

Restoration of the 8 chörten building

Wanla, Ladakh, India

Achi Association India



Ladakh 2014

Funded by the Cultural Preservation Program,
German Foreign Office, Delhi, India

Report by Hilde Vets, Heike Pfund, Anne Voll, Susanne Bosch

11 October 2014



Achi Association India

Restoration of the 8 chörten building in Wanla

Table of Contents

- 1. Abstract**
- 2. Restoration of the 8 chörten building**
 - 2.1. Preliminary note**
 - 2.2. Desacralization of the building**
 - 2.3. Building (architectural structures)**
 - 2.3.1. Condition assessment
 - 2.3.2. Restoration measures
 - 2.4. Wall paintings, chörten and wooden screen: description and condition assessment**
 - 2.4.1. Wall paintings
 - 2.4.2. Chörten
 - 2.4.3. Wooden screen
 - 2.5. Preparatory work**
 - 2.5.1. Wall paintings
 - 2.5.2. Chörten
 - 2.5.3. Wooden screen
 - 2.5.4. Walls: reinforcement
 - 2.5.5. Propping of the building
 - 2.6. Structural restoration of the building**
 - 2.6.1. Demolition of the roof and the outer walls
 - 2.6.2. Redressing the wooden screen and the inclining wall
 - 2.6.2.1. Wooden screen
 - 2.6.2.2. Inclining painted wall
 - 2.6.3. Reconstructed parts
 - 2.6.3.1. Materials
 - 2.6.3.2. Fabricating the mud bricks (*phagbu*)
 - 2.6.3.3. Reconstruction of the walls
 - 2.6.3.4. New wooden structures
 - 2.6.3.5. Roof and parapets
 - 2.7. Conservation and restoration of chörten, wall paintings and wooden screen; protection of the new wooden structures**
 - 2.7.1. Wall paintings
 - 2.7.2. Chörten
 - 2.7.3. Wooden screen
 - 2.7.4. Protection of the new wooden structures
- 3. Participants**
- 4. Outcome and outlook**
- 5. Annexure of photographs**



Achi Association India

Restoration of the 8 chörten building in Wanla

1. Abstract

In 2010 the Indian organization Achi Association India was founded and carried out its first heritage preservation project in 2011. Achi Association India emerged from a fruitful cooperation with Achi Association Switzerland.

Since 1999 the Achi Association as a Swiss non-profit organization is contributing to the preservation of the architectural heritage of Ladakh; first with a team of international experts from Europe. Later, in 2005, the Association started to cooperate with Indian art conservators and in 2009 a Youth Training Program was launched thanks to the support of the Getty Foundation, Los Angeles. The aim of this program is to build capacity for heritage maintenance and a reasonable utilization of preventive conservation among Ladakhi Youth and Young Professionals. In 2009 a Ladakhi conservation architect joined in, and successively an Indian organization was formed in 2010, named Achi Association India.

In 2011 the Achi Association India started its first project in Ladakh, the restoration of the Kagan Chorten in the village of Wanla. Funded by the Cultural Preservation Program of the German Foreign Office and private donors, the project was implemented during the summer of 2011. Participation by village volunteers was high and three years later the community still praises the project.

Successively, in 2013 another heritage preservation project took place in Wanla, named "Conservation of wall paintings in the Avalokiteshvara Temple and revival of the Heritage Path in Wanla".

During this campaign important talks with the village community took place to evaluate Achi Associations past activities in Wanla and plan further projects. Gratitude was expressed for the past work of Achi Association in the Avalokiteshvara temple and at the Kagan Chörten, and assistance requested for the upkeep of the religious structures alongside the ancient pilgrimage/circumambulation path, further on named "Heritage Path".

In 2014 Achi Association India aimed to carry forward the revitalization of the Heritage path, with the restoration and conservation of a significant building on its way, the 8 chörten building.

The 8 chörten building is located in the old part of Wanla, called Zomal. It is a structure housing the eight different types of chorten¹ with a roofed circumambulation path. It was traditionally owned by one family, but has been handed over to the community to gain more support for its upkeep.

¹ Compare with Romi Khosla, Buddhist Monasteries in the Western Himalaya, Kathmandu, 1979, pp.85-87



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 1: Village meeting in 2013 about the work of Achi Association and future projects in Wanla (photo: Hilde Vets)

The building suffered from severe structural problems. The inner walls were leaning heavily and the structure was on the verge of collapsing completely. The painted walls had cracked in several places under these forces and roof leakages had caused damage on the wall paintings. Therefore it was proposed to restore the construction structurally and thus safe the building and it's precious interior from destruction.

All restoration and conservation activities planned for 2014 were implemented during two campaigns. The first campaign beheld the structural restoration of the 8 chörten building and took place during June and July under the guidance of a conservation architect and wall painting conservators.

Due to the visit and the Kalachakra Teachings of the Dalai Lama (23 June -14th July 2014) social and religious life was 'disturbed' and a multitude of religious ceremonies were organized all over Ladakh. The local communities are supposed to assist logistically these ceremonies, resulting that few craftsmen and labours were available all the time. Also the Achi Association monk trainees were only able to join the project during some weekends, as they were obliged to attend these ceremonies and the Kalachakra Teachings.

