

Legal and Regulation Challenges for Reducing Emissions from Goods Transport in China

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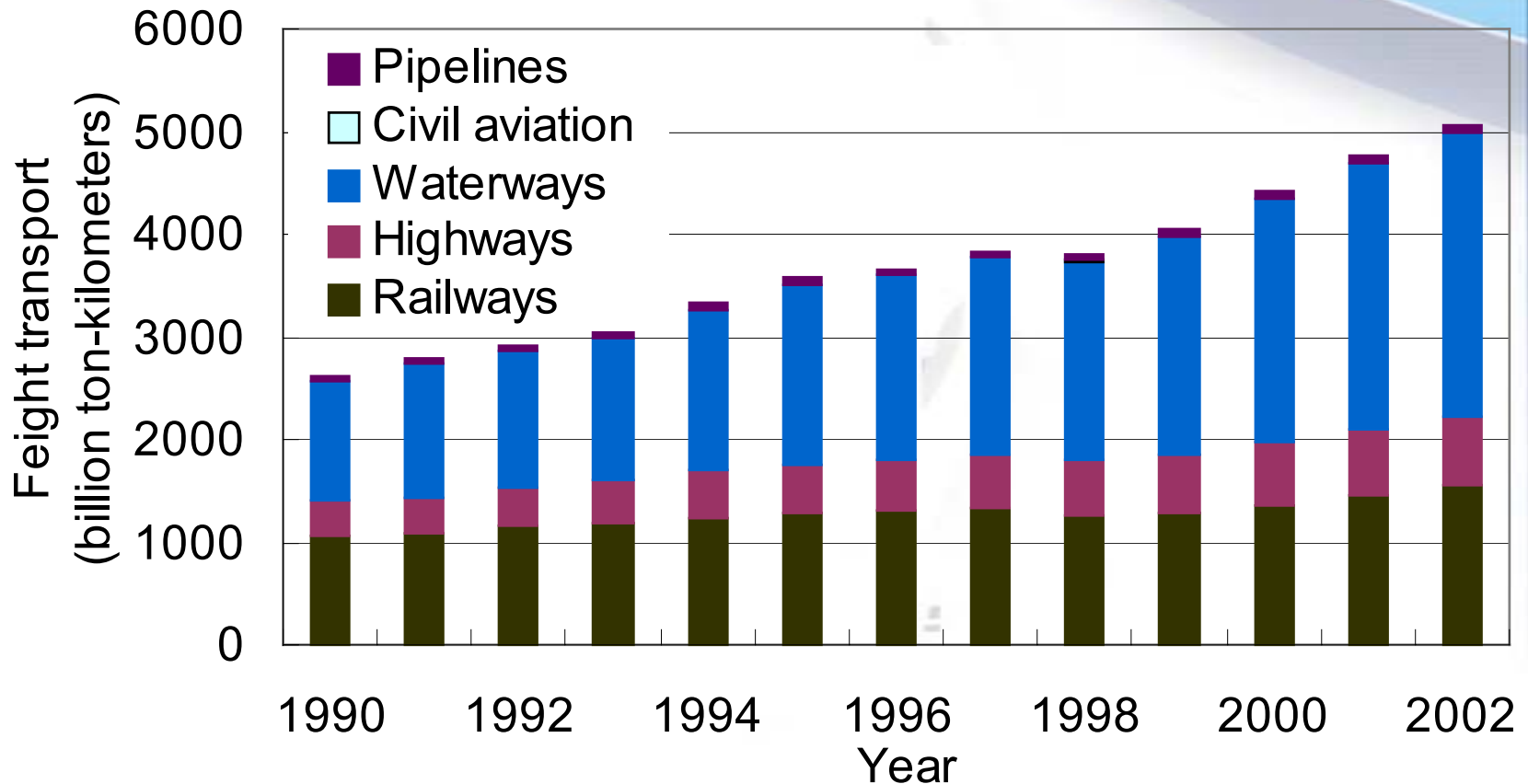
Outline

The background features a stylized map of the Yangtze River delta region, including Shanghai. The map shows the river's course, major cities like Nanjing, and various transportation routes. A red bridge is highlighted in a circular inset in the top right corner. The text 'Outline' is prominently displayed in the upper left quadrant of the slide.

