PEST MANAGEMENT ASSOCIATION

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Promoting Training & Education In Indian Structural Pest Control Industry"

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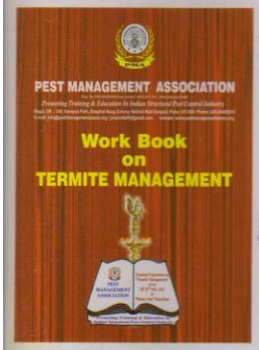
"Integrated Termite Management"



Integrated Termite Management?
Biology, Habits of termite,Pre & Post Control
Measures with liquid Termiticides, Baits,
Sanitation and Preventive Measures.

LEARN "ITM" AND SAY GOODBYE TO "TERMITE"...

Current scenario of termite management in buildings in India

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INTRODUCTION

Timber is probably the most versatile substance used man everywhere in the world for the construction of building, furniture, boat, ship, railway sleepers, and transmission poles etc. Worldwide demands for timber are steadily increasing as the population grows and more homes and furniture are needed. The houses made up of wood and bamboos are mostly preferred in earthquake prone countries. It is important to realize that subterranean termites may eat timber and timber products or any material containing cellulose and this could include building contents such as furniture, important printed documents, fabrics, clothing, footwear, packing cases and tools. About one third of the timber produced worldwide is lost due to various biodegrading agents, termites are one of them. It can also damage some non-cellulose materials for example- inferior concrete, soft metals, and soft plastics, building sealants and rigid foam insulation.

Termite is a serious menace and most problematic pest of structure as well as agriculture. Subterranean termites most often enter into all kinds of structures from the surrounding soil through the foundations to feed wooden materials, cellulosic materials and sometimes non-cellulosic materials also. About 95 % damage to buildings are caused by subterranean termites. In fact, every structure gets termites even with no wood. If it is unchecked, it can cause considerable damages. A single colony of termites may contain million of active workers to damage contents of a structure. Subterranean termites are cryptic creature; normally remain hidden until considerable damage is observed. It has recently been estimated that annual termite damage to structures and commodities, control and repair costs exceeds $20 billion worldwide (3).

Following anti-treatment treatment options are gaining popularity in India:

(i) Conventional anti-termite treatment:

In India, majority of pest management professionals rely on conventional approach for termite management in buildings. In it termiticides are sprayed on or injected into soil to create a toxic chemical barrier. Presently, 1.0 percent concentration (a/i) of Chlorpyrifos 20 E.C. and Lindane 20 E.C. are recommended in IS:6313 (2001) for structural termite control. The basic principle of all termite control is to break the line of contact between soil and wood. Chemical prevention is normally guaranteed for 5-7 years and requires multiple re-applications during the life of the structure to remain effective. Because of variations in soil texture and moisture and restricted access it can be very difficult to achieve a uniform chemical barrier without the help of skilled Pest Control Professional. Pesticidal toxicity is the major global concern now due to environmental and health issues, specifically in futuristic "green" buildings. The pesticides banned in India continue to flow into the market despite government notifications. The small farmers prefer them because they are cost effective, are easily available and display a wide spectrum of bioactivity.

Based on the recent findings, Chlorpyrifos 20 E.C. and Lindane 20 E.C are considered highly toxic. Pesticides quickly find their way into food chains, persists in the environment and contaminate underground water also. It is great concern for their potential adverse effects on human health (Barr et al., 2005). Chlorpyrifos is a major representative of organophosphates group of widely used termiticides that affect the cholinesterase system. It is increasingly restricted in several industrialized countries because of its potential adverse effect on fetal and neonatal brain development (Rauh et al., 2006; Slotkin, 2004). Organophosphorus insecticides, including Chlorpyrifos still account for up to 50% of all pesticide applications worldwide (Casida and Quistad, 2004, Kwong, 2002, Simona et al. 2009). A case- control study reported increased risk of non-Hodgkin lymphomas (a diverse group of blood cancer) among male farmers exposed to chlorpyrifos in the United States, although that result was based on only seven cases (16,17). Subsequently, it was shown that the pesticides lindane, carbaryl, and 2,4-dichlorophenoxyacetate (Whorton et al., 1979), solvents such as glycol ethers and carbonium disulphur

(Veulemans et al., 1993), and the heavy metals lead (Pb) and cadmium (Cd) (Dawson et al., 1998) damaged testicular function in men. Lindane, also known as gamma-hexachlorocyclohexane, (?-HCH), gammaxene, Gammallin and erroneously known as benzene hexachloride (BHC). Beta isomer of lindane is most persistent and therefore accumulative isomer, whilst the alpha and gamma isomers are mostly converted to the beta isomer in biological systems (21). Lindane poisoning may result in tremors, ataxia, convulsions, stimulated respiration, prostration etc. There has been speculation that such agents may also play a role in the aetiology of cancer (22,23). The new pesticides e.g. Bifenthrin, Fipronil, Imidacloprid, Cypermethrin, Lambdacyhlothrin, Ethion etc. are available in the market as alternatives and considered comparatively safe. Some of these pesticides are likely to be included in the forthcoming revised version of IS: 6313 for their use in buildings for termite control.