A second campaign in August concerned the conservation work after the structural restoration, meaning cleaning, securing the plaster of the painted walls and chörten and protecting the new wooden constructions.



Achi Association India

Restoration of the 8 chörten building in Wanla

2. Restoration of the 8 chörten building

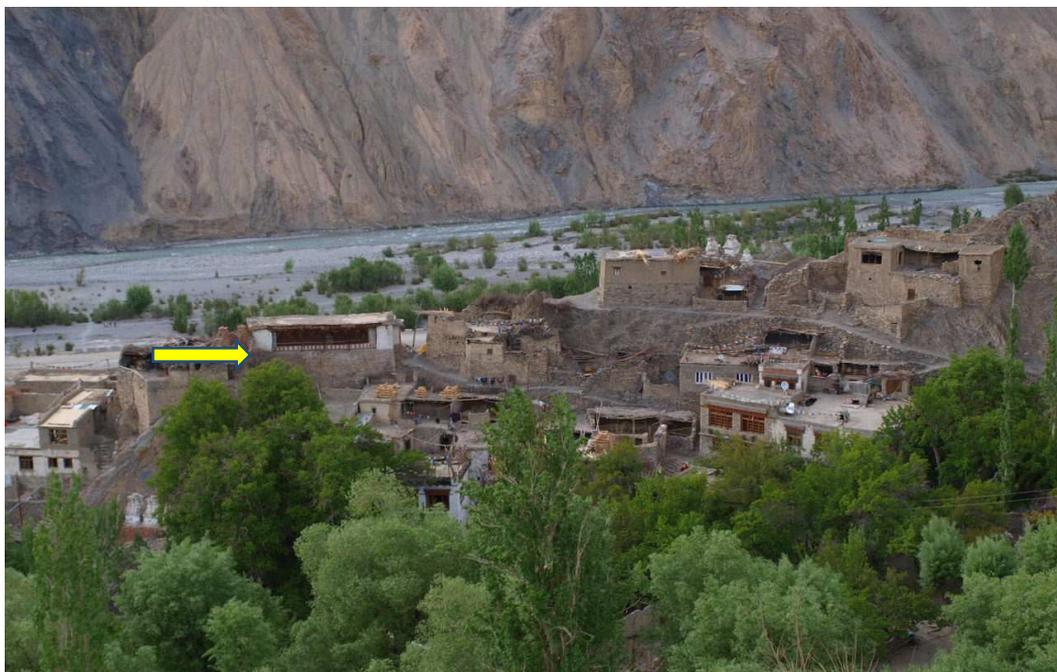


Fig. 2: View on the ridge of Zomal from the castle, with the 8 chörten building (picture: Anne Voll)

The 8 chörten building (*deshek chörten gyad*) is situated on the ritual circumambulation path of the village (the so-called Heritage Path or *rgya-skor*²), and is built on a ridge at Zomal³ side facing the castle ruins of Wanla. It is a religious structure housing the eight different types of chörten⁴. Paintings of approximately 110-120 years old⁵ are covering the walls of the inner shrine.

The construction is mainly made up of one rectangular inner room which is then surrounded by a 'veranda' where people circumambulate the shrine. Both the veranda and the inner room share the same roof. The veranda is open on both lengthwise sides. On the short sides it is closed with mud brick walls.

The roof is a traditional wooden construction, covered with an earth/clay mixture and supported by the tiny wooden columns of the veranda and the rear wall of the inner room.

² The tradition of circumambulating the religious buildings (and villages) is part of Ladakhi intangible cultural heritage but is also defining the landscape. Along these circumambulation paths chorten, mani walls, prayer wheels and sacred buildings were or are still being erected by the villagers.

³ Zomal is the oldest inhabited part of the village, based in the valley behind the promontory rock where the Avalokiteshvara Temple is situated. The ancient fortified village (deserted) though was located underneath the castle (*Khar*) and temple.

⁴ The eight chörten of Buddha symbolize the different events in the life of Sakyamuni Buddha

⁵ The previous owner, Sonam Angchuk Kharapa (aged around 60), told that it was built by his grandfather's father and uncle, a mason/carpenter and a painter. This period would fit with the overall look and design of the complex and with the colour scheme and design of the wall paintings.



Achi Association India

Restoration of the 8 chörten building in Wanla

The inner structure (shrine with the eight chörten on a row) is likewise made of adobe walls, while one of the long sides (the south façade facing the Wanla castle ruins) consists mainly of a wooden screen held by short walls. This wooden screen encloses eight windows (according to the number of chörten), which can be closed with wooden shutters. The one long and two adjoining short brick walls of this inner room surrounding the chörten are covered with wall paintings on a clay plaster. The wall paintings do not continue on the short sides of wall where the screen is attached to.