- Development of goods transportation
- Progress of legislation
- Regulation System
- Implementation of rules
- Case Study
- Recent efforts

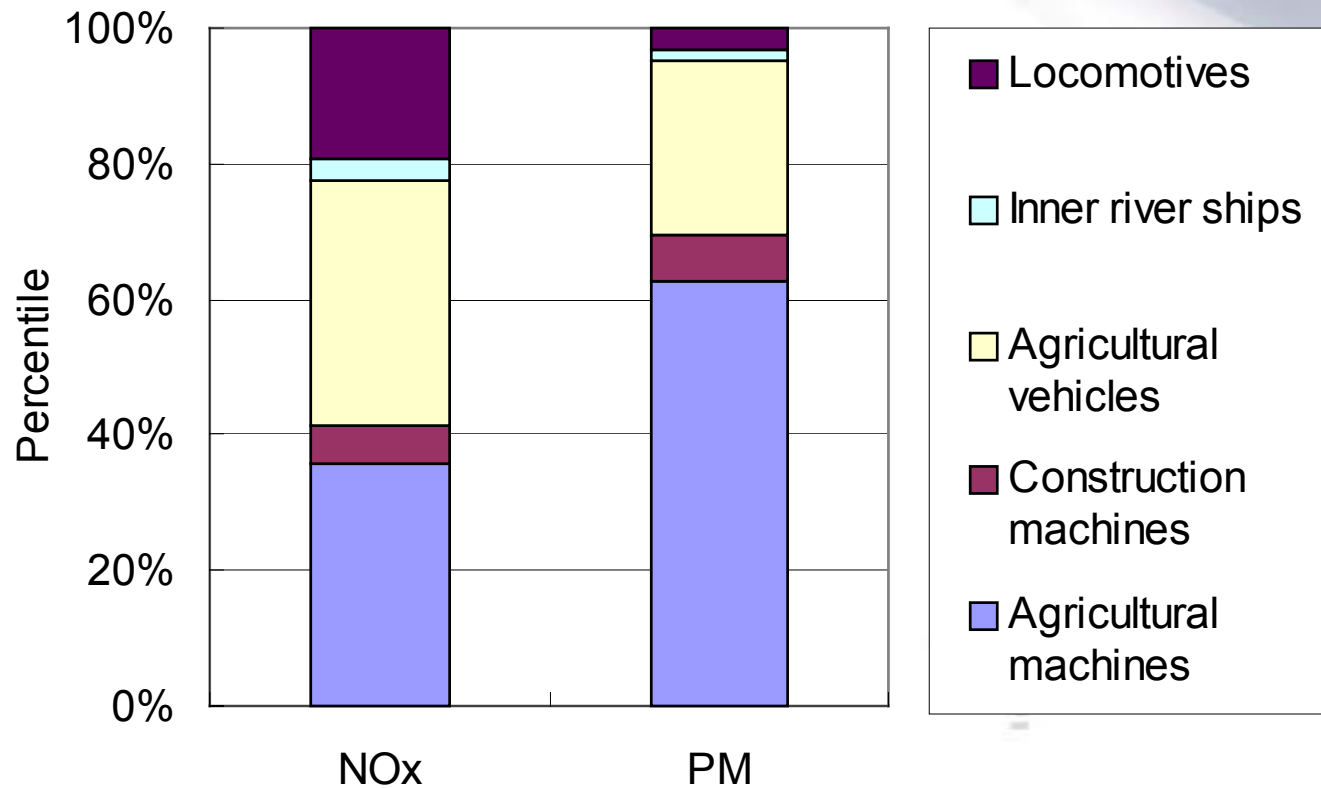
Development of goods transportation

- The nationwide freight turnover is increasing rapidly, especially in the latest 5 years. More than half of the freight turnover were transported by waterway in 2003