(ii) Reticulation or tubing system:

It is a plastic tubing system (with 8mm joint-less LLDP pipes, thickness OD-8mm and ID-6.4mm) with inbuilt drippers or openings at every 0.30 metre. The light weighted joint- less LLDP tubing network can be laid under the floor , apron and throughout internal and external periphery of building. The flexibility of pipe makes it easy for looping around pillars, drainage systems, corners or turnings etc. The junction boxes are provided on the walls outside the building. Once the building is ready, termiticidal solution is pumped at minimum 2 psi pressure using an injection pump as and when required. The technology can be implemented in the structure that is under construction and in post construction also. In post construction, a trench measuring 2 inches wide and 4 inches (approx.) deep is prepared along the junction of floor and walls of building. Floor cutting machine can also be used for making trench. The top, bottom and sides of tubing system is filled with ordinary loose sand, which serves easy spreading of chemical emulsion. Finally, finishing is required on the top surface of trench after installation of tubing network. This system is gaining acceptance and popularity in India. However, the success of system depends on the perfect installation guidelines.(4)

(iii) Bio-termiticides:

Due to growing awareness of environmental and public health in recent years, interest has increased to search new alternatives of synthetic termiticides which are less toxic, eco-friendly and biodegradable. Plants are the richest source of bioactive phytochemicals and secondary metabolites such as alkaloids, terpenoids, polyacetylenes, unsaturated isobutylamide and rotenoids etc. which may act as toxicant, repellent and behavior modifiers. Herbal formulations are frequently lethal to insect upon contact or their vapor may kill the insect by fumigation. Some herbal anti-termite wood preservatives (e.g. copperised anacardium pericarp extract etc.) are available in Indian market for protection of wood, ply, timber, wooden pillars, logs etc. Herbal pesticides have good potential for preservation of wood works and spot treatment of termite infested areas in buildings but much research work is required to find out persistence of herbal pesticides in the soil and effectiveness against subterranean termites for long term protection of buildings (6,7,9). Bacillus thuringiensis strains are widely used as microbial control agents for different insect pests. In India , some researchers have tried it in tea plantations in Assam for termite control with successful results. B. thuringiensis subsp. israelensis was found to be more virulent compared to B. thuringiensis against the termites. (8) The use of biological strains in structural applications still need more research for better performance.

(iv) Baiting system:

Termite baiting system is an alternative approach and newly emerged termite management tool for buildings, which is used as an alternative to chemical barrier treatment. A very different approach is employed in it. Small amount of bait material with an active ingredient is deployed to eliminate the whole termite colony present in and around our structures. Foraging termites consume the bait material and share it with their nest-mates, resulting in a gradual decline in termite numbers. A comprehensive baiting program is required to maintain a termite-free buildings through ongoing inspection, monitoring and re-baiting as needed. The termite baits consist of cardboard, paper or other palatable food, combined or impregnated with a slow-acting substance lethal to termites. The termite bait must be "tasty" enough that termites will readily consume it, even in the presence of competing tree roots, stumps, woodpiles and structural wood. Entire termite colony can be eliminated using baiting system. Depending upon the active ingredient, some bating system has fast killing action while others are slow acting. Delayed-action enhances transmission of the lethal agent to other termites, including those that never fed on the bait. If the bait kills too quickly, sick or dead termites may accumulate in the vicinity of the bait stations, increasing

the chance of avoidance by other termites in the area. A typical baiting system contains two units –In ground baiting unit and above ground baiting unit. In-ground baiting unit is installed around the periphery of building to be treated and above ground unit is installed inside the building directly on the termite infested areas. Baiting system technology is not available in Indian market. However, work on Chlorfluazuron 0.1% based baiting system is recently completed in the institute. We do hope, very soon it will be available for general public (5).

(v) Physical barriers:

Some professionals are installing transparent plastic sheet (by weight minimum 0.25gm to 0.30gm per sq. inch) just below the D.P.C. level in new buildings to protect buildings from dampness and termite infestations. There are no specific guidelines in India for installation of plastic sheet for the said purpose. Adequate knowledge and experience of termite pest is required for better and long lasting effectiveness of this type of physical barrier. Other anti-termite physical barriers (e.g. crushed stone, gravel aggregate, sand, metal mesh etc.) for subterranean termite control are physical deterrent because the termites cannot cross through it. Particulate material barrier can be applied in crawl spaces under pier, beam foundations, under slab foundations, concrete porches, terraces, patios and steps etc. Use of these physical barriers for protection of buildings from termites is not in practice in India.

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