

# CURRENT STATUS AND PROSPECTS OF TERMITE PREVENTION AND ECOLOGICAL MANAGEMENT IN NEWLY BUILT HOUSES IN MY COUNTRY

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**Abstract:** Termite damage is related to public safety. In cities or densely populated areas, it is especially necessary to pay attention to the public safety issues and hidden dangers caused by termite damage. Our country has been carrying out urban termite prevention work for nearly 30 years, and has effectively reduced the termite damage rate in urban areas. At present, termite control in my country is facing a transformation and upgrading process, and termite monitoring and control technology will gradually replace the traditional "toxic soil barrier method." This article reviews the current status and shortcomings of termite prevention in newly built houses, as well as the application of termite monitoring and control technology in the prevention of new houses, and looks forward to the concept and technology of "trapping and killing in one" combined with the ecological management of construction sites for termite prevention. Application prospects.

**Keywords:** House construction; Termites; Trapping and killing in one; Ecological termite prevention

## 1 CURRENT STATUS OF TERMITE PREVENTION IN NEW BUILDINGS

Termites are highly destructive worldwide pests. The harm caused by termites to urban houses involves public safety and public interests, and particularly requires the attention of society and government departments. According to the "Regulations on the Management of Termite Prevention and Control in Urban Houses" (Ministry of Construction Order No. 130, hereinafter referred to as Order No. 130) revised and promulgated in 2004, preventive treatment must be implemented for newly built, renovated, expanded, decorated and decorated houses in termite-infested areas in my country. "Order No. 130" is the current programmatic departmental regulation for termite control in my country. Most localities have issued relevant local regulations or local government regulations based on the actual situation of the region, and actively carry out termite prevention and control work to control termite damage in houses [1].

The "toxic soil barrier method" has been used abroad for more than half a century as a method to prevent subterranean termite damage [2]. Since the implementation of termite prevention in urban houses in my country, the "toxic soil barrier method" has been used to prevent termites in houses. Work. In recent years, as people's awareness of environmental protection has increased, termite control has gradually transformed from single chemical control to integrated management (IPM). The General Office of the Zhejiang Provincial People's Government has issued opinions on further strengthening termite prevention and control work. Currently, Zhejiang and other places are fully implementing termite monitoring and control technology to replace the "toxic soil barrier method" for termite prevention in newly built houses. The transformation and upgrading of termite control has become inevitable. trend. This article reviews the current status of termite prevention in newly built houses in my country and the application and shortcomings of monitoring and control technology in termite prevention.

### 1.1 Current Status of Termite Prevention in Newly Built Houses

#### 1.1.1 Chemical barrier

Since the late 1980s, cities with termite hazards across the country have gradually begun to carry out termite prevention work in newly built buildings. Spraying chemicals to form toxic

soil barriers has always been the most important prevention method[3]. After treating the soil at the foundation of the house, both sides of the foundation wall, the drainage slope, the outside of the exterior wall, the column base, the pile foundation along the column, around the pile, deformation joints, shrinkage joints and other locations, a continuous layer of soil is formed under and around the house foundation ground. Toxic soil barrier prevents termites from invading the house. After the Ministry of Construction promulgated the "Regulations on the Prevention and Control of Termite in Urban Houses" (Ministry of Construction Order No. 72) in 1999, termite prevention work in newly built urban houses in my country has been carried out in most areas affected by termites. In the past, termite preventive drugs mainly included insecticides such as arsenite, DDT, chlordane, aldrin, dieldrin and chlorpyrifos. Currently, the termite preventive drugs used in our country mainly include fenvalerate, permethrin, Insecticides such as cypermethrin, imidacloprid and bifenthrin[4].

### **1.1.2 Physical barriers**

The physical barrier method uses sand, stainless steel mesh, etc. to isolate termites from invading the house. As people pay more and more attention to environmental issues and alternative methods of chemical control, physical barrier methods have received relatively widespread attention internationally. The United States, Australia, Canada and other countries, as well as Guangdong, my country, have carried out research on physical barriers to prevent termite invasion. The ones with good effects include sand, volcanic rock particles, basalt particles, granite particles, coarse coal slag, etc.[5].

## **1.2 Current Problems in Termite Prevention**

In recent years, in order to unify and standardize the basic terms and definitions of termite prevention projects, standardize professional terms, and at the same time strengthen the technical management of termite prevention projects in houses and ensure the quality of construction, the national standard GB/T 50768-2012 "Termite Prevention and Control" has been issued one after another. "Basic Engineering Terminology Standard" and industry standard JGJ/T245-2011 "Technical Regulations for Preventing Termite in Houses". With the efforts of relevant national departments and local termite control units, termite prevention has achieved great development. However, from the perspective of actual application, there are still some problems and deficiencies that need to be solved in current termite prevention.