Emissions from off-road mobile sources in China

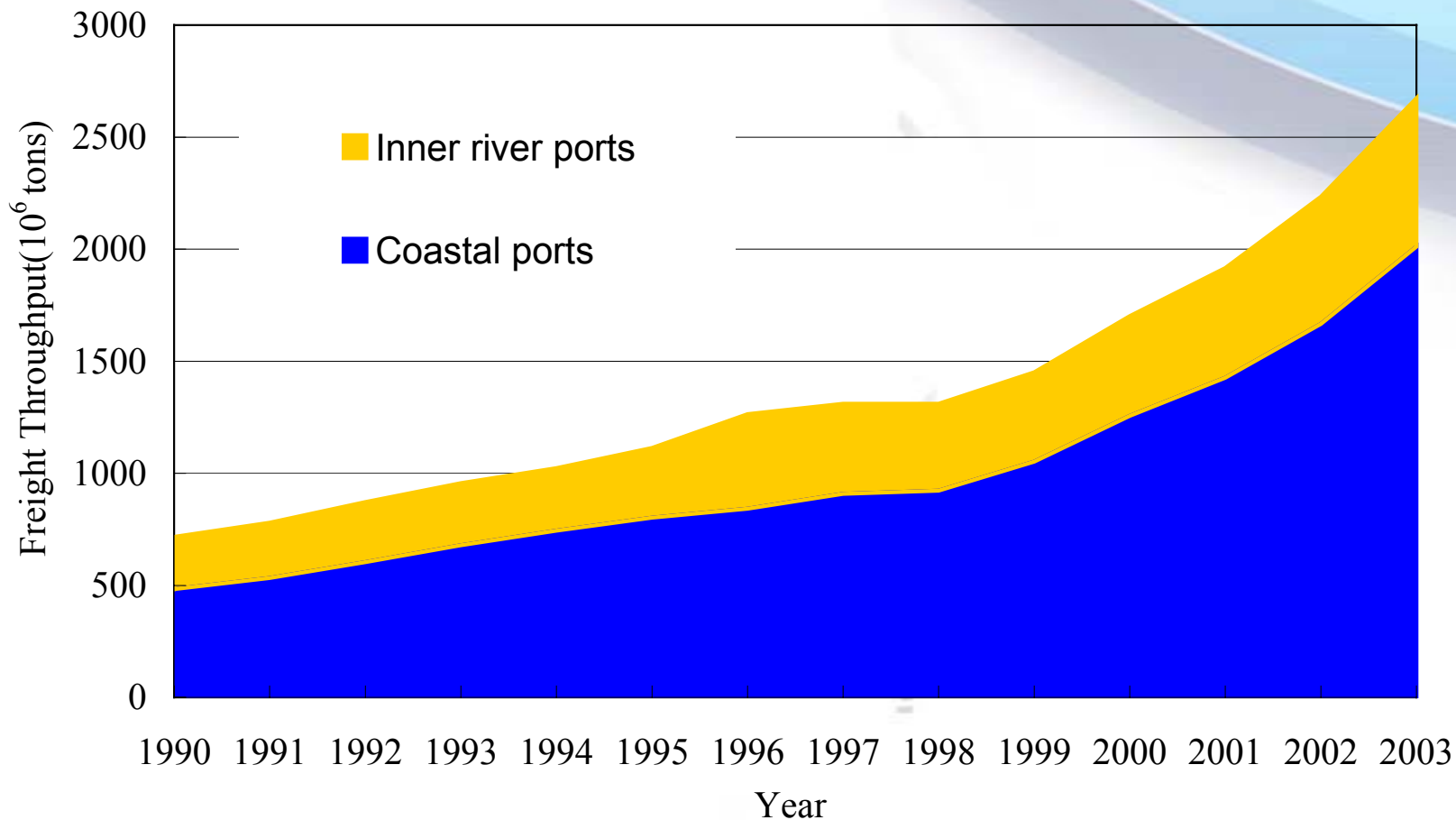
- In 2002, the NO_x and PM emissions from off-road mobile sources were 2007×10^3 tons and 184×10^3 tons (not including marine ships)



Composition of the total emissions from off-road mobile sources

Development of waterborne transportation

- The national port throughput has grown from 642 million tons (in 1987) to 2674 million tons (in 2003), at an average annual rate of 8.7%

