

Strategies for effectively reducing air and noise pollution in Xi'an

In order to build a typical environmentally friendly ecological livable international city, Xi'an government attaches great importance to environmental protection, which put in the forefront of urban management as the important livelihood projects. With the help of the science, technology and strict management for reducing air and noise pollution, the degradation of the air quality and noise environmental quality has been effectively curbed, and gradually improved, in the rapid economic development and the scale urban construction being expanded.

1、 Air and noise pollution prevention in Xi'an

1.1the Feature of atmospheric pollution

Xi'an is located in Guanzhong Basin in the middle of the Yellow River in China. with a warm and humid continental monsoon climate, it has an average annual precipitation of 566 mm and wind velocity of 1.8 m/s.

Currently, Xi'an is one of the most serious air polluted cities, $PM_{2.5}$, PM_{10} is the main problems of environmental pollution. Studies have shown that the top three anthropogenic sources of atmospheric pollution are motor vehicle exhaust, coal-fired flue gas, constructive sites and road dust, which accounting for more than 75% of total anthropogenic pollution.

In 2013, the annual average concentration of Particulate matter (PM_{10}) was $190\mu g/m^3$, the fine particulate matter ($PM_{2.5}$) was $105\mu g/m^3$,

and nitrogen dioxide(NO_2) was $57\mu\text{g}/\text{m}^3$, which are 1.71, 2.00 and 0.42 times more than the national secondary standard. Only the annual average concentration sulfur dioxide (SO_2) ($46\mu\text{g}/\text{m}^3$) met the secondary standard. The number of good air-quality-days accounts for 37.8% of the whole year.

1.2 The status of noise

1.2.1 Functional Area Noise: In 2013, noise at daytime all meet the standard, except for education residential area and industrial concentration area, noise at night didn't meet the standard, the lowest noise at night was in the special residential areas and education residential area, and the highest noise at daytime is at the both side of the roads.

1.2.2 Regional environmental noise: The noise was 55.3 dB at daylight and 48.1 dB at night, which can be confirmed as second-level according to the Traffic Noise Quality.

1.2.3 Traffic noise: The noise was 68.2 dB at daylight and 59.9 dB at night, which can be confirmed as second-level according to the Traffic Noise Quality.

2、 The prevention measures of air pollution and noise pollution of Xi'an

2.1 The prevention measures of air pollution and noise pollution of Xi'an

2.1.1 The government pays more attention to prevention and control

works of air pollution

Xi'an government always adhere to the environmental protection work in an important strategic position in economic and social development, by a series of the synthetically control measures such as adjust the industrial structure, control strictly environmental access, eliminate backward production capacity, promote clean energy, speed up the ecological construction and implement the policy of easing traffic jam and keeping unblocked to promote actively the prevention and control of air pollution.

2.1.1.1 Determine the objectives and tasks of pollution controlling every year. In 2012, in order to improve air quality, Xi'an government printed and distributed the “The work planning of overall improving environmental air quality in Xi'an city (2012-2020)”, making the work targets, key tasks, and safeguard measures to be clear. from 2013, “Implementing scheme of controlling pollution and reduction haze” can be drawn up every year, in which index of reducing air pollutants, decomposing and tasks of pollution control are determined

2.1.1.2 Carry out responsibility-ascertained system of air pollution prevention. Establish grid management system of the prevention and control of atmospheric pollution in base on community, village as nodes, sub District Township as the basic unit, clear responsibilities of controlling pollution and reduction haze at each nodes and units. Any

government department which can not finish the task should be punished.

2.1.1.3 Increase environmental protection investment. In 2013, the air pollution control funds were given 570 million yuan to Xi'an city by the central and provincial governments. Meanwhile, Xi'an fiscal systems invested special fund nearly 10 billion yuan for water and air pollution prevention, each district and county governments, each development zone management committees had expenditure 1.2 billion yuan totally at works of controlling pollution and reduction haze.

2.1.1.4 Strengthen the scientific research for prevention and control of the atmospheric pollution and the law enforcement and supervision work. The environmental protection department, the science and technology department, the meteorological department, and the other departments, are joint researching on the prevention and control technology of the atmospheric pollution to improve the air quality forecast and contingency plans which will provide strong support for the prevention and control work. Strengthen the joint law enforcement and supervision of atmospheric pollution and the daily supervision of the key areas, the key industries and key enterprises. Investigate and solve the difficult and major issues of the atmospheric pollution that the masses feel strongly about.