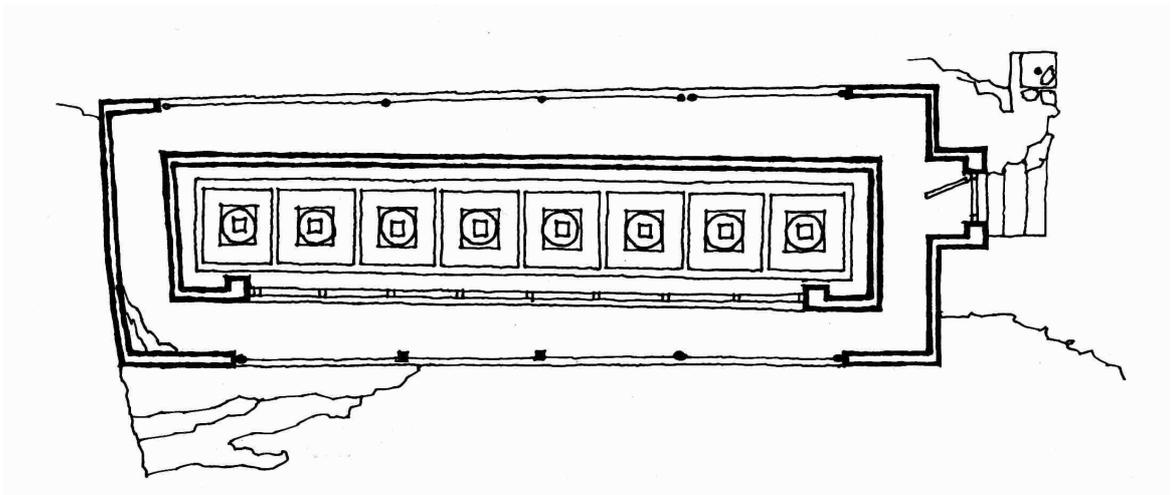


Fig. 3: Floorplan of the 8 chörten building (drawing: John Harrison, 2010)

This interesting building was in a very bad condition and in danger of collapsing.

The architectural surveys of 2010 and 2013 pointed out that the rear wall of the inner structure and the large front window were moving seriously outwards due to several reasons. The thin supporting wall (made of only one 'phagbu' or mud brick of 20 cm width), the insufficient wooden supports of the 'balustrades', the lack of a supporting beam above the large opening of the front window, the heavy load of the roof, the situation towards the main wind direction, etc. would account for the outward movement.

This had caused severe cracks in the walls and roof, and serious water damage to the paintings and supporting walls.

Since 2013 the building (and certainly the roof and the parapets) was showing much more damages because people were afraid of going on the roof to maintain it.

During the winter break of 2013/2014, a restoration proposal was made and discussed with the other conservation architects of Achi Association. It was decided to put in supplementary wooden structures to support the roof and to take away most of the load from the reclining wall and wooden screen.

This implied a demolition of the roof and some dilapidated parts of walls, putting in the new wooden structures followed by the reconstruction of walls and roof.



Achi Association India

Restoration of the 8 chörten building in Wanla

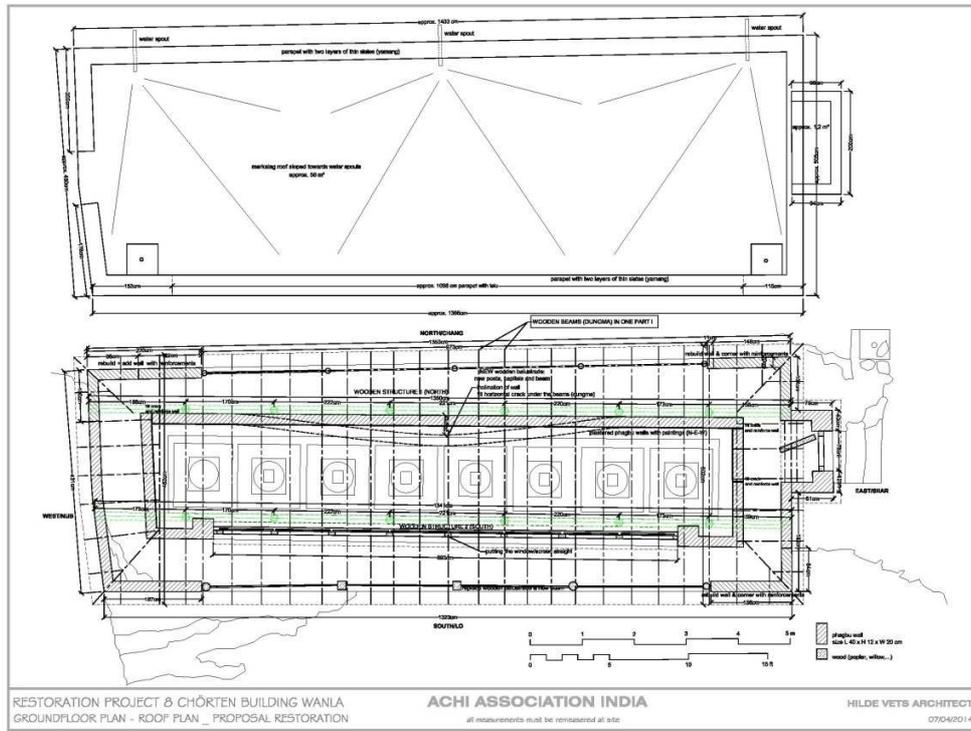


Fig. 4: Restoration proposal: plan with two new wooden structures (in green) and roof, dd april 2014 (drawing: Hilde Vets)