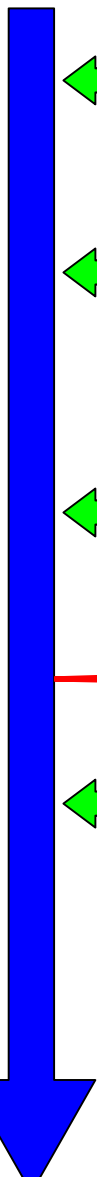



Freight Throughput of Coastal and Inner River Ports

Major container seaports of China and their rankings in the world by container transfer (2003)



Progress of legislation

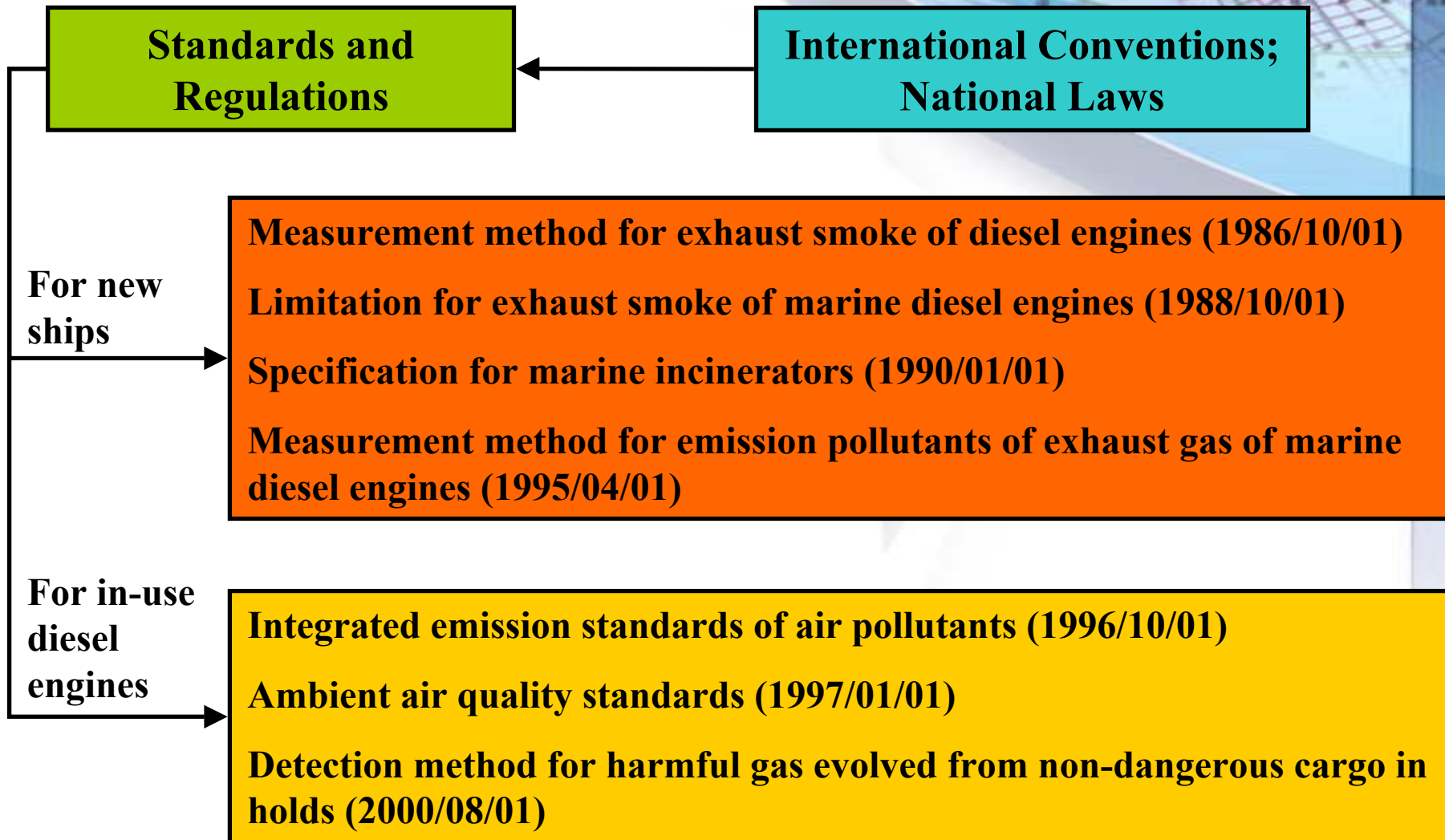
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- 1973/11/02 ← **International Convention for the Prevention of Pollution from Ships (MARPOL73/78)**
 - 1978/02/17 ← **International Convention for the Prevention of Pollution from Ships (MARPOL73/78)**
 - 1979/09/13 **Environmental Protection Law of PRC □ for Trial Implementation □**
 - 1982/12/10 ← **United Nations Convention on the Law of the Sea**
 - 1983/03/01 **Marine Environmental Protection Law of PRC □ revised in 1999 □**
 - 1983/12/19 **Regulations of PCR on the Prevention of Vessel-Induced Sea Pollution**
 - 1985/03/22 ← **Vienna Convention for the Protection of the Ozone Layer**
 - 1988/06/01 **Law on the Prevention and Control of Atmospheric Pollution (LPCAP)**
 - 1989/12/26 **Environmental Protection Law of PRC**
 - 1991/06/13 ← **Montreal Protocol on Substances That Deplete the Ozone Layer**
 - 1991/07/01 **Rules for Implementation of the LPCAP**
 - 1995/08/29 **1st Amendment of the LPCAP**
 - 2000/09/01 **2nd Amendment of the LPCAP**