### **1.2.1 The curative period is difficult to meet**

According to the "Decision of the Ministry of Construction on Amending the Regulations on the Management of Termite Prevention and Control in Urban Houses" (Order No. 130 of the Ministry of Construction of the People's Republic of China), the shelf life of termite prevention projects is 15 years. Affected by environmental factors in the soil, termite control chemicals directly shorten their effectiveness through various methods such as microbial degradation, photolysis, hydrolysis, adsorption, migration, and volatilization [6]. Chlordane and mirex have a long lasting effect, and their half-life in the soil can reach more than 10 years. (Howell and Pawson, 1996). Bifenthrin (0.062%) and chlorpyrifos (1%) were used for preventive spraying at 3L/m<sup>2</sup>. After one year, their residual rates in the soil were 33.7% and 21.5% respectively, and the calculated half-lives were 302.6. d, 186.3d [7-9]. Field tests in the United States have shown that bifenthrin (0.062%) has a lasting effect of up to 14 years, while other agents are less than 14 years, and some even only last for 2 to 3 years [10]. In addition, combined with meteorological factors, pesticide quality and application technology, it is almost impossible for termite prevention to last for 15 years [11].

### **1.2.2 Impact on the ecological environment**

According to the "Technical Regulations for Preventing Termite in Houses" (JGJ/T 245-2011), chemical barriers should be set up continuously. The dosage of chemical liquid in the vertical barrier soil should be 25~30L/m<sup>2</sup>, and the dosage of chemical liquid in the horizontal barrier soil should be It is 3~5L/m<sup>2</sup>. On the premise of ensuring the preventive effect, high concentrations and high doses must be applied multiple times, which greatly increases the amount of toxic chemicals used in the environment and will inevitably pose a huge threat to human health and the ecological environment.

### **1.2.3 Single prevention and treatment methods**

At present, termite prevention in my country is still based on spraying chemical agents. The physical barrier method has considerable application prospects in local areas such as dam termite control, building expansion joints, bathrooms, kitchens, pipe wells, columns, etc., but it is still in experimental research. Simple chemical application without considering checking the original ant infestation, not cleaning up cellulose waste on the construction site, and not transplanting seedlings through quarantine will affect the prevention effect.

## **2 APPLICATION OF MONITORING AND CONTROL TECHNOLOGY IN NEW CONSTRUCTION PREVENTION**

### **2.1 Situation Policy**

In May 2015, the Central Committee of the Communist Party of China and the State Council issued the "Opinions of the Central Committee of the Communist Party of China and the State Council on Accelerating the Construction of Ecological Civilization", requiring comprehensive promotion of conservation, recycling and efficient use of resources, and promoting fundamental changes in utilization methods; strengthening the protection of natural ecosystems and the environment, Effectively improve the quality of the ecological environment. According to the Ministry of Construction's "Notice on Issuing the Outline of the "Twelfth Five-Year Plan" for National Termite Control Enterprises" (Jianfang [2012] No. 92), termite control should establish an environmentally friendly new technology promotion mechanism to achieve the transformation and upgrading of termite control methods, so that The harm caused by termites has been effectively controlled, the use of chemical drugs has been significantly reduced, and the harmonious development of termite prevention and ecological civilization construction has been achieved.

The Zhejiang Provincial Engineering Construction Standard "Technical Regulations for Monitoring and Control of Termite in Houses" (DB33/T1108-2014) approved by the Department of Housing and Urban-Rural Development of Zhejiang Province, as my country's first standard for monitoring and control of termites in houses, also came into effect on December 1, 2014. At the same time, in order to promote monitoring and control technology to prevent termites, the Zhejiang Provincial Price Bureau and the Zhejiang Provincial Department of Finance also issued the "Notice of the Zhejiang Provincial Price Bureau and the Zhejiang Provincial Department of Finance on Approving the Standards for Termite Prevention Fees for Monitoring and Control Technology" (Zhejiang Price Bureau [2015] No. 33). It can be said that the replacement of the "toxic soil barrier method" by monitoring and control technology will be an inevitable trend in the transformation of prevention methods in the national termite control industry.

### **2.2 Application Status**

In termite prevention projects for newly built houses, termite monitoring and control devices are installed after the house is built and the surrounding greening is completed, and are inspected regularly. Once termites are found feeding, the poison bait is replaced or placed. After the termites feed on the poison bait, they pass it on to each other through feeding and grooming behaviors in the colony, ultimately killing the entire nest of termites. The use of trapping and killing systems to control subterranean termites has been used at home and abroad. conducted extensive and in-depth research [12-14].

At present, Zhejiang Province has fully implemented monitoring and control technology for termite prevention in newly built houses. Since Hangzhou began piloting termite monitoring and control systems in 2006, it has achieved good results. In its application, monitoring and control technology has the advantages of being green, environmentally friendly, highly targeted, long-lasting, and thorough in eradication and control. Since the 1980s, Yichang City has studied and piloted a large number of cases of using chemical bait methods to control termite damage in newly built houses. By setting baits below the floor without moving, removing and inspecting them, no termite damage was found during re-inspections. As a termite control method with little or no pollution to the environment, termite monitoring and control technology has strong advantages and development prospects in preventing termites in newly built houses.