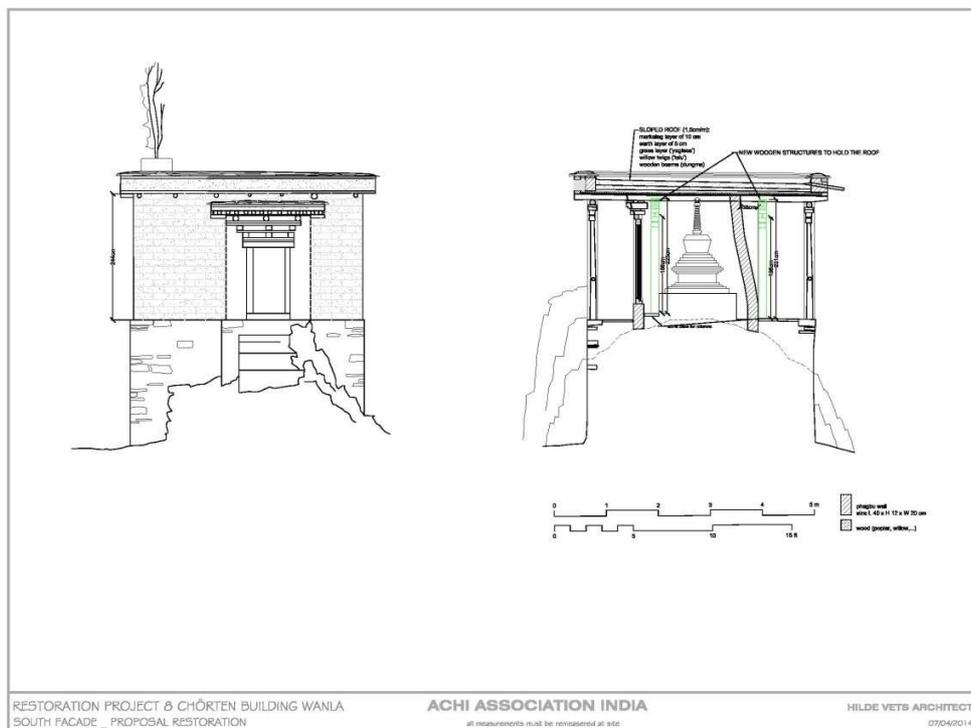


Fig. 5: Restoration proposal: section dd april 2014 (drawing: Hilde Vets)

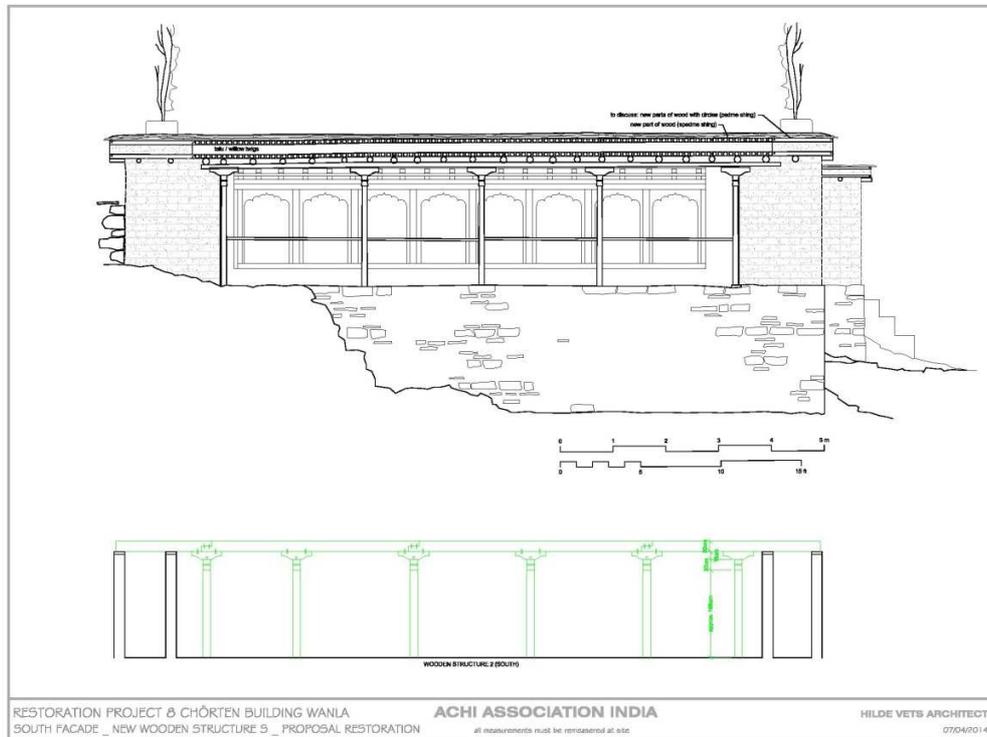


Fig. 6: Restoration proposal: south façade and new wooden structure (in green), dd april 2014 (drawing: Hilde Vets)

2.1. Preliminary note

As it is usual to make the circumambulation or *skora* in clockwise direction, for this report all building parts including the chörten were numbered starting near the entrance area and ending on the rear of the building.

