

Of Rodents, Termites & Wires

— Protecting Plastics from Pests

by:

Sonal Sapale, Technical Marketing Manager, and Priya Payal, Asst. Business Development Manager
C Tech Corporation
www.ctechcorporation.com
www.rodrepel.com
www.termirepel.com

Today's world relies on uninterrupted telecommunications, information transfer and reliable power supply. This means that any problems resulting from rodents and termites must be addressed effectively and sustainably.

Gone are the days when human interactions were limited by the span of distance that existed between individuals, where the speed of communication was dictated by the pace of the traditional messenger on foot. Evolution and revolution went hand-in-hand and that resulted in the advances by leaps and bounds in the field of telecommunications. Wires gave a new hope to the world. Life became easier, communications increased and long-distance relations became easily accessible.

Further, human development and aspiration led to rapid industrialization and with that came the increased role of electricity in enhancing productivity and mechanization. Wires gained predominance there too, and power cables made life comfortable for everyone. Now wires and cables form an integral part of life, whether it is in telecommunication, information transmission systems, signaling in railways, power transmission, under-the-hood harnesses or domestic applications.



Facts & Incidents

However, every advancement in technology that tries to make its place in nature is tested by nature in various and often unusual ways. Wires and cables have not been an exception to this phenomenon, whereby they are often found to be damaged by rodents and termites and various other subterranean insects.

The numbers are interesting as some 40% of mammal species found on the earth are rodents, and there exists over one million known insect species in the world. And some of these insect species have highly dynamic reproductive systems such as the *Odontotermes obesus*, which is a type of termite that lays one egg per second.

The incidents are many and shocking. One such incident was reported by **NZ Herald**, saying that a rat chewed a fiber

Subterranean termites, particularly in tropical soils, can cause damage to cables at depths of up to ten feet. Damage is attributed to the saw tooth jaws of the worker termites and to the acidic secretions soldier termites

-Internal working paper, Naval Civil Engineering laboratory, California, USA

optic cable bringing the stock exchange to a halt and stopping shoppers from using EFTpos machines. On that day, trading on the stock exchange was brought to a halt from 11:01 AM until 4:00 PM.

Another incidence involved **Timesonline**, **UK News**, which reported a disastrous death of an elderly lady due to a gas explosion. Gnawing rodents were to blame for the death of this woman in a massive explosion that flattened her home. The rodents had gnawed through her kitchen pipes, causing a buildup of gas the room.

Rodents, due to their growing incisors, need something to gnaw on in order to reduce their incisors length. Rodents will gnaw practically anything they can get their teeth on. And they are attracted to the smell and color of plasticizers.

Smaller than rodents are termites. These eusocial insects believe in "united we stand and divided we fall". A single termite may not be able to cause immense damage, but united they have the power to bring down your home in a night. Around €200 million is spent every year for termite treatment. If the costs of repairs and replacements are added to this amount, the annual cost can easily reach €500 million per year.

Of Metal & Poisons

The need to address the problems of rodents and termites is evident from the various practices adopted such as the use of PA12, glass rovings or fiber reinforced plastics, all of which have limitations, with little significant impact on minimizing the damage. The currently favored method involves use of metal armoring, especially in the wire and telecom industry. Again, this alternative is limited in its scope as it compromises cable flexibility and often leads to corrosion. It is also not very cost-effective. Based on the current copper price, the cost of armoring can be as high as 48% of the total cable cost for a standard small-size cable.

As for the effectiveness, quoting an additional testimony, **Steven Elmore** of **CommScope**, said, "And once critters

get into a data center, even armoring cable will not necessarily stop them from damaging wires or getting into electrical systems that power networks. It will just slow them down.”

The need for superior and cost-effective solutions has led to the employment of toxic pesticides in the form of a masterbatch or an active or aerosol spray. Whatever the form, the truth is that these pesticides or insecticides are extremely toxic and hazardous. They can inevitably enter the human food chain.

Lindane, which is extremely toxic, has been banned in several countries in Europe and America for use in the wire and cable industry. Sadly, the pesticides are still used and probably might take another few decades of accumulated environmental negligence to finally phase them out. However, by then it will be too late and the main problem of rodents and insects will have still remained unsolved.

