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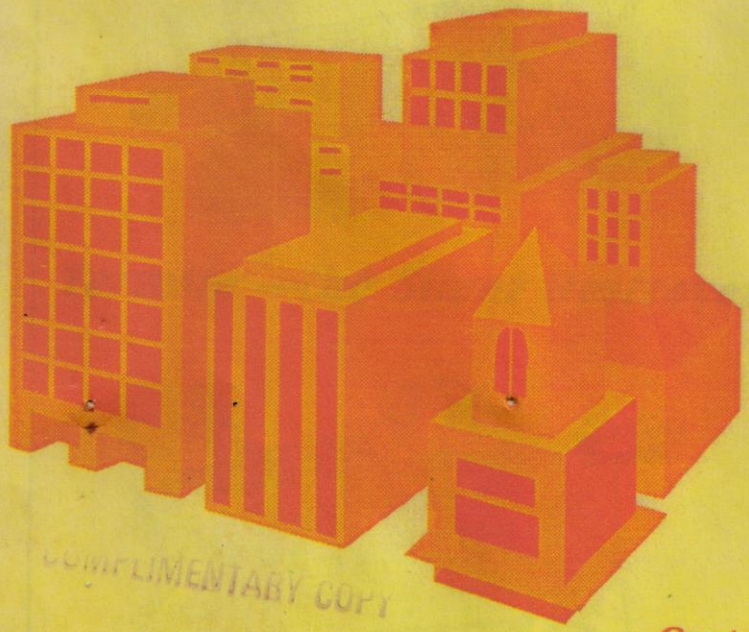
Tenders At a Glance



Towards Higher Quality

Cost Indices -- Clause 10 cc

New Materials

RECENT TRENDS OF RESEARCH IN TERMITE CONTROL

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Termite in the animal kingdom belong to insect order Isoptera. They are soft bodied and medium sized insects found in tropical, subtropical and most temperate climate zones. According to habitat, they may be classified in two groups:

(i) Wood dwellers

(ii) Ground dwellers (subterranean)

Wood Dwellers:

They are confined to wood and make their nests and tunnels in it. They may live in seasoned and unseasoned woods. In India, they are available in forests of eastern states and coastal areas and thus do not pose any problem in buildings.

Ground Dwellers (Subterranean):

Ground connection is necessary for their normal life and breeding. Their workers come out from the ground through earthen runways or shelter tubes. They may enter directly inside the wood if it has connection with the ground. Common termite species which may attack in buildings in India are as follows:

(i) Cryptotermes domesticus

(ii) Coptotermes heimi

(iii) Odontotermes feae

(iv) Heterotermes indicola

Pesticides for Controlling Termites in Buildings:

Some compounds of organic origin such as creosote, coal tar and carbolic acid have earlier proved their worth for this purpose. However, these toxicants are found useful for limited extent, while some of these compounds are not very effective, the others which are based on Arsenic and Mercury are deadly for living beings. Chlorinated hydrocarbons such as Aldrin, Chlordane, and Heptachlor are found very effective to control termites in buildings. Millions of dwellings have been treated successfully around the world in the last 33 years with them. However, in the last few years it has come into light that these compounds are highly toxic in nature. Moreover, they are very persistent in atmosphere also. If they get into wrong place, they can cause contamination problem. U.S. National Academy of Sciences suggested a safe limit for long term continuous exposure of Chlordane as 5 ug/m3 of air, Heptachlor 2 ug/m3 of air and Aldrin 2 ug/m3. In treated houses when their concentration is measured, in some cases the concentration was more than the recommended value. Therefore these pesticides have now been subjected to very stringent use regulations in many countries. In U.S.A., Chlordane has been banned in Massachusetts and the Chlorinated hydrocarbons in New York state. In 1984, Saudi Arabia has also banned the use of Chlorinated hydrocarbons. In India, Government of India has also banned the use of Aldrin with effect from December 1993. Keeping in view the above facts, work was started in various parts of the world and also in Termite Control Laboratory of C.B.R.I. on Environmentally safe and ecologically compatible termite controlling methods. The main thrust is in following directions:

(i) Use of Safer pesticides for soil treatment:

Organophosphorus pesticides are characterised by cholinesterase inhibition and are used as stomach and contact poisons as fumigants and as systematic insecticides. They are considered eco-friendly due to the fact that they can be transformed by energy available from sunlight within the range of ultraviolet sunlight wavelengths from 290 to 450 n.m. Once pesticide is incorporated in soil, chemical decomposition catalysed by metallic ions of soil, adsorption to soil colloids, microbial metabolism and possibly plant uptake may be the factors for its disappearance. However, sometimes metabolites formed are more poisonous than parent compounds. Organophosphorus pesticides do not move freely in soil with water and the loss by leaching does not appear to be appreciable.

Chlorpyrifos, an organophosphorus compound was studied extensively as termiticide for buildings in various

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parts of the world. It was found that 0.5% concentration of chlorpyrifos was 100% effective upto more than 14 years in Maryland while upto 7 years in Florida and South Carolina state of U.S.A. However, it remained fully effective more than 19 years at 1% concentration. In Japan also it was evaluated as excellent wood preservative. Experiments started more than 5 years ago in this institute have shown that its 0.5% concentration is fully effective to control termites in buildings. In order to have long term data, the observations are still recorded. Further work is in progress to study the effectiveness as building termiticides of other organophosphorus soil pesticides, synthetic pyrethroids and environmentally degradable chlorinated compounds.

(ii) Termite - repellent Compounds:

Lot of research was carried out in U.S.A., Australia and Japan to find the use of termite-repellent compounds which may be obtained from leaves, bark, flowers, and roots of plants. It has been found that certain species of termite do not attack pine timber and that termite abandon an area in which pine is planted. It may be due to repellency of pine wood to the presence of terpenes. Extensive work has been done to isolate and study the characteristics of various chemical constituents of pine wood, leaves and bark. The terpenes available in P. Roxburghii have repellent effect on termite species O. Obesus. The crude extract was found to have low repellent activity. However, efforts were made to isolate actual repellent fractions by T.L.C. Similarly, it was found that Cudesmal, Azulene, Stilbene which are pinosylvin monoethyl ether compounds and extracted from various plant origin have better termite repellency. In Japan, it was found that building timber and furniture treated with extractives from leaves of Cypruss plant showed long term termite repellency.

Encouraged by the available literature, work has been started in C.B.R.I. to investigate the termite repellency properties of waste material from plants of Himalayan origin. Some extractives were found to have excellent repellency to termite. Work is going on to identify the chemical constituents of the crude extractives and subsequently to develop non-toxic termite repellent surface coatings.

DEVELOPMENT OF INORGANIC PHYSICAL BARRIER AROUND BUILDINGS

Conventionally soil is treated around the buildings in order to make toxic chemical barrier with toxic pesticides. It helps in preventing termites to enter into the buildings. Recently number of patents have been taken in Australia and Japan on the inorganic barriers. An anti termite barrier in the form of stainless steel mesh was developed in Australia. It may be incorporated into the building to prevent termites entering a structure through the concrete slabs and walls. It was claimed effective to all species of termites.

In C.B.R.I. systematic work has been started to evaluate effectiveness of various types and grades of sands, flyash and inorganic chips with a view to evaluate their effectiveness to prevent termites to make passage through them. Some materials are found better to prevent termite to enter through them. However, work is going on to evaluate if the effectiveness is due to physical nature of the material or some chemical composition.

CONCLUSIONS:

Based on the foregoing discussions, it may be concluded that there is great need to develop eco-friendly termite control methods. Work carried out in C.B.R.I. is in accordance with international trends. Recommendations given for the use of chlorpyrifos for this purpose are accepted by Central Insecticide Board and Bureau of Indian Standards. However, investigations on other pesticides, to development of termite repellent technologies and Inorganic barriers are in the pipeline.

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