Research on Green Construction Noise and Dust Monitoring and Management

Tianli Wang

Beijing Polytechinc College, Beijing, 100042, China

Keywords: Noise and Dust Monitoring, Management Method, Green Construction System

Abstract: According to the concept of green construction, applying analytical research, summarizing and other methods, it puts forward quantitative requirements and controls the important indicators in the green construction process, and points out the responsibilities and obligations of the government, developers, construction parties and other relevant departments. Through the optimization of specific measures for implementing green construction, the green construction system was discussed.

1. Introduction

China's existing standard GBT50460-2010 “Construction Engineering Green Construction Evaluation Standard” according to different construction stages, in accordance with the “four sections and one environmental protection” five elements, the construction site dust and noise have made relevant management regulations, but did not propose specific Technical control indicators. The “Green Code for Construction Projects” stipulates the dust emission height in the construction operation area and the environmental noise day and night emission limit of the construction site boundary. In general, domestic research and standards mainly focus on the environmental emission values of dust and noise, and there are few studies on their corresponding exposure values. They only stay in the stage of qualitative analysis. The proposed management methods are not supported by on-site monitoring data. Targeted. In order to compare the building noise and dust exposure values of different construction processes, this paper selects a prefabricated concrete structure (prefabricated construction process) and cast-in-place shear wall structure (prefabricated construction technology) in Shanghai. In contrast, in the summer breeze conditions, the same height of the floor (about 20m), on-site inspection of noise and particulate matter generated by the construction, to obtain the main pollutant components to distinguish the advantages and disadvantages of the two construction processes. And put forward targeted solutions for the noise and dust that exceed the standard on the spot.

2. Indicator Control and Management

In the construction process, the treatment of dust is the most important. There are many instruments for measuring dust, such as dust meters, dust monitors, and dust monitoring systems. The best of these is the dust monitor, which is an instrument that measures the concentration of dust and has a small error. Based on the characteristics of dust during construction, the error of the measuring instrument should be $\leq \pm 10\%$ when selecting the instrument; the total dust concentration should be measured from 0 to 1000mg/m3. The national environmental quality standards stipulate that the daily average concentration of residential areas should be less than 0.3mg/m3, and the annual average concentration should be less than 0.2mg/m3. According to the green construction guidelines, in the earthwork operation stage, measures such as watering and covering are adopted to achieve the visually measured dust height of the working area of less than 1.5m and not diffused outside the field. In the stage of structural construction, installation and decoration, the dust height in the working area is less than 0.5m. The difference between the monthly average concentration of total suspended particulate matter (TSP) and the urban background value measured at the height of the barrier around the field is not more than 0.08 mg/m3. Therefore, the author suggests that the dust content interval should be controlled within the range of 0 to 0.38 mg/m3 during the

  DOI: 10.25236/mfssr.2019.056

construction process. If the measured value exceeds the recommended range, refer to the treatment measures for reducing dust in green construction.

In general, night construction is not allowed. If the construction is not exceeded, the implementation limit is 15dB. When measuring noise, according to the national standard "Measurement method for noise of building construction site boundary" (GB/T12524 ~ 90), the measuring instrument uses integral sound level meter HS5618A/HS5628/HS5628A and noise statistical analyzer HS6288E/HS6298/HS6298A/HS6298C. According to the general regulations, the position of the measuring point is suspended 1m outside the construction site and the height is more than 1.2m. However, when there is a wall around the measuring field and there are affected noise-sensitive buildings around, the measuring point should be selected outside the field. 1m, above 0.5m above the wall, if the distance between the outer boundary of the noise source and the sensitive building is less than 1m, measure inside the building. When making noise measurements at the construction site, it will definitely be interfered by other noises, that is, affected by background noise, so the measured values should be corrected. The correction rule is given: if the background noise value is lower than the noise measurement value by more than 10dB, the measured value is not corrected; if the difference between the two is 3~5dB, the background noise value is rounded off by the noise measurement value; if the phase difference is less than 3dB , measures need to be taken to reduce the background noise, otherwise the measurement is invalid. If the measured value exceeds the noise limit, it must be controlled in accordance with noise control measures, which are not discussed in detail in this chapter.

3. Main control measures

The concrete of the road in the field is hardened, the water is sprayed regularly, the main road is arranged with sprinklers, the branch road is arranged to push the sprinkler, the boundary part is equipped with artificial spray facilities, the exposed open space is greened or covered with dust net. There is a vehicle automatic flusher at the gate, and a wet dustproof felt is placed outside the gate to prevent mud on the road. Install the tower crane spray dust-reducing device to spray dust on the working surface. When excavating and backfilling the earthwork, cover and sprinkle water to ensure that all exposed earthwork is covered with moisture and reduce dust. Install a closed vertical transport garbage lane. The garbage in the floor will be transported to the bottom floor through the closed garbage road, or the bagging and closing will be lifted by tower crane. When transporting garbage and earthwork, take strict cover measures to prevent spillage. Use pre-mixed mortar to prevent dust from being generated by mixing. The scaffolding is completely enclosed by a dense mesh to block the dust inside the building. The dense mesh network is regularly sprinkled with water to clean the contaminated old net every month. When the scaffolding and the dense mesh are removed, the water is first wetted and then removed to eliminate dust. Clean the debris in the steel bar with a vacuum cleaner to avoid the dust caused by the traditional hair dryer cleaning method. Carry out PM2. 5 and PM10 monitoring, compare the scene dust situation with the city background data, if the city background data is exceeded, immediately strengthen the dust suppression measures. The processing area is equipped with a fully enclosed soundproof room to reduce noise emissions. Templates, wood, tiles and other materials are all cut in the processing area, avoiding cutting in the field. Set the speed limit card and prohibit the number plate on the spot to reduce noise emission. There are 1 noise monitoring points in the middle of the surrounding walls of the east, west, south and north of the construction site near the processing area and the gate. A total of 5 noise monitoring points are set up for dynamic monitoring and timely correction.