Emission standards for marine diesel engine were established

Green fonts: sign date

Black fonts: effective date

Regulation System



Limitation for exhaust smoke of marine diesel engines

Displacement (L/s)	Cut point (Bosch)	Displacement (L/s)	Cut point (Bosch)	Displacement (L/s)	Cut point (Bosch)
≤45	4.5	140~160	3.4	600~700	2.2
45~55	4.4	160~185	3.3	700~900	2.1
55~65	4.2	185~210	3.2	900~1150	1.9
65~75	4.1	210~250	3.0	1150~1500	1.7
75~85	3.9	250~290	2.9	1500~2000	1.5
85~95	3.8	290~350	2.8	2000~3000	1.4
95~110	3.7	350~400	2.6	3000~5000	1.2
110~125	3.6	400~500	2.5	5000~7000	1.0
125~140	3.5	500~600	2.4	>7000	0.8

The standards are limited by smoke intensity, and the recommended measurement method uses Filter-Type Smoke-meters. Till now, there are no standards for PM from ship emissions in China.

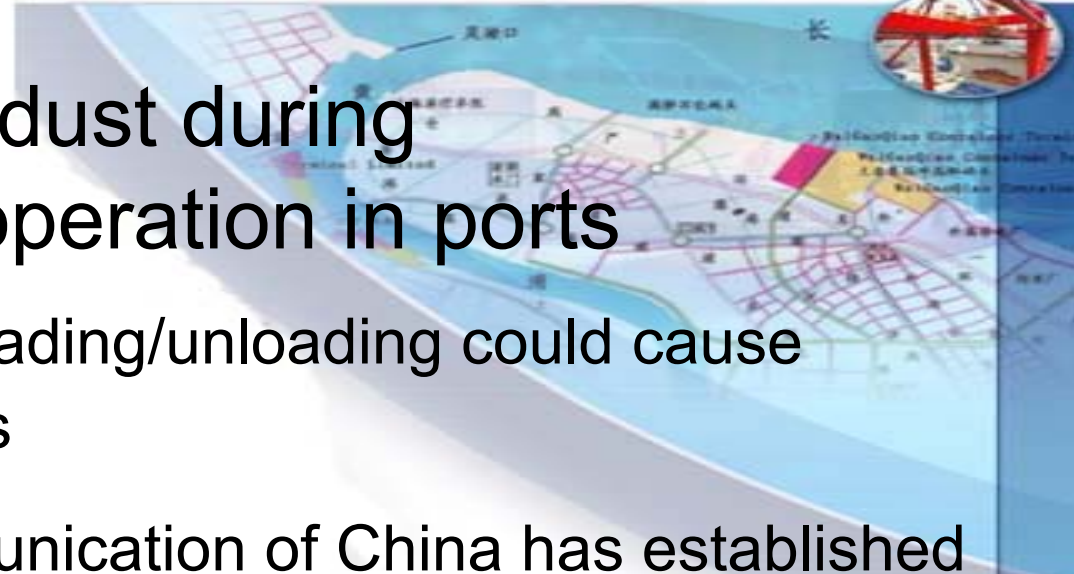


Specification for Marine Incinerators

Terms	Unit	Cut points	Notification
Ringelman black	Grade	≤ 1	
Dust	mg/m^3	≤ 200	At 0□ and 760mmHg
SO_2	kg/h	≤ 1.5	
NO_x □ NO_2 equivalence□	kg/h	≤ 0.5	
H_2S	kg/h	≤ 0.07	

