

CONSERVATION PROJECT OF NAKO TEMPLES



Nako village

The Buddhist temples from the 12th century at Nako, in the Kinnaur region of Himachal Pradesh – Western Himalayas of India, have been identified as one of the 100 most endangered heritage sites by the World Monuments Fund.

The traditional earth architecture of the Himalayan area has been designed for arid and cold climate. This architectural heritage of Nako, which has survived for approximately 800 years, has recently started showing serious signs of deterioration –both physical and cultural. Recent years have witnessed a considerable change in the climate and the region now receives regularly rainfall every year. This increase of rainfall is affecting adversely all traditional buildings and especially the historic temples of Nako.



Training course on block making

This preservation project is a joint undertaking based on the cooperation with the local Nako Chug Lhakhang (Buddhist Temple) management committee, Indian and Austrian conservation architects, Romi Khosla Design Studio-New Delhi and the Interdisciplinary Research Unit on the Cultural History of the Western Himalaya – University of Vienna, Austria. This project has been funded by the World Monument Fund and other private donors.

The services of the Auroville Earth Institute have been requested at the end of May 2004 for two purposes:

1. Research some alternative solutions with totally natural materials for the waterproofing of the Temple's roofs.
2. Help the extension of the Buddhist Temple, where villagers could go during the conservation activities in the historic temples. This extension was supposed to be done with compressed stabilised earth blocks.

A one-week training course for block making was conducted to the local villagers, with one Auram Press 290. Trainees learnt all details from soil preparation to quality control. The curing aspect had been emphasized a lot as the area had always a dry wind with high velocity.

After analysis of the situation and the way the traditional waterproofing were done, a research programme was elaborated. These tests aimed to find waterproof combinations for the walls plasters and the roof of one of the temple, the Gongma Lhakhang, which was the most endangered. The main aim of these tests was to use only local materials easily available in the area and without adding any foreign material.

Four different combinations were tried with various coats of local clay (Tua), soil, barley straw and dung (mule or cow). They were implemented while Satprem, from the Auroville Earth Institute was there. The samples had to be air dried slowly and then monitored by the local team remaining there.

The samples were monitored by pouring 3 litres of water on the samples, which represented about 12mm of water per m² of roof. This amount was decided to represent a heavy rainfall of a few hours. The monitoring shown that the samples were too young and that the last coat which had dung was too fragile and not homogeneous. Nevertheless, the speed of absorption was not too high: 1h 25 min. for the best sample. The total water absorption was measured with an electronic moisture meter: the moisture at the base of the best sample was not higher than 26 % after 6 hours of absorption.

The new roof structure and the waterproofing with the specifications of the best sample were implemented in summer 2005. A small development has been done by Ms. Sweena Berry, who was in charge of this work, by adding some layers of birch bark below the earth layers. This roof behaved well till now after the increasing rains which fall on Spiti.



1. Frame, mesh and jute clothe



2. First coat = adobe pattern



3. Applying 2nd coat & checking thickness



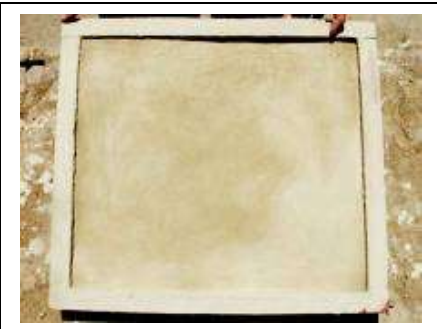
4. Scraping every coat before the next one



5. Cracks of the 3rd course with Tua clay



6. Filling cracks of the Tua course



7. Hair cracks after the 2nd slurry = OK



8. Applying the 4th coat



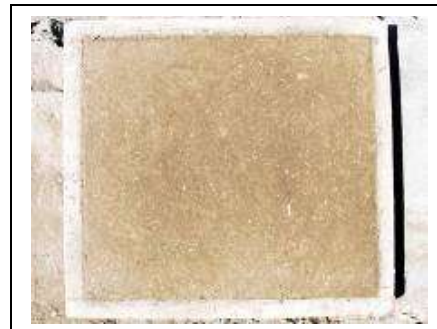
9. Scraping the coat and soaking it after



