A Report on Wood Treatment Training

Baagkhor, Lamidanda, Paanchkhal Municipality

Background

Wood has been a choice of building material for ages. Wood has necessary flexure, high tensile as well as compressive strength. Wood is used in various components of a building like door, window, floor, purlin, rafter, seismic band etc. But the wood used as these components must be strong enough to carry dead load, live load as well as seismic load. The wood need to be frequently taken care of to assure durability.

Introduction

Wood treatment refers to action of protecting wood from damage caused by insects, moisture, fungi and other effects. Insect (Termite) subsist on the cellulose material found in all types of wood. Seasoning of wood reduces the risk of damage to some extent but wood treatment hugely improves the performance and life of the wood.

Wood treatment is a relatively new concept in Nepal as treatment was not necessary before. It was mainly due to availability of hardwood: Saal (Agrakh), which is unfortunately not available now. The number of saal wood trees has decreased significantly and the few remaining trees have been protected by the government and banned for use.

After the earthquake, the government has made seismic band as compulsory structural element in new building construction. Many houses have wooden seismic band due to difficulty in transportation of cement, sand and steel for concrete band. Wooden band is a structural element so, poor choice of wood as seismic band material can lead to even weaker structure.

Thus the training regarding treatment of wood directly benefits the community; on the other hand some enterpriser will get new opportunity of earnings if they implement permanently.

Objective of training

The main purpose of the training is to educate people about procedure of wood treatment. Wood has been major component of building since long ago in Nepal, and people are using it as a structural component like band, post, roofing elements after new norm of government. So it is necessary to have treatment of wood to free it from insects, bugs and fungal. The treatment method is easy but all the procedures have to be implemented precisely.

Procedure of training

The training was conducted for four days.

- Day 1:

    - Introduction
    - There was a brief session regarding Day 1, Day 2, Day 3 & Day 4.
    - Pre test was taken.
    - Interaction with the trainer about the different treatment process as well as uses of the wood.
    - Theory classes were conducted.
    - DOT Treatment method was described.

- Day 2:

    - Short revision of the previous day was done.
    - Information was provided about the remaining steps which were remaining on previous day.
    - There was a practical session of the treatment process where there was description about all the steps.
    - A batch of timber was treated.

- Day 3:

    - There was short revision of the previous day.
    - Trainers were divided into groups and all wood treatment steps were done by them.

- Day 4:

    - Revision of the wood treatment process was done.
    - Quality control was checked and it gives the positive result.
    - Post test was taken.

DOT method for wood treatment

DOT (Disodium octa-borate tetra-hydrate) is a boron based compound with many uses. The 10% concentration of this solution is used for treatment of wood. It can be prepared by mixing Borax and Boric acid too which is the method we used at our different site. The termite dies in this process not because the DOT is poisonous but because it cannot digest the treated wood and dies of starvation.

Main reasons of choosing DOT as the substance for wood treatment are:

- Cheaper

- Least toxic to humans
- Easy to understand and use
- Fire and water Resistant to some extent
- Environment friendly

Nevertheless, its effectiveness depends on a thorough preparation and execution of the whole process.

Method

The method consists of soaking the wood pieces into a prepared boron solution for a proper impregnation. For an easier and reliable process, a soaking tank is required. The size of RCC tank was 6m.*1.2m. *1m. To avoid the leakage of chemical punning was done at the surface and periphery of the tank, since any leaks can easily become quite expensive, due to product's price. Each step is described in detail below:

1. Dilution:

For the preparation of the solution, Boric acid and Borax is used in the ratio of 2:3. For 2 kg of Boric acid and 3 kg of Borax, we added 28 liters of water.

The quantity of Boric acid and Borax used was 50 kg and 75 kg in the 700 liters of water respectively. We prepared solution in a bucket and heated the solution to desired temperature of 20-30 degree Celsius.

2. Soaking:

The wood pieces cut in appropriate sizes are then put in the tank carefully so that the solution won't splash. The wood floats in the solution so; a heavy object like stone is placed above the wood to sink the wood. Soaking is done for 30 minutes but after 15 minutes, the wood is turned.

3. Dripping:

Some wood laths are put over and across the tank and the wood pieces are laid over them after removing them from the tank. It is done so that the solution might drip back into the tank. The dripping is done for about 3-5 minutes and proceed to stocking.

4. Stocking:

The treated wood is laid over a flat surface, separated from the ground by some wood laths and plastic. They are slightly apart from each other. When stocking another layer above one layer, 1" gap should be left.

5. Diffusion:

It is during this phase that the solution penetrates deep inside the wood through osmosis. Drying too fast can result in a bad diffusion process, which means only the surface gets

treated. Therefore, the wood pieces are wrapped in a waterproof plastic right from the moment when they come out of the soaking tank. The wood must then stay wrapped for at least 3 days.

6. Quality control:

It is necessary to determine the penetration and retention of the wood preservative. For this, samples from the stock have to be cut at certain length exposing their cross-section.

The cut ends will be sprayed with a mix of Dye and Revealer.

The Dye is a mix of:
− 10 g of turmeric;
− 100 ml of alcohol.

Once the wood parts become dry after application of Dye using brush, revealing solution is sprayed made with:

− 20 ml of hydrochloric acid;
− 6 gm salicylic acid dissolved in 100 ml of alcohol.

The wood parts where the preservative has penetrated become red, but those where there has not been proper diffusion remain with the wood's original color.

Participants

The trainers were the member of the Community Forest User Group. There were some other people working with wooden structure, involved in our training. There were 20 participants.

Duration of training

There were mainly two sessions of training; theoretical and practical. Theoretical session was conducted for 1 day and practical session was conducted for remaining 3 days, lead by technical as well as non-technical team of ASF Nepal.

Conclusion

The quality control check done at site provided fine results. The chemicals penetrated to required depth which is suitable to be used on buildings.

Treating a wood can expand its life as long as the house itself. However it is better if the surface of the wood exposed to atmosphere be painted so that the chemical do not get washed away due to leaching.

Recommendation

Since the chemical treatment of wood is very new concept; it needs regular monitoring in the site. If possible, it would be better to have some more training at the ground level to aware people about the importance of treatment of wood. Though the methodology is less toxic, we have to assure safety measure by visiting in regular interval to the site. It is necessary to check the concentration of chemical frequently during every site visit. Clean water is preferable for the mixture.

Annex

Some glimpses of wood treatment training carried out at Baagkhor Lamidanda, Paanchkhal Municipality

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Ongoing Training</td>
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Mixing of chemicals</td>
<td> 
Moisture checking</td>
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Soaking of wood

Dripping of chemicals

Stocking of wood

Diffusion

Application of Dye

Quality Control Measure