The control of coal dust during loading/unloading operation in ports

- The process of coal loading/unloading could cause serious dust emissions
- The Ministry of Communication of China has established a standard to control coal dust in 1985
- For most of the machines used in ports, the limitation of coal dust concentration at operation site is 20 mg/m^3 , and that for operation area is 30 mg/m^3
- General measures, such as sprinkling and covering, are used to control the coal dust around stacks and roads
- This standard is applicable to all of the coal wharfs in China



Port State Control Report submitted to the International Maritime Organization in 1996, by Ministry of Communications of China

Number of Ships inspected during the period of reporting (only foreign ships inspected)	14674 (total)
Number of ships failed to meet International Oil Pollution Prevention (IOPP) certificate	47 (total)
(1) Without IOPP cert. or doc. equivalence	11
(2) With IOPP cert. or doc. equivalence but actually failed to meet the requirements	36
(3) Compliance rate	99.7%
Number of ships failed to meet MARPOL73/78	345 □ total □
(1) Without necessary equipment	44
(2) Disabled equipment	301
(3) Compliance rate	97.7%

Implementation of rules

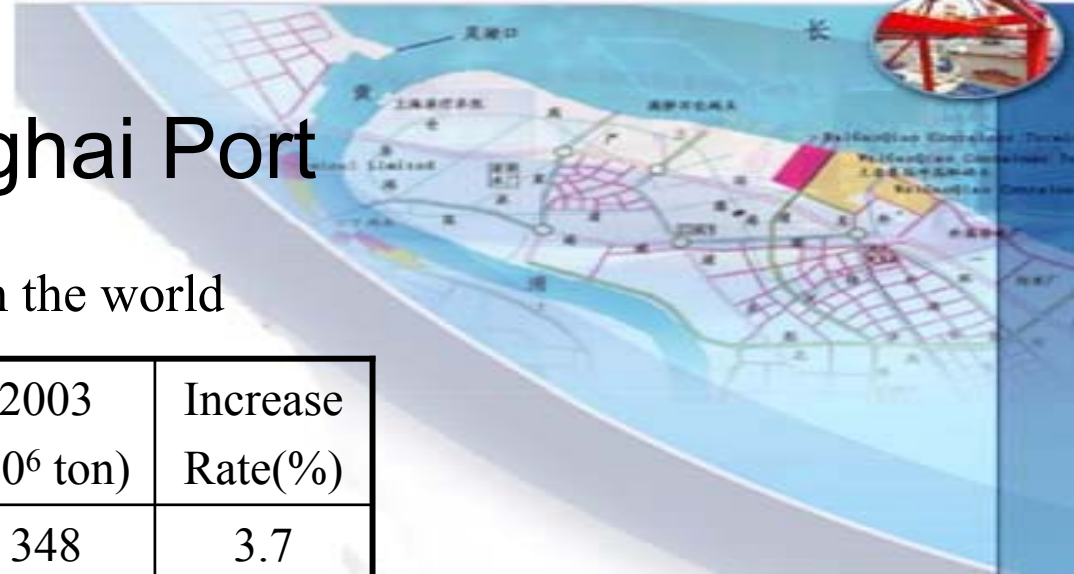
- Management of marine ships:
Marine Affairs Bureau
- Management of inner-river ships:
Harbor Superintending Office
- Management of Ports:
Port Authority
- Administration of those regulations involved with ship emission control is usually implemented by harbor superintending office