### 2.3 Problems

Termite control is in an important period of transformation and upgrading, and the application of monitoring and control technology is one of the important measures to transform the prevention and control methods. At present, other areas with termite hazards should actively promote the application of monitoring and control technology, and at the same time strengthen technical research to improve some shortcomings of monitoring and control technology.

The shortcomings of current termite monitoring and control technology mainly include: ① The operation is cumbersome and the cost is high. After the termite monitoring and control devices are buried underground, all devices must be inspected regularly once or twice a year or even every month, which requires a large workload and high costs. ② The monitoring effect is short. Termite monitoring devices are generally installed on the shallow ground. In areas with frequent human activities, the monitoring devices may be lost due to various reasons. The loss of wooden bait buried underground is relatively serious. Weather conditions such as rainfall that cause damage to the bait due to soaking also need to be considered. Bait can easily become moldy in high temperature and high humidity environments. ③ Monitoring interferes with the normal activities of termites. Currently used termite detection devices need to frequently check whether there are termites, and subterranean termites are very sensitive to various disturbances. Frequent changes of bait or the disturbance caused by putting poison bait may cause the termites that are feeding to move immediately. ④ The lack of effective management after the monitoring and control devices are applied has greatly reduced the termite control effect. A large number of control devices are used, and traditional manual management is inefficient and ineffective.

## 3. ECOLOGICAL ANTI-ANT PROTECTION FOR NEW HOUSES

Starting from the building itself and the surrounding environment, by controlling the breeding environment and propagation conditions of ant infestation, the occurrence of ant infestation can be controlled from the source, and the occurrence of ant infestation can be controlled by combining effective termite prevention methods [15].

### 3.1 Architectural Design

The design of new houses should fully consider the role of termite prevention. According to relevant requirements, the house should have good ventilation, lighting, moisture-proof, and drainage conditions. Parts in direct contact with the soil should have anti-termite properties, such as kitchens and bathrooms.

For walls in humid locations, hollow brick wall structures and wooden materials should not be used.

### 3.2 Site Cleanup

During the construction process of the house building, the construction unit failed to remove the waste wood materials and other cellulose-containing waste left on the construction site in time, which provided a rich food source for termites and also posed a threat to the safety of the building. Do a good job in "containing waste". The clean-up work of "cellulose waste" is particularly important. The main contents include construction base cleaning, backfill soil cleaning, guest soil backfill cleaning, local backfill cleaning, construction waste backfill soil cleaning, wooden formwork removal, etc. [16-19].

### 3.3 Landscaping Quarantine

In recent years, with the expansion of landscaping area and the introduction of a large number of garden plants, the harm caused by termites in landscaping has become increasingly serious. Some community landscaping materials have not been tested and can carry a large number of live termites, becoming a source of infection for ant infestations in housing buildings. Therefore, greening units must strictly control quality and introduce seedlings that are healthy and free of

diseases and insect pests, especially those that do not carry live termites. At the same time, they must strictly control the acceptance. During the acceptance, it is found that "trees showing signs of termite damage must be replaced unconditionally."

#### 4 OUTLOOK

With the acceleration of my country's urbanization and people's continuous improvement in housing requirements, and against the background of the country's vigorous promotion of ecological civilization, termite prevention in newly built urban houses will face more opportunities and challenges. The environmental problems caused by the use of a large number of chemical agents in the "toxic soil barrier method" are becoming increasingly prominent and will eventually be eliminated; as an alternative method, termite monitoring and control technology developed based on trapping and killing is highly efficient, low-toxic, and highly targeted, and is playing an important role in the transformation of termite prevention and control. It will play an important role in the upgrade process and has good application prospects. In view of the current problems of termite monitoring and control technology in the prevention of termites in newly built houses in cities in my country, termite prevention should comprehensively consider the prevention effect and prevention cost, and simplify the operation. One possible solution is to bypass "monitoring" by using poisonous bait from the beginning, by taking steps to ensure that the poisonous bait remains effective for a long time and does not rot or grow mold before termites feed on it. Su showed through experiments that the method of wrapping bait and bait with polyethylene film and wrapping it with plastic cables is enough to withstand conditions such as high temperature, rainfall and temperature difference changes. At the same time, termites can eat away at the wrapping material and eat the bait and bait. Yichang Termite Control Research Institute has been researching and screening bait embedding materials since the 1980s. When the number of feeding termites reaches a certain number, the plastic bags will be broken to feed on the bait, currently, Yichang Kangju Pest Control Co., Ltd. has applied for a patent for this method and results in 2015. By solving the problem that bait, especially bait, is prone to decay and mold in the natural environment, "monitoring and control" can be simplified into "trapping and killing in one", greatly reducing the cost of current termite monitoring and control technology, and realizing large-scale promotion and application [20]. As termites are a worldwide pest, their control should also combine termite living habits and relevant local ecological factors. In the prevention of termites in newly built houses, the building itself, cellulose-containing construction waste and introduced garden seedlings are all important ecological factors in the occurrence of termites. Only by fully paying attention to building ecological termite prevention and formalizing and standardizing relevant work can we more effectively ensure the quality of termite prevention projects.

#### COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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