing Municipality

--Strengthening I/M Quality Management

- † **Maintenance Quality Assurance Measures**
 - † **Environmental agency implement supervision to maintenance quality of repair workshops;**
 - † **An irregular check to maintenance workshops and a strict certificate management system;**
 - † **Repair workshops shall establish repair record database connecting to the information management center ;**
 - † **Strengthening training, certificate approval and exams for mechanics .**

28

Future I/M Action Plan in Chongqing Municipality

--Establish I/M Data Management Center

- † **Chongqing EPB shall establish an I/M Data Management Center to collect and manage the I/M data. This center will,**
 - † **Establish Network for Inspection Data Management to connect with all inspection stations which provides an easy access to information, process data statistics and realize sharing of information;**
 - † **Establish Network for Maintenance Data Management to connect with all emission repair workshops, to set maintenance record database for individual repair workshops, to develop maintenance management statistics and make information exchange/feedback.**

Future I/M Action Plan in Chongqing Municipality

-- Vehicle Emission Control Activities before 2003

- † **A new regulation for vehicle emission control to be released by the municipal government. Following activities shall be enforced:**
 - † **High smoked vehicle will not allowed running in the urban area;**
 - † **The carburetered light-duty vehicles in urban area will be retrofitted either with E-controlled air-fuel ratio system and catalytic converter, or with CNG system;**

30

Future I/M Action Plan in Chongqing Municipality

-- Vehicle Emission Control Activities before 2003

- † **All diesel middle buses in the urban area will be replaced by other cleaner fuel vehicles.**
- † **By the end of this year, the number of CNG gas stations will reach 30 in the city proper, and the number of CNG vehicles will be 6000.**

31

Programs need to be supported in Chongqing

- † **Implementation of Action Plan on Strengthening I/M;**
- † **Study on comprehensive strategy to control vehicle pollution in Chongqing;**
- † **Public transportation infrastructure capacity building in Chongqing.**

32

Thank You!

33