Case Study □ Shanghai Port

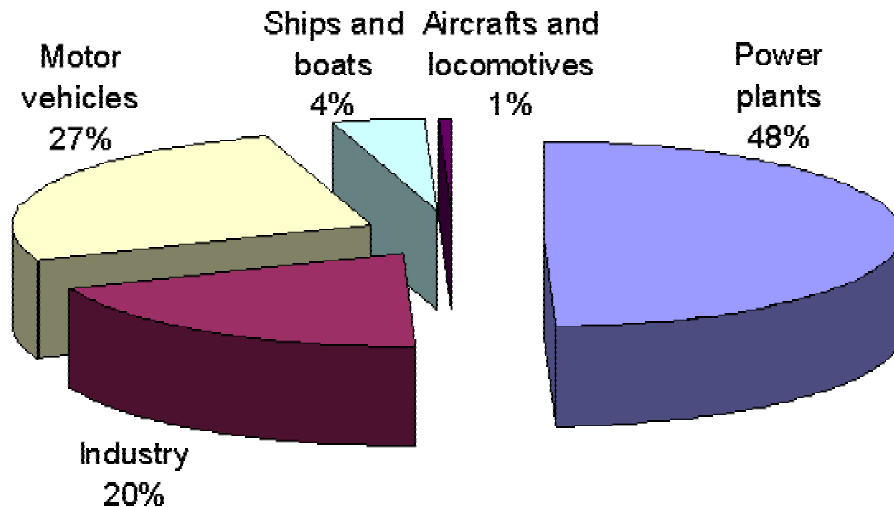
Freight throughput of main ports in the world

Size	Port	2002 (10 ⁶ ton)	2003 (10 ⁶ ton)	Increase Rate(%)
1	Singapore	335	348	3.7
2	Rotterdam	321	328	1.8
3	Shanghai	264	316	19.8
4	South Louisiana	259	239	-7.9
5	Hong Kong	193	208	7.8



Air pollution in Shanghai

- PM and NO_x are main pollutants in Shanghai
- Exhaust pollution is getting more and more serious in recent years
- The government has made great efforts to reduce emissions from stationary sources and vehicle exhaust, however, emission from ships are usually neglected



Share Responsibility of NO_x Pollution
in Shanghai in 1998

- The emission inventory of air pollution from ships will be established this year in order to estimate whether it is necessary to provide land-use power for ships in Shanghai Port

NOx emissions from ships in Shanghai Port in 1998 (tonnage<3000t)

Category	Number (ships/a)	Time of stop in Port (hr)	NOx Emission	
			t/hr per ship	t/a
Container ships	2706	24	0.0359	194
Bulk Carriers	12751	24	0.0339	864
General Cargo ships	82120	24	0.026	4270
Roll ships				
Other Transport ships				
Passenger-cargo ships	35870	12	0.038	2726
Other ships				
Special vessels				
Tankers ships	16616	24	0.0335	1113
Total	150063			9168

Source: Fu Qingyan, The Status Quo and Share Responsibility of NOx Pollution in Shanghai, 1998