These conventional pesticides are not designed for polymeric applications where elevated temperatures are used during the process of extrusion thus leading to generation of toxic fumes which poses serious risks to the personnel working on the shop floor. These toxic chemicals are known to leach out of the polymer matrix and they enter and pollute the groundwater reservoirs affecting even human life which is dependent on these for sustenance

Effective & Nonhazardous Solutions

That there has been significant damage has made the industry stand up and take notice. That there are solutions, which are in turn problematic, is also something of which everyone is becoming increasingly aware. That there is a need for all-pervasive solutions in the form of polymer-specific masterbatches for effective insect and rodent repellence is something that is getting acknowledged. And now, such solutions exist.



C Tech Corporation has developed the Rodrepel[®]™ and Termirepel[®]™ ranges of nontoxic and nonhazardous anti-rodent and anti-termite/insect additive masterbatches, that have been evaluated in various applications. These products are compliant with *RoHS* and *REACH*, and are *FIFRA* exempted. Unlike conventional pesticides, they are developed

The Acknowledged Leader

STRECKER

Buttwelding machines for stranded conductors

Flashfree welds on stranded conductors with or without tubes



Type SE 100 G
copper strands 5 - 1500 MCM
aluminium strands 3 - 2000 MCM



Type SE 1
copper strands 24 - 9 MCM



Type MS300
copper strands 1/0 - 1250 MCM
aluminium strands 4/0 - 1250 MCM

SALES, STOCK, SERVICE for US and Canada

WAFIOS MACHINERY CORP.
27 Northeast Industrial Road,
Branford, CT 06405, USA
Phone: 203 4815555
Fax: 203 481 9854
e-mail: sales@wafios.us



ON SALE IN USA



MADE IN GERMANY

! US\$ 3,000
Special price
Available in 2011

AUGUST STRECKER GmbH & Co.KG

Phone: + 49 64 31 96 10 - 0

Fax: + 49 64 31 4 42 21

e-mail: sales@strecker-limburg.de

Internet: www.strecker-limburg.de

in a special manufacturing process that provides high-temperature stability of up to 400°C and even beyond. Thus, these products can be extruded on any extruder at elevated temperatures making them ideal masterbatches suited for polymeric applications. These products offer long-life action and have been bottom-up designed for polymers.

Rodrepel and Termirepel chemical products act through a series of highly developed intricate mechanisms that ensure insects and rodents are kept away from the target application.

For instance, Rodrepel makes use of the sensory mechanism of smell. Ferocious species are deterred from biting by advanced mechanisms like dermal irritation, extremely pungent taste and sensory stimuli modification, thus conditioning their response towards the Rodrepel-containing products. Rodents, being social animals, communicate the unpleasant experience to their population in the vicinity

Termirepel acts in a similar manner by creating an unpleasant reaction within the insect trying to feed on the application. Destructive species are further deterred from attacking by mechanisms such as growth cycle inhibition, thus modifying their response towards the Termirepel-containing products and thus keeping insects away.

Both of these products are environmentally friendly, meaning that they do not leach out of the polymer matrix, in addition to exercising their basic function of keeping the target species away. They are effective in low dosages, have low vapor pressure thus posing no problems of fumes in the air and have a long life action of five to 40 years depending on the application. These products are available in the

form of polymeric masterbatches compatible with all types of thermosetting and thermoplastic polymers. The masterbatches can also be customized depending upon the target, application, region and so on.

Real-Life Testing

The most important aspect of these products is the degree of effectiveness that they exhibit in exercising their primary function of keeping rodents and insects away.

PolyOne Corporation, which distributes Rodrepel and Termirepel in the wire and cable industry in Europe and the USA, has evaluated these products in real-life testing conditions in various government testing institutes for their performance with respect to their repellence properties.

Anti-Rodent Testing: A field test simulating real-life conditions was proposed and accordingly, a standard operating procedure was devised incorporating suggestions from various reputed ethnologists. The tests, conducted at **ICT, Hyderabad**, involved setting up a large enclosure reproducing a natural habitat built for around five freshly captured rodents for conducting a choice test for 30 days. Cable incorporating Rodrepel was placed at various depths within the enclosure filled with mud. The tests were executed in 2010 and the results are shown in **Figure 1** (on next page). As illustrated, the average weight loss for the control sample is extremely high as compared to the average weight loss for the test samples. In fact, the weight loss for the test samples is quite insignificant, thus proving that Rodrepel is effective.

