

## THE NEED TO CREATE A DEVICE THAT ALLOWS THE POSSIBILITY OF REMOTE DETERMINATION OF THE SPREAD OF TERMITES

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### ABSTRACT

This article presents the causes of damage to buildings by termites in the conditions of Uzbekistan and the method of their remote prediction. The hidden lifestyle of termites has been shown to cause more damage to interior parts of buildings.

**Keywords:** Soil, buildings, termites, damaging, humidity, relative humidity.

The technical condition of 54 historical museums in Khiva Ichon Castle State Museum Reserve, the causes of termite spread and damage were studied. The database has been created. Based on the conducted research, it was found that some museums have no ventilation system, it is dark, storage of excess wood materials as a warehouse, and due to the increase in humidity, the termite population has increased and the cases of damage have increased. The administration of the Ichon fortress was given recommendations to carry out cleaning works, make a ventilation system, and implement lighting works to the extent possible in the museums in this condition, and the work is being carried out. Termite damage was prevented through this measure.

On the basis of studies, biological (termite damage) and physical (warping) damage was detected in the wooden constructions of the mosque due to improper repair work on the roof of the Juma Mosque in 2008 (Fig. 1).



**Figure 1. Biological (termite damage) and physical (warping) damage to wooden columns**

During rainy days, the interior of the mosque was completely flooded. As a result, the level of humidity increased sharply, and the number and damage of termites led to the level of rotting of wood. Also, due to the lack of ventilation system in the inside of the mosque, it was found that there is a sharp increase in humidity in summer. This, in turn, has been studied to have a positive effect on termite activity.

According to our statistics, the roof of the mosque and its wooden pillars have been replaced and repaired several times. Improper repair of the roof part of the building led to accumulation of rainwater (no water escape slope), passing through the wall to the interior of the building, excessive humidity, and rotting of wood due to moisture in some places of the roof (photo 2).



**Figure - 2. Rain seeping into the building and damp rotting ceiling**

The absence of protective barriers such as slate on the roof causes a sudden increase in humidity and when the winged termites fly, a new family of termites is formed on the roof. Moisture transfer from the roof to the timbers caused the growth of micromycetes (fungus) belonging to the genera *Alternaria*, *Cladosporium* and *Termitomyces* and softening (rotting) of the timbers. Termites feeding on fungal activity are known to digest 50-60% of the lignin from wood decomposed by the fungus, while termites feeding on undecayed wood can digest 1.0-6.0% lignin. This created conditions for termites to have ready food. Also, the 2,530 m<sup>2</sup> roof of the Juma Mosque Museum was concreted with a thickness of 5 cm and covered with a ruberoid layer, an additional 7-10 cm of soil was thrown over it and covered with straw plaster, which caused the lack of air exchange, rotting of wood, the rapid development of termites, and the increase in the level of damage. has been



**Figure 3. Device installed in Juma Masjid (Juma Masjid)**

The difference in the amount of moisture in the roof of the Juma mosque, the lack of ventilation system in the interior of the mosque caused an increase in humidity (70-85%) and an increase in the activity of termites. As a result, mud plasters of 1-1.5 meters and longer were formed on the wooden poles and caused damage to the

wooden poles and roof timbers. Studies show that if this type of damage continues, termites can cause serious level 3 damage to wooden posts, where the inside of the post is eroded and loosened.

Recommendations were made to the UNESCO representative office in Uzbekistan and the cultural heritage agency in order to eliminate the above defects, to immediately carry out reconstruction works on the roof of the mosque, to prevent moisture in the roof and to carry out light construction works while preserving the historical condition of the "Ichan Qala" Juma Mosque Museum.

In order to create samples of modern and effective means of combating termites in the Juma Mosque and test them on site, a device was created and installed in the building of the Juma Mosque, which allows remote detection of termite distribution based on changes in relative humidity, temperature and gas content of the air in the building. Through this device, it was possible to identify the risk of termites in advance and implement measures to combat them (Figure 3).

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