2.1.2 Varieties of measures to control the atmospheric pollution.

2.1.2.1 Strengthen the comprehensive pollution prevention. We will

combine the atmospheric pollution control work, the urban planning layout, the economic structure adjustment, the ecological civilization system reform ,and other tasks, to improve the air environment quality fundamentally. According to the conducive to the atmospheric pollutants diffusion theory to optimize the urban space layout. The industrial enterprises will be moved step by step from the urban area to the corresponding industrial parks , and the circular economy demonstration area will be constructed in there. To improve the environmental barriers to entry and execute the strict examination and approval mark.

2.1.2.2 Improve the eco-construction. Enact the “creating national forest city act (2014-2016)” and the program “eight rivers surrounding Xi’an ” , to build Xi’an to a national ecological garden and national forest city. Increasing the eco-construction of The Great Water and The Big Green for The Big Xi’an constantly to increase the environmental capacity.

2.1.2.3 Strengthen the coal pollution control. The new coal boiler will not be built within the scope of Xi’an and the coal which is not up to standard must not be entered into the market in Xi’an. The main coal-fired boils below 20 ton vapor have been basic dismantled and the flue gas of the existing coal-fired boils will be implemented the stricter emissions standards.

2.1.2.4 Strengthen management of dust pollution. All the

construction sites in the city should comprehensive upgrade and standardize the prevention and control work of the dust pollution. Set and implement the standard of the road dust pollution prevention and control work. All the city's main artery must be mechanical cleaned and the road barriers, the dustproof belt, the green belt of trees will be washed.

2.1.2.5 Strengthening of motor vehicle exhaust pollution control. Improving the public transport , To speed up the "yellow label cars" and the elimination of outdated vehicles, control the new motor vehicle emission, Improve product quality, reduce the exhaust pollution of motor vehicles

2.1.2.6 To strengthen pollution control of volatile organic compounds. To carry out a comprehensive renovation of petrochemical, volatile organic compounds in organic chemical industry. Encourage the production, sale and use of low toxicity, low volatile solvent.

2.1.2.7 To strengthen the management of biomass burning behavior. The ban burning straw, garbage and sundries, reduce the discharge of fireworks and firecrackers and other measures, reduce the biomass, rubbish burning on atmospheric pollution.

2.2 Prevention and control measures of noise pollution

2.2.1 Formulate laws and regulations, providing powerful support.

"Provisional Regulations of Environmental Noise Management in

Xi'an was promulgated in September 1985 ". The law "noise of the people's Republic of China" was implemented in 1997, 2013 " environmental noise pollution control regulations "(draft) was began drafting.

2.2.2 Monitoring and mastering sound environmental quality status and trends

2.2.2.1 Carry out the city's functional area noise monitoring, the special residential areas, residents of cultural and educational area, industrial area and industrial areas and residential, commercial, industrial complex in the area of each quarter throughout the year a total of 1 times, 4 times the sound environmental quality monitoring.

2.2.2.2 Doing regional environmental noise monitoring once a year in the region of 200 noise monitoring points, the night regional environmental noise monitoring was done for the first time in 2013.

2.2.2.3 Carry out traffic noise monitoring about 156 points on the road in daytime and night.

2.2.2.4 Carry out the creation of noise compliance areas, to encourage and promote the whole society to concern and participation in pollution control work of the sound environment of the city.

2.2.3 Use environmental complaints hotline to solve noise pollution problems.

According to the statistics from Xi'an environmental hotline 12369,

noise pollution complaints accounted for over sixty percent of the total complaints number .Among these construction noise complaints accounted for more than sixty percent too, which reflects the noise pollution characteristic in the period of urban great construction and high-speed development.

Therefore, it is very important to strengthen the regulation and governance of construction noise pollution. First, according to national "construction sites environmental noise emission standards", constrain the noise emission in the process of construction from the management level. Second , impose excessive sewage charges for construction sites , which could urge and encourage construction units to control and reduce noise pollution consciously by Economic leverage.

2.2.4 Take various measures to solve the problem of noise pollution

Aimed at the emphasis of noise pollution and the hot issues people concerned about, such as industrial and commercial entertainment noise pollution, the noise nuisance in the midnight, horns noise pollution problems etc. , Xi'an formulated a series of strict and perfect management measures pointedly to shut up the sources of noise generation from system aspect.