Extensive tests were also done at the **Haffkines Institute**



YA SIH 
A Company of Ya Sih Group

As a professional packaging consultant,
we continuously focus on 3S in machinery –

SIMPLE, SMALL AND SMART.

Efforts to provide complete automatic packaging systems
for wire and cable manufacturers.

YA SIH TECHNOLOGY CO., LTD.
Tel: +886-2-2680-5933
Fax: +886-2-2680-4926
Website: www.yasih.com.tw
E-mail: sales@yasih.com.tw

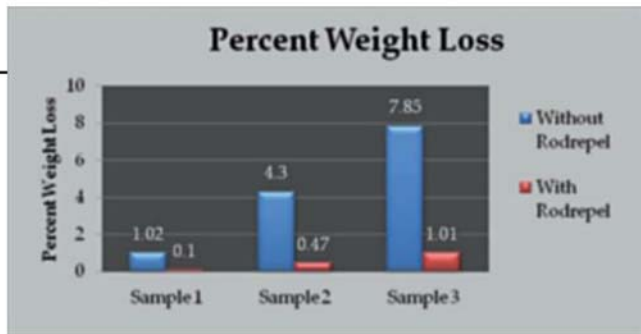


Fig. 1 — Anti-rodent test results.

for Training, Research and Testing in India, the University Department of Chemical Technology in India and the Central Arid Zone Research Institute in India.

Anti-Termite Testing: In this real-life test, cable samples were placed in earthen pots, which were placed inside termite mounds in the field. Cables were analyzed after 30 days and the results showed significant surface pitting present on the nontreated cables. On the contrary, the cables containing Termirepel masterbatch were not pitted at all. Even the cable identification mark could be easily read. See Figure 2.

PolyOne has also tested Termirepel at **BAM—the Federal Institute of Materials Research and Testing** in Europe where the initial results look favorable and promising.

Conclusion

Telecommunications, information transmission, faster modes of transportation and uninterrupted power supply has made the world a smaller and flatter place where increasingly enhanced interactions form the basis of social and

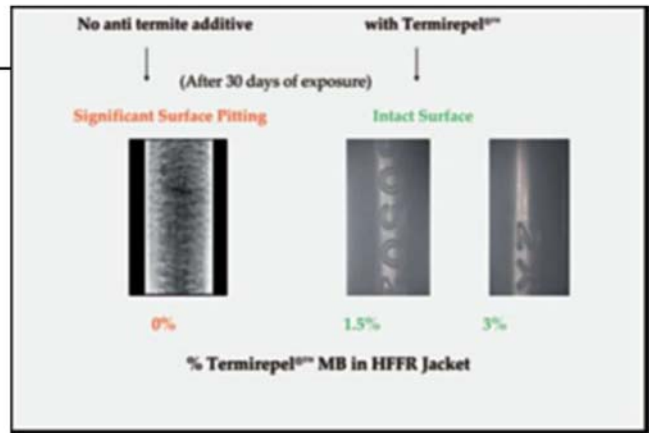


Fig. 2 — Anti-termite test results.

corporate life. Thus it is essential that problems stemming from rodents and termites that may hamper progress in this area be addressed effectively and sustainably.

Rodrepel and Termirepel have been developed in response to the acute needs and requirements of the polymeric industry in general and the wire/cable industry in particular, while keeping in mind the safety of the environment, animals, human life and the planet. www.ctechcorporation.com

www.rodrepel.com / www.termirepel.com

WCTI

Company Profile: C Tech Corporation, which is a subsidiary of the C Tech Group of Companies, has a distinguished history of providing its customers with quality products at competitive rates along with required technical assistance and services. The C Tech Group of Companies has been manufacturing chemicals in India for 80 years and exporting products globally for over 50 years. www.ctechcorporation.com / www.rodrepel.com / www.termirepel.com

Inosym Reels

Delivering World-Class Quality & Performance

Inosym Reels

Quality Reels

Flexible Designs

Cost Competitive

High Performance

Inosym Ltd.
 Ph: +64 21 353 634
 Fax: +64 3 341 6668
 Email: inosym@inosym.com
 Web: www.inosym.com