Coal dust during coal loading



Exhaust emissions from passenger ships



Emissions from the trucks in the port



Operation room of the conveyor belt

Some photos taken in Zhujiamen Wharf of Shanghai Port

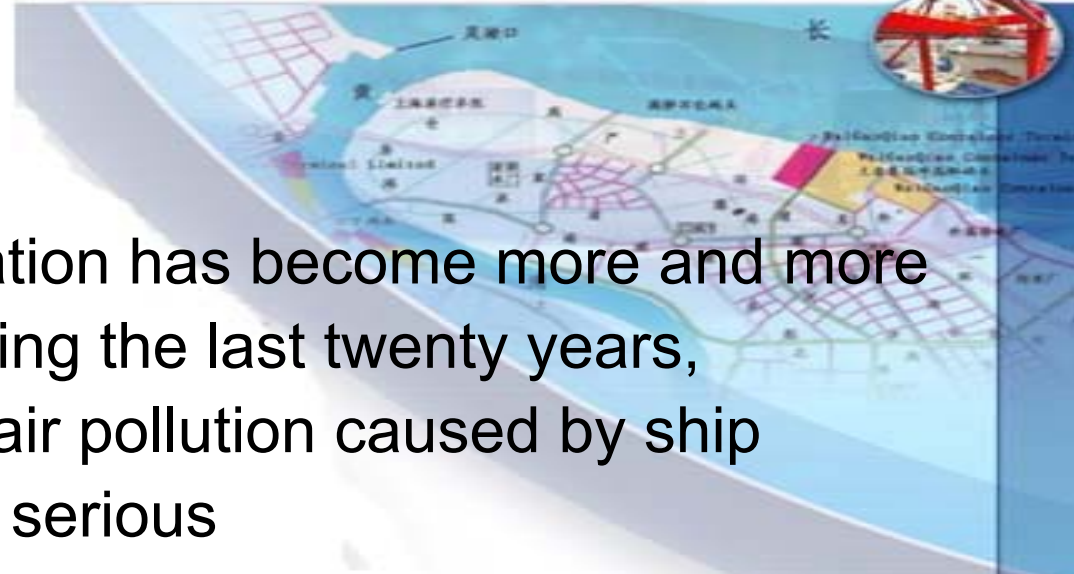
Recent efforts

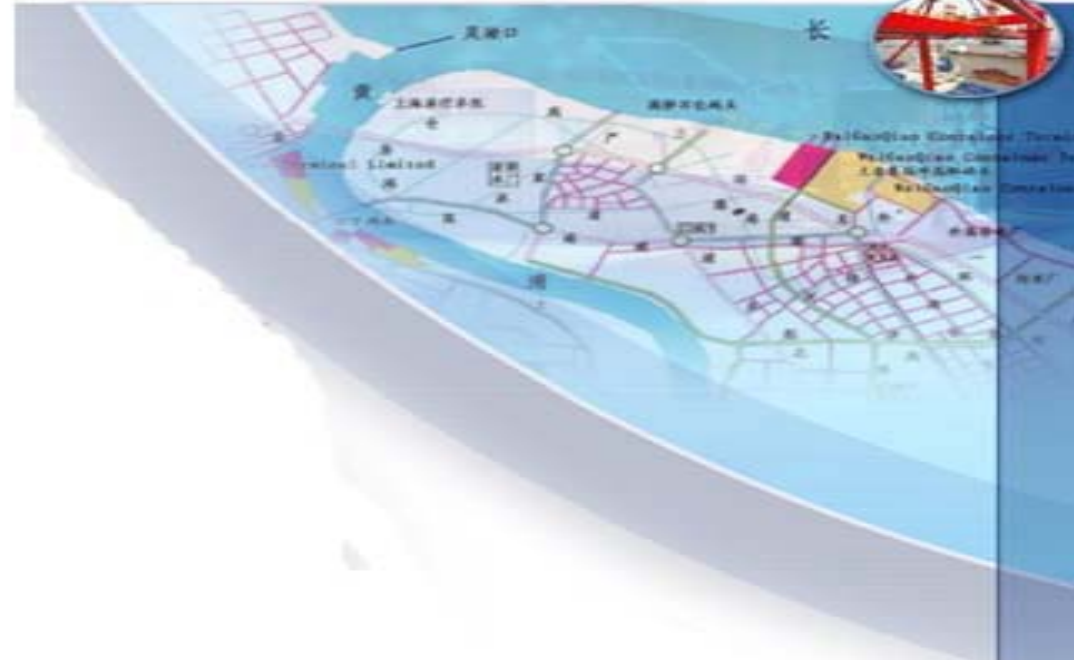
- Annex Six of MARPOL 73/78 will be effective in 2005:
the challenge and also the chance in pollution control for ships in China
- State Environmental Protection Administration (SEPA) has organized a research on emission inventory of vehicles and ships in China in 2003, to improve the system of emission standards for mobile sources
- Tsinghua University, Waterborne Transportation Institute of the Ministry of Communications, Chinese Research Academy of Environmental Sciences have joined in the research.



Conclusion

- Waterborne transportation has become more and more important in China during the last twenty years, At the same time, the air pollution caused by ship emissions was getting serious
- Legislation aiming at air pollution control for ships can not meet the requirements in China
- Basic research of ship emissions is weak, both statistic data and experimentations are short
- The duty of management and monitoring is not clear, which makes the emission control more difficult
- Regulations and researches on the ship emissions in China are far away from the expectation and must be improved in the future





Thank You!

Welcome for questions and comments!