A Review of Termite Risk Management in Housing Construction

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Abstract—There is a multi pronged approach in dealing with the termite which is the biggest problem as of now in the housing industry. Certain types of wood which are less prone to termites should be preferred over light weight soft woods in housing. Physical and chemical barriers should be used to prevent termites from invasions. Different substitutes for wood like SS 304 and other metallic and PVC panels are also flocking the market which can also replace wood. Some other important guidelines have also been discussed.

I. INTRODUCTION

Termite continue to be the biggest problems in housing industry. More than 15% of the construction of house is spent on the wood works. Wardrobes, furniture, modular kitchen, doors, window frames are all made of wood. Concerns are often raised about building industry’s ability to protect buildings against termite attack.

Objective of the Review

Understand the actual risk of termite attack on dwelling.
Identify risk points during the life cycle of house.
Identify the types of wood which are less prone to attacks.
If there can be a substitute for wood having the elegance, durability and strength of wood.
Quantifying the risk of termite attack.

II. QUANTIFYING THE RISK OF TERMITE ATTACK

It is generally observed that light weight woods which are soft are more soft are more prone to termite attacks.

Termites don’t eat wood which are hard and resistant to penetration of nail. Woods which have more density are less prone to termite attack.

RESULTS ON WOOD

In my experiment various woods were examined and kept for inspection and different types of experiments were performed on them. Though a linear relationship couldn’t be established between density of wood and resistance to penetration of termite, however woods which are more dense are more resistant to termite attacks with the exception of teak wood. Teak wood having medium density has the maximum resistance to termite attack. It is attributed to the presence of wood oil present in the teak wood which makes it hard and difficult to scratch.

Two experiments were conducted to determine the response of different woods under identical conditions to the termite attacks. In the first experiment ,different woods were buried two feet under the earth for six months and their response to the termites was observed. In the second experiment woods were tested for penetration of nail.

EXPERIMENTS ON DIFFERENT WOODS

Six woods were taken and kept two feet under earth for six months and distress caused to these woods was noticed after the end of each month. The distress after six months was given marks from zero to 5 with 5 meaning complete damage and zero meaning no damage.
Table 1 Resistance of wood to termite attacks

<table>
<thead>
<tr>
<th>S. NO.</th>
<th>Wood</th>
<th>Distress</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Teak</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Malaysia Sal</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>Indian Sal</td>
<td>1.5</td>
</tr>
<tr>
<td>4</td>
<td>Holak</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Red Mirandi</td>
<td>3.5</td>
</tr>
<tr>
<td>6</td>
<td>Yellow mirandi</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Imported pine</td>
<td>5</td>
</tr>
</tbody>
</table>

PENETRATION OF NAIL

Same woods were further studied for penetration of nail. One kg iron hammer was made to fall from a height of 1 feet under its self weight on a half inches identical nail and number of blows were counted for 1cm penetration in each of these woods. It was observed that woods which were resistant to termite attacks were also resistant to penetration of nail.

Table 2 Resistance to penetration of nail

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>Wood</th>
<th>No. of blows for 1cm penetration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Imported pine</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Yellow Mirandi</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Red Mirandi</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Holak</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Indian Sal</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>Malaysia Sal</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>Teak (Imported)</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>Teak (Indian)</td>
<td>11</td>
</tr>
</tbody>
</table>

Indian teak also known as sangwaan showed the best results in terms of resistance to penetration of nail and also resistance to termite attacks.

RISK ASSOCIATED WITH AGE

Cookson (1999) found that age of the house is the most important indicator of risk. He found that owners experienced 38% increase in risk of attack every year. Keith and Dunn’s (1995) insight about age related risks. In their study, houses up to 30 years of age had the lowest incidence of attack and houses more than 70 years of age had the highest incidence of termite attacks.

It can be concluded from the above that the risk of termite attacks changes with age. The best way to express the change in risk is a rate of increase per year (eg. 38%/year).

OTHER FACTORS AND INDUSTRY ASPECTS

There are numerous other factors on which resistance of wood to termites depends on. Sunlight is one of such major factors. It is observed termites love to live in dark and damp places. Wood which is exposed to sunlight has more termite resistance. Further 19mm ply has more resistance to attacks than boards. Ply should be used in preference to boards for wardrobes and other items.
Moving parts are less prone to termite attacks. Slabs of wardrobes can be made of marble or reinforced cement concrete. Shutter of windows can be made from ply and non moving parts like frames and slabs can be made from wood substitutes. Further if some sweets or chaasni falls on wooden parts, termites follow the attacks by brown ants.

III. PREVENTIVE AND CURATIVE MEASURES

Physical and chemical barriers are used as preventive and curative measures.

PHYSICAL BARRIERS

It involves installing an impenetrable material when the termite attacks the house from underground. Termites then makes the visible mud tunnel over the barrier. Regular inspection is required to detect the mud tunnel which can then be dealt by termite inspector. These barriers can be graded stone or concrete slabs or sheet metal termite shields.

CHEMICAL BARRIERS

Chemical barriers use termiticides which kill or repel termites. This type of treatment is done once or twice in a year as the need may be. These chemical barriers are applied around the foundations and around the slab. Long life chemicals have adverse impact on health and environment. These chemicals are poisonous and should be handled carefully.

IV. SUBSTITUTES FOR WOOD

Stainless steel 304 has replaced wood in railings for stairs and balconies. It has the elegance of wood and is better in many ways. Long life, economical, high scrap value, strength and lowly skilled craftsmanship are some of the qualities associated with it. PVC panels are also available for wardrobes and modular kitchens. Having high coefficient of thermal expansion, they cannot be used in places where there is hot climate or large variation in temperatures. Screws don’t have long life in them.

Japanese sheets made of iron are also available in the market which are replacing woods in frames for doors and windows.

PVC doors are also available in the market which can be used as a door for attached toilets only as they have very low strength.

V. CONCLUSION

Indian Teak is the best option for shutters (doors and windows) and has very high resistance to termite attacks.

Various substitutes of wood made of steel and pvc keep on flocking the markets having pros and cons vis vis wood every now and then.

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