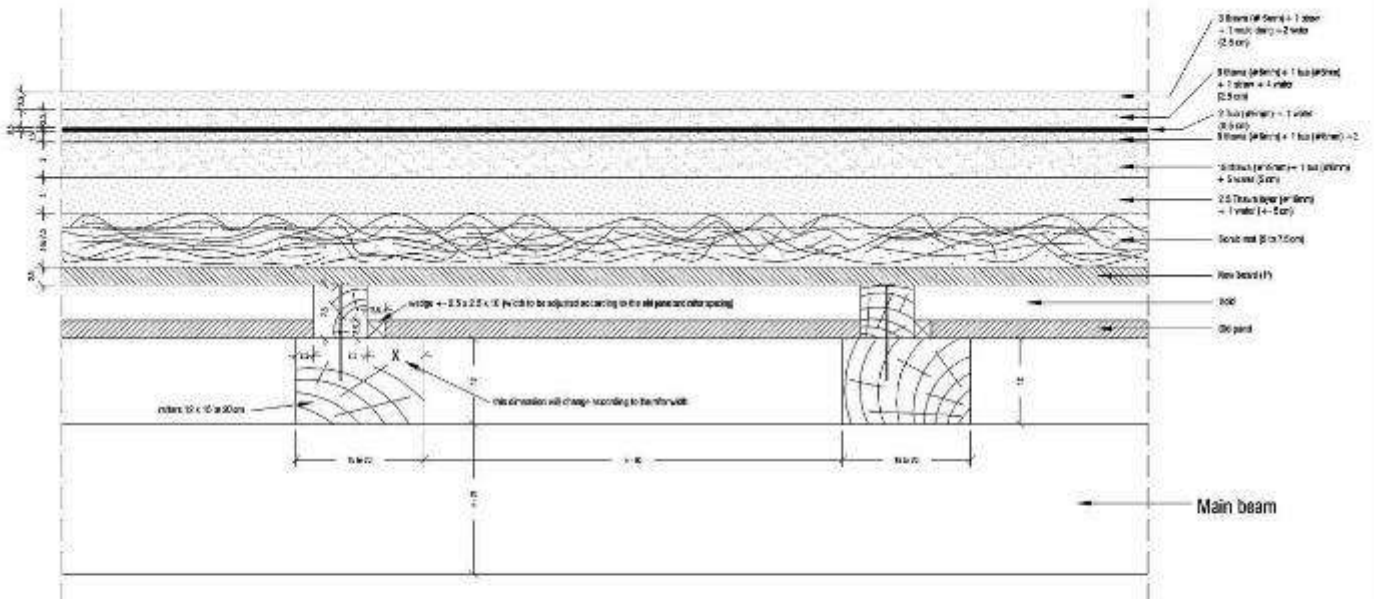
10. Pressing the coats with a wooden float



11. Smoothing the last coat with a trowel



12. Last coat and finished plaster sample



Note:

- The rafters width (15 to 20 cm) should be checked individually for every rafter.
- It is essential that the finished width of the new rafters have the same width as the old ones. Note that rafters should have the same height (12cm)
- The rafter length should be checked individually: the length should taken from the lean centerline to inner side of the wall and added 40° extra length for the wall thickness and outer projection. These rafters length should not be cut. They will be adjusted in situ.