Develop tower crane spray dust reduction and cooling device. Pipes and nozzles are installed on the boom of the tower crane, and the multi-stage pump is used to transport the water to the boom, and the water mist is sprayed through the nozzle. As the tower crane boom rotates, the water mist covers the entire working surface, humidifying the air, and achieving dust reduction and cooling. The role of effective control of construction dust. Moreover, by spraying with atomized water, the collected rainwater is used twice, which greatly improves the water use efficiency. Stone gravel on the corner of the construction site next to the construction project or self-made water-permeable

floor with cement bricks can prevent dust from being dusted and green, and reduce the disturbance to the original soil. Effectively communicate with the construction, design, and supervision units to carry out secondary design. For example, in roof construction, change the position of the roof insulation layer, reduce the 20 mm thick fine stone concrete screed, and reduce the dust and noise emissions. Increase the proportion of factory production. Draw CAD bricks in advance, measure the number of irregular tiles, customize to the factory, and factory production to prevent noise and dust from being generated on site. Customize the different sizes of airing blocks to the manufacturer to reduce on-site cutting and greatly reduce dust and noise emissions.

Harmful substances polluting the atmosphere will be generated during the construction process, mainly including construction dust and exhaust emissions. In the construction organization design prepared by the construction unit, it is necessary to formulate corresponding construction plans according to the construction links that may generate harmful substances, and reduce the air pollution during the construction process. Dust is the primary factor affecting the atmospheric environment. The following control measures are taken for the cause of dust generation, including the establishment of a sprinkler cleaning system at the construction site, equipped with sprinkler equipment, and a special person is responsible. If the amount of concrete works is too large during the construction of the project, the concrete must be mixed or concrete mixed at the construction site when the cumulative amount of concrete exceeds 100m3. The established mixing station should be closed, and the sealed bulk cement should be used to configure the dust-reducing device to reduce dust. Measures such as tree planting and beautification can be used to reduce dust. In the case of windy weather with four or more levels, earthwork backfilling, transshipment, and other constructions that may cause dust pollution are not allowed. A garbage station will be set up at the construction site to sort, recycle and clear the on-site garbage station in time. The high-rise buildings can be equipped with closed temporary special garbage or container transportation.

Energy conservation measures should be established at the construction site to improve energy efficiency. Try to adopt a construction technology with advanced technology and low energy consumption, and choose energy-saving equipment when selecting equipment. When arranging the construction process, priority is given to the use of electrical equipment resources. Regular maintenance and maintenance of the equipment to ensure normal operation of the equipment, reduce energy consumption, and do not waste energy due to abnormal operation of the equipment. Establish electricity consumption control indicators for production, living, office and construction equipment. The design and location of the temporary facilities and the construction area are determined according to the personnel configuration in the construction organization design, and the corresponding written materials are formed. The earthwork excavation construction adopts advanced technical measures to reduce the amount of earthwork excavation, minimize the disturbance to the land, and protect the surrounding natural ecological environment. Temporary roads are reasonably set according to site construction requirements and fire protection requirements. Use and protect the original green vegetation within the scope of construction land. For the site with a long construction period, the site shall be newly built for greening according to the requirements for permanent greening of the building.

Improve the construction process, reduce unnecessary material consumption, recycle construction waste generated during the construction process as much as possible, and improve the construction process to save material consumption; scientific management of construction materials, construction materials must be selected the green principle is to save as much material as possible. Use recyclable materials whenever possible. Recyclable materials can reduce the amount of construction waste generated and save resources. Pay attention to the construction quality during construction, and good construction quality can extend the service life of the building.

4. Conclusion

Through the above analysis and evaluation, the green construction management system was initially established. Green construction is a new concept and new trend in the development of the construction industry. Taking the road of green construction has taken a new step in sustainable

development. Based on this green construction management model, all sectors of society should respond and do our part for this work.

References

[1] Xiao Yuzhen, Hu Chengyou, Zeng Ying. Research on Green Construction Noise and Dust Monitoring and Management [J]. Construction Technology, 2018, 47(S1): 1089-1092.

[2] Han Jianqiang, He Jian, Luo Zhenhua. Research on Noise Pollution Management of Green Construction in Subway [J]. Science & Technology Information, 2015(16):121-122.

[3] Lei Xiaofei. Research on Green Construction Management of Engineering Project--Noise, Solid Waste and Air Pollution Management [J]. Low Carbon World, 2016(20): 132-133.

[4] Shan Caijie, Feng Dakuo. Overview of Green Construction Technology in 10 New Technologies in Construction Industry [J]. Architecture Technology, 2018.

[5] Zhou Xiaoli, Cao Wengen. An Example of Green Construction at Construction Site--Shanghai High Court, People's Court Trial Court Office Building [J]. Architecture Construction, 2007(12): 988-989.