The entrance of the building is considered east, the front veranda with the wooden screen at Zomal side south, the back at the riverside north.

Ladakhi words are written in Italic. We use the pronunciation as base for the transliteration, instead of the Wylie⁶ transliteration, which is difficult to read and understand.

⁶ The Wylie transliteration scheme is a method for transliterating Tibetan script using only the letters available on a typical English language typewriter. From: Wikipedia. Ladakhi language is a dialect of Tibetan.



Achi Association India

Restoration of the 8 chörten building in Wanla

2.2. Desacralization of the building

As the 8 chörten building is a 'living' religious structure and the restoration entailed a considerable risk of severe damage at the painted walls and chörten, Lama Tsewang Chumpa and Konchok Rinchen Chupipa - the present *gomnjer*⁷ of the Avalokiteshvara Temple in Wanla – decided to perform a religious ceremony or *puja* that demands the spirits of the paintings and the chörten to leave this place and reside for a while in a ritual mirror (*melong*). This ritual mirror, covered with cloth, was then stored in the house temple (*chodkhang*) of Kharapa family, the previous owner of the building.

After this ceremony, all (portable) religious items were removed: hundreds of *tsha-tsha* (miniature chörten as relic of a dead person), butter lamps, relics, etc.

At the end of the restoration of the building and the conservation of the wall paintings and chörten, the spirits will be asked during another *puja* to take their original places again.



Fig. 7-8: Desacralization of the building (photo: Hilde Vets)

⁷ This is a position/function given to a monk for two or three years, with the duty to perform all necessary religious ceremonies in the temple and to maintain the gonpa buildings.



Achi Association India

Restoration of the 8 chörten building in Wanla

2.3. Building (architectural structures)

2.3.1. Condition assessment



Fig. 9: Condition of the 8 chörten building at the start of the campaign 2014 (photo: Hilde Vets)

Before starting the actual restoration work, a condition assessment and documentation of the structure, chörten and walls were undertaken.

In comparison with the survey of 2013 the overall condition of the building had severely worsened.

The inclination of the rear wall of the inner structure and of the large front screen (wooden screen with doors) continued outwards. While in 2013 the wall was inclining for about 38 cm (at most, over a height of 230 cm), we measured this year 40,5 cm.

The cracks in the walls had widened and some more cracks had appeared, endangering the stability of the whole building. Especially the walls of the outer structure near the entrance were in a very bad condition and were separating at corners. But also in the east wall of the inner structure (opposite the entrance) two huge cracks (2-5 cm width) cut through the entire adobe bricks, affecting as well the wall paintings on the inner side.

In general the mud brick walls lacked mortar in most of the vertical and horizontal joints.

Due to the fact that the roof got inaccessible and no longer maintained, a proper drainage of the roof was no longer assured and the parapets were run down or even disappeared partly. Rain got its way through the roof and quite some walls were affected with mud runners and washed away parts.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 10-11: Condition of the 8 chörten building: the circumambulation (photos: Hilde Vets)



Fig. 12-13: Condition of the 8 chörten building: the circumambulation - details (photos: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.3.2. Restoration measures

Considering the badly conceived structure of the building and the dilapidated state of the outer walls and roof, the team decided to alter the restoration proposal.

All the walls of the outer structure (also the entrance) would be demolished and be reconstructed with old and newly made (same size) adobe bricks.

As the supporting columns and beams of the existing 'balustrades' weren't sufficient to carry the load of the roof, they would be replaced by new wooden structures (columns, capitals and rectangular beams). An extra wooden structure behind the wooden screen would help to take away the load from this screen and from the inclining wall. Roof joists running from one side to the other would spread the load as well over these three new supporting structures.

Ring beams placed on top of the walls and tied together with these new structures, would make a rigid construction of the entire building.

This proposal was then discussed and approved by architect expert, John Harrison, who was working this summer for Achi Association at the restoration project of the castle in Skurbuchan.

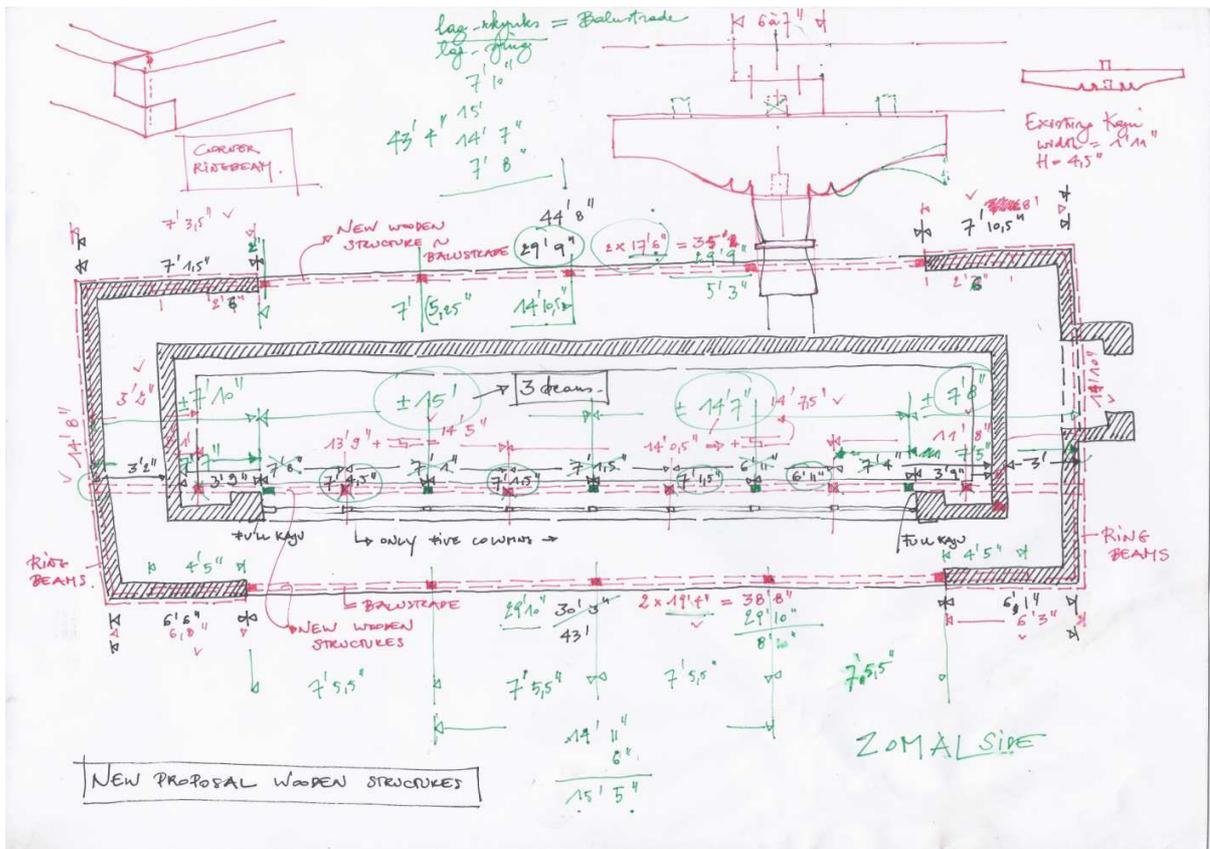


Fig. 16: New restoration proposal (sketch on site: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.4. Wall paintings, chörten and wooden screen: description and condition assessment

2.4.1. Wall paintings

The wall paintings are executed on a fine and rather thin layer of smoothed mud plaster. White paint had been applied as a background for the multi-coloured figures.

The uppermost area of the wall is divided by the roof beams into single sections of appr. 40-60 cm width. These are decorated in a floral design consisting of blue foliage and a single orange blossom each, painted freely, not stencilled (height of this floral ribbon: about 15 cm).

Below three rows of coloured strips: first a thinner brown strip, appr. 4 cm high, below a green one, divided into even intersections of colour-flow from stark to pale green, appr. 8 cm high. This is followed beneath by an orange strip executed in a similar style, about 8 cm high.

The main picture field shows smaller figures grouped around bigger figures, depicting Bodhisattvas⁸. Below the figures again three horizontal ribbons close the painted area. First, a monochrome brown strip, appr. height 3,5 cm, then a strip of whitish colour, appr. height 7,5 cm, lastly a blue strip of appr. 4,5 cm height.

The background is of a blue and green shade, while the figures mainly seem to “float” in front of it. The figures are painted in strong colours, the contour lines are black. The inner contour lines are performed in a fine brush stroke. The outer contour lines are drawn in a thicker black line, giving the painting a very graphic impression. The use of artificial pigments for the paintings is very likely (judging by its bright appearance), but has not been tested yet.

The entire painting program seems to be original, no alterations could be discovered.



Fig. 17: Detail of floral design at the top. Between floral ribbon and maroon coloured ribbon black splashes can be seen. They indicate that an inking string was used as means to construct the design (photo: Anne Voll)

⁸ The exact content and iconographic program still has to be surveyed by an art historian.



Achi Association India

Restoration of the 8 chörten building in Wanla

The paintings were well preserved, the colours still vivid. However they show some severe damages due to the poor state of the buildings' structure. As the heavy roof load pushed on the supporting walls, vertical cracks appeared. The walls were bulging out, went into strong deformation causing horizontal cracks (mainly underneath the beams/floral designs).

Leaks of the roof led to water penetration, mud runners and loss of plaster. Most strongly affected were the east and west ends of the inner structure, where water had come in with devastating effects.



Fig. 18: Leaks of the roof led to water penetration and loss of plaster. Underneath the beams the big horizontal crack (yellow arrow) caused by the movement of the wall (photo: Anne Voll)

Fig. 19: Mud runners obscuring most of the painting in the northeast corner. You can also notice the two big cracks that run through the bricks. (photo: Hilde Vets)

2.4.2. Chörten

The chörten consist of mud on an inner wooden construction. They are painted white and colourfully ornamented: the dome is decorated with garlands and the steps are partly decorated with the 'om mani padme hum'⁹ lettering.

Crafted on the base (facing the viewer's point / screen) there are quite finely made reliefs of Buddhist figures, as well painted. It is unlikely that the artist used moulds for these figures, as every figure is unique in form. They have maroon coloured backdrops, framed by swirls and clouds in relief. Every base possesses its own pair of figures, same in kind but different in expression, colour or pose. (The pairs can be seen in the chart see fig. 107 in appendix.)

⁹ The Buddhist mantra: 'O Hail the jewel in the lotus'

Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 20: Chörten no. 3 (before restoration). Broken corners and dust as well as a hunched staff. Height from floor level to top: ca. 210 cm. (photo: Anne Voll)

The top of the chörten (*chuksum khorlo*¹⁰ and *nyilza*¹¹) is made of wood and fixed around a axle-pole (*srog shing*)¹² into the vase-shaped dome (*bum*) of the chörten. The moon crescent is decked out with silver coloured and embossed paper, the circular sun is painted red and the spherical shaped flame is painted in a golden color. The 13 wheels of the *chuksum khorlo* are decorated with golden paper (chörten 2, 6, 7: embossed paper - chörten 8: plain paper, painted golden) or golden paint (chörten 1, 3, 4 and 5). In between the wheels the surfaces are painted red; at the base there is a blue coloured umbrella.

¹⁰ *Chuksum Khorlo*: Staff-like top consisting of the symbolic 13 steps, cresting the chörten like a pinnacle. From: *chuksum*: thirteen and *khorlo*: wheel.

¹¹ *Nyilza*: sun and moon symbol, crowned with a flame. The flame symbolizes enlightenment. From: *nyima*: sun and *lda*; *lza*: moon.

¹² For the description of the parts of the chörten see: *Stupa and its Technology: A Tibeto-Buddhist Perspective*, Pema Dorje, Delhi, 2001.



Achi Association India

Restoration of the 8 chörten building in Wanla

The overall condition of the eight chörten was good: the colours looked bright, the paint layer was quite undisturbed. Dust was covering all surfaces.

The maroon backdrop of the reliefs was flaking and in part lost (see chart, fig. 107 in appendix).

A lot of corners and edges had cracks, were broken off or even lost.

Water damage occurred due to leaks in the roof resulting in washed off parts combined with mud runners. Especially at the outer two chörten, only one of the two figures had survived.



Fig. 21: Base of chörten n° 8: Only one of the white elephants survived. The right corner was completely washed away. (photo: Anne Voll)

2.4.3. Wooden screen

The wooden screen is situated at the south side of the building, resting on a support of mud bricks (height of 25 cm).

The screen consists of a frame construction with a traditional elaborated lintel construction and shutters or doors, which are moveable and can be shifted aside. There are no hinges; the shutters are leaning on the window frame. They are locked with bolts of metal (probably iron), at the upper part of the window frame. All shutters are done in the same style, apart from no. 5: this one has a twin set of bolts, closing smaller shutters within the top half of the main shutter, to be able to reach a little shrine for butter lamps.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 22: The window screen from the entrance area, before construction work started. All shutters are closed. (photo: Anne Voll)

The painted decoration of the wood was only found in the upper areas on the outside of the screen, where it was shielded from climate and touch. We can assume, that the entire front was painted from top to bottom.

At the top are three rows of wooden boards (à 18 pcs/row, making a total of 54 wooden boards, each approx. 40 by 10 cm); likewise decorated with floral designs and patterns. They are divided by painted carved blocks (*pag-sna*).

A few of the boards seem unfinished. They have either been refurbished or (what by their appearance seems more likely), they were for some reason left unfinished. They show only one layer of paint. On some of these, a floral decoration was roughly sketched with something like pencil or charcoal. (fig.)

Below the wooden boards, floral decorations and even dragons can be found on the columns of the screen and the beam above the opening. The dragons and also partly the flowers are done in a *pastiglia*¹³-like technique, probably using fine clay (*markalak*) and (skin) glue to achieve the relief.

Due to the aging process, the binding medium of the paint layer is in part reduced to a minimal degree. The result is a loss of its adhesion to the wooden support. Especially fragile are decorations done in 'pastiglia' technique. Many of these have gone lost, leaving behind only traces or 'negative' forms of the former decoration.

¹³ *Pastiglia* (ital.): a relief decoration technique in paintings.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 23: Detail of the screen: dragon and clouds done in 'pastiglia' technique. (photo: Björn Bühler)

Fig. 24 : Losses in 'pastiglia', causing a 'negative' effect in the design. (photo: Anne Voll)



Fig. 25 : Left end of the screen: the paint layer washed out. Water stains and a thin mud layer obscure the image. (photo: Anne Voll)

Fig. 26 : Right end of the screen: white paint drops have splashed on the decorated elements. Also visible cracks have appeared at the connection with the plastered wall as well as in the profiled wooden blocks (*pag-sna*) due to the mechanical stress. You can also notice sketches on one board and plain monochrome colour boards. (photo: Anne Voll)

Apart from this, the main problem was the area at the southwest end of the window: as water was able to come in through cracks in the roof, it resulted in washing away the decoration of wooden panels and window frame. It seemed to have entered over a longer period of time, leaving behind an obscured image of the former decoration. Water stains and a thin mud film remained.