2.2.4.1 Management lead, strictly implement the specifications of noise management strictly. Implement the system of environmental

impact assessment and examination approval for new projects. For the projects with noise pollution hazard, control with constraints from the source of examination and approval and don't "add noise" to the city. For industrial and commercial entertainment noise pollution, according to national standards, use the regular inspections and random checks combined methods, so that management could play a front and leading role in the prevention and control of noise.

2.2.4.2 Strengthen supervision to reduce the noise of the construction at night. For noise nuisance at night, stipulate every night from 22:00 P.M. to 6:00 A.M. the next day. Stop all construction operations that generate noise. For environmental protection departments, strengthen inspections and eliminate the approval of unnecessary nighttime construction to reduce the impact of noise pollution.

2.2.4.3 Designate the no vehicle honking area to purify urban sound environment. As for noise of car honking, designate the no honking area throughout the city. Also, the illegal honking vehicles will be administrated and punished by the traffic police department.

2.2.4.4 Utilize science and technology, the implementation of scientific noise. Encourage the development and promotion of the use of low-noise technology in the construction and industrial production; take science noise reduction measures, including the rational planning of urban roads, the use of composite construction low noise road surface,

updated low-noise vehicles, city building facades with low reflection high absorption the design and building materials. Planting trees and grass on both sides of the road while reducing noise in the sensitive sections of the installation of professional sound barrier, the implementation of scientific noise.

3、 problems and future work plans

3.1 Currently air and noise pollution problems

3.1.1 Noise pollution problems :

3.1.1.1 Continue to increase noise pollution, pollution complex overlay, to put forward a more sophisticated governance requirements;

3.1.1.2 Road traffic noise pollution outstanding, the total number of the city's nearly two million motor vehicles, traffic noise impact pressure on the urban sound environment even more prominent;

3.1.1.3 noise pollution disturbing problem continues to heat up. 2013 compared with the previous year, the amount of construction noise complaints rose 21.85%.

3.1.2 Problems of air pollution:

3.1.2.1 Environmental research is weak, the formation mechanism of the complex air pollution, the impact of many factors, the current "three

clear" lack of capacity, and technology support capability is weak.

3.1.2.2 Pollution management assessment UNEVEN, focused on pollution management, but the responsibility for environmental management accountability account ability is weak.

3.1.2.3 Motor vehicle exhaust arduous task of governance, pressure exhaust pollution caused by the city's nearly two million vehicles continued to improve.

3.1.2.4 Coal dust pollution and pollution prevention to be done. The city's total coal consumption, a high proportion (about 14 million tons in coal), and also about 10 percent annual growth rate; dust pollution rebound is difficult to cure, the regulatory mechanism is not in place, the drawbacks of multi-bull management, department of convergence loopholes, prevarication and more responsibility, lack of road mechanized cleaning ability.

3.2 Further working plan

3.2.1 The control plan of noise pollution

3.2.1.1 Improving the laws and regulations about the noise pollution, focusing on the draws and regulations of "management and regulations about the noise pollution in Xi'an", which should be authorized and issued through the government as soon as possible.

3.2.1.2 Scientific planning. To adapt to the development and changes of the city, redrawing the sound environment function areas, adjusting the city traffic noise monitoring points,.

3.2.1.3 Strengthen the construction of ability of noise automatic monitoring; The daily regulation should be fine and responsibility. Focus on the prevention of the noise pollution of construction site, industry and traffic, reducing noise pollution complaints.

3.2.2 Air pollution control plan

3.2.2.1 Doing scientific research, analyzing the polluted source of PM_{2.5}, providing technical support for pollution control.

3.2.2.2 Strengthen the assessment of concerned government department, improving the work ability and efficiency for the control of air pollution

3.2.2.3 Deepen the motor vehicle pollution prevention. Increasing the controlling ability of “yellow label cars and those heavy polluting vehicles”, strengthen the supervision of gasoline quality, accelerating of eliminate old vehicles, speed up the development of public transport.

3.2.2.4 Strengthen the supervision of the air polluted source. Proving the use of high quality coal, to ensure the efficient of the “dust, sulfer and nitrate –removal facilities of the boilers.

3.2.2.5 Strengthen the prevention and control of dust pollution. Speed up the clinker convey vehicles refitted, using the engineering technology to control dust. Increase the sweeping cleaning equipment; improve the quality of road cleaning.

3.2.2.6 Strengthen the propaganda and guidance. Strengthen the publicity and education of enterprises and institutions, businesses, and the masses , making people understand the laws and regulations about the urban management and environmental protection, give great importance to the relationship between environmental quality and social life quality. Getting people's understand and support on pollution prevention and control work, and the active participation of the whole society.