GONGMA LHA KHANG

PRINCIPLE SECTION

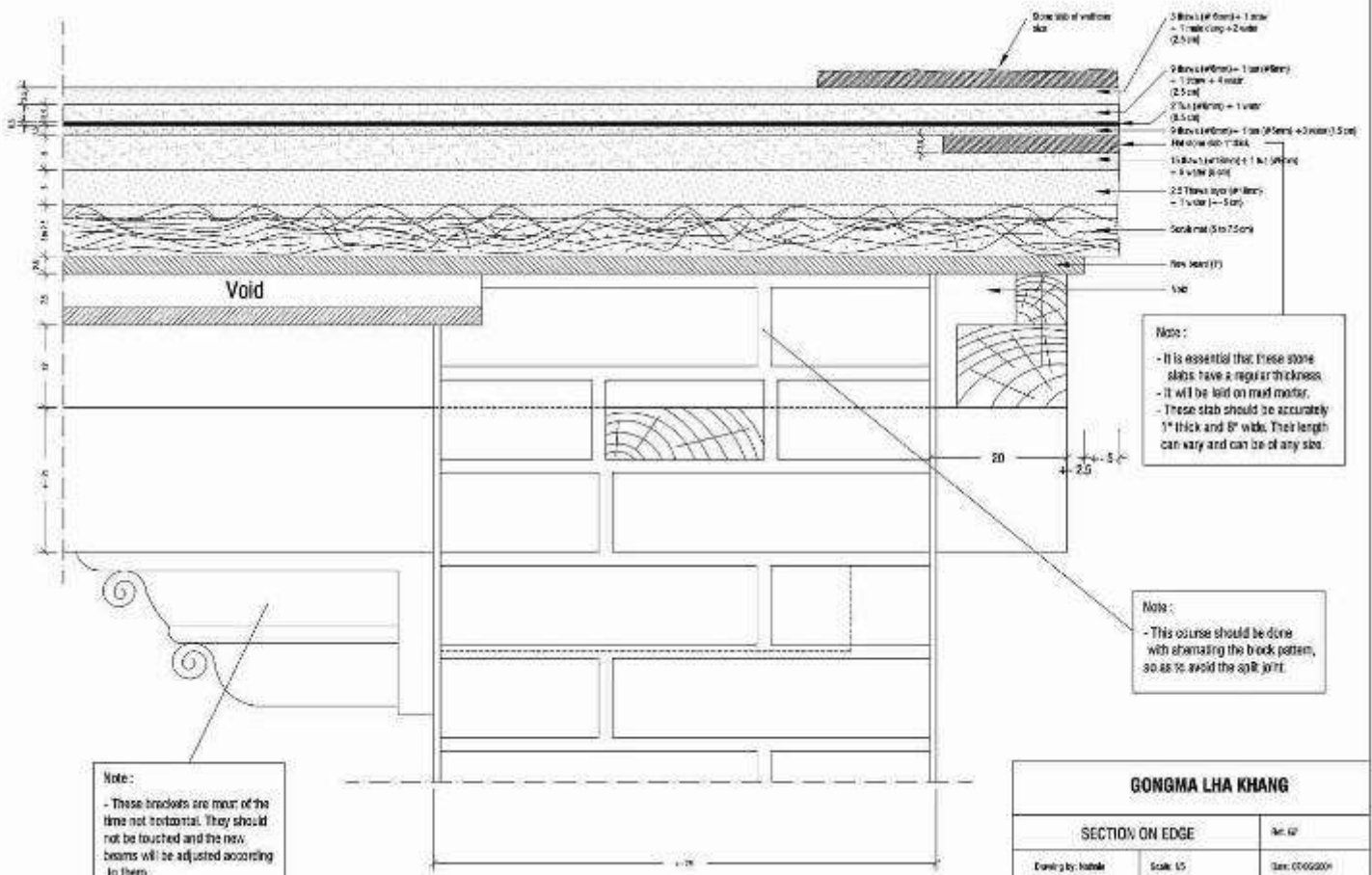
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Drawn by: Isabelle

Scale: 1:1

Date: 01/06/2008

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Note:

- These brackets are mason of the time not horizontal. They should not be touched and the new beams will be adjusted according to them.

Note:

- It is essential that these stone slabs have a regular thickness.
- It will be laid on mud mortar.
- These slab should be accurately 1" thick and 6" wide. Their length can vary and can be of any size.

Note:

- This course should be done with alternating the brick pattern, so as to avoid the spill joint.

GONGMA LHA KHANG

SECTION ON EDGE

Ref: 07

Drawn by: Isabelle

Scale: 1:1

Date: 01/06/2008

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Moulding of new adobes



Repairing walls with new adobes



Plastering walls with earth mixes



Checking the thickness of the earth plaster



Removing the old roof



Laying the new scrubs for the roof



Scratch on the first layer of roof plaster



Roof in progress with stone slabs on the sides



1-traditional-village



2-nako-temple-front



3-nako-temple-back



4-chorten-gya-pag-pai



5-lotsawa



6-lotsawa-frescoe-1



7-lotsawa-frescoe-2



8-lotsawa-statue-3



9-lotsawa-frescoe-4



10-lotsawa-frescoe-5



11-gongma-roof-1



12-gongma-roof-2



13-gongma-roof-3



14-gongma-roof-4



15-gongma-roof-5