Furthermore, with the heavy roof load leaning on the screen, the paint layer had suffered from mechanical stress and cracked, together with its wooden support.



Achi Association India

Restoration of the 8 chörten building in Wanla

2.5. Preparatory work

2.5.1. Wall paintings

Before the propping of the building could start, the wall paintings had to be protected.

During the campaign of 2013 tests were made how to protect the paintings before propping the leaning wall. The paintings seemed to be carried out with water colours as the binding is not too strong. To protect them from mechanical damage, layers of Japanese paper had to be applied to the surface. The glue for that measure had to be rather weak, but strong enough to keep the paper in place, and in any case reversible.

Tests were made with a modified Cellulose glue, brand name Klucel E, in a 5% solution in Ethanol-water mixture. A small piece of paper was glued to the painting, and removed two days after by applying an Ethanol-water mixture. Removal was possible without damaging the painting, but the colours had darkened because of remaining glue which had penetrated the painting. This kind of penetration is almost impossible to prevent and was therefore tolerated in favour of having some protection of the surface.

Provisional propping were to touch the wall in three places. In these areas two layers of Japanese paper were glued to the wall.

In June 2014 the papers were still in place, but no props.



Fig. 27 : Two layers of Japanese paper on the painted wall (east) with the crack in the corner (photo: Anne Voll)



Achi Association India

Restoration of the 8 chörten building in Wanla

We discussed the propping with the master builders Tsewang Gyaltzen and Puntsok Dorjay. It was decided to prop the leaning painted wall in as many places as possible (see paragraph 2.5.5 Propping of the building). Therefore all painted surfaces received two layers of Japanese paper in order to minimize mechanical damage during the propping procedure. Additionally, the wooden boards of the props were padded with soft foam to prevent damages and to give them an evenly distributed connection to the uneven wall surface.

As soon as the roof was open, all the walls were covered with strong plastic sheets.

2.5.2. Chörten

All chörten were first cleared of *tsha-tsha*¹⁴, butter lamps and other objects standing about. They were surveyed and some of the paper and wood at the wooden staff (*chuksum khorlo*) had to be glued back in place. A fish glue (5%, in water) was applied for this task.

Afterwards, the chörten were wrapped. As the roof would be removed, they had to be protected against possible rainfall as soon as they would be exposed to the elements. Also, there was a risk of objects (stones, *talu*, earth,...) falling down during work in progress. They were covered with soft foam before wrapping them with strong plastic sheets.



Fig. 28 : *Tsha-tsha* collected from the chörten. (photo: Hilde Vets)

Fig. 29 : The chörten protected with foam and plastic. (photo: Hilde Vets)

¹⁴ *Tsha-tsha*: spiritual object formed like a miniature chörten, esp. in honour of a dead person. It is commonly formed out of ashes and *markalak*.



Achi Association India

Restoration of the 8 chörten building in Wanla

2.5.3. Wooden screen

The shutters/doors were numbered, taken out and stored on the roof of the underlying house (of Kharapa, the previous owner).

To prepare the window for the coming work and as an emergency measure, the screens' paint layer was consolidated. Loose paint layer was treated with injections of fish glue (appr. 5% in water). Where the paint layer had cracked up, the fish glue was applied through Japanese paper with a soft brush. To help reattaching the paint layer to the wood, it was pressed gently with non-sticking plastic foil.

As the screen also had to be propped, the paint layer was secured with a double layer of Japanese paper against the mechanical stress. The paper was glued reversibly with Klucel E in water. Additionally, a soft padding was applied between props and underground. As soon as the roof was exposed, the screen was covered with plastic sheets.



Fig. 30 : Björn Bühler securing the paint layer. (photo: Hilde Vets)

2.5.4. Walls: reinforcement

In the east wall of the inner structure (opposite the entrance) two huge cracks (2-5 cm width) cut through the entire adobe bricks, affecting as well the wall paintings on the inner side. The adjoining south wall – weakened and half reduced by leaks through the roof - was leaning outwards, worsening these cracks by the movement.

Four horizontal joints over a length of 3 mud bricks (appr. 120 cm, as well on the east as on the north wall) were reinforced with thin willow sticks (2 or 3 sticks/joint) until halfway of the bricks and filled with a course mud mortar.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 31-32: Reinforcement of the eastern wall by willow twigs (photos: Hilde Vets)

Later on the big voids of the cracks were filled with jute bags soaked in mud mortar. Once these had hardened, the rest of the voids were filled up with a mud mortar (earth, sieved river sand, straw) on the outer side of the wall. The cracks on the painted side were treated by the conservators during the second campaign (see paragraph 2.7.1).

Also the northwest corner (see fig. 13) was reinforced within two joints.

The villagers were surprised about the strength and toughness of the mud mortar. They were all convinced that cement was used.



Achi Association India

Restoration of the 8 chörten building in Wanla

2.5.5. Propping of the building



Fig. 33: Propping of the building. The arrow is pointing at the long supporting trunk (photo: Hilde Vets)

A secure propping of the building was needed to be able to take down the roof and to avoid the collapse of the inclining wall and window once the load of the roof would be removed.

The propping was not an easy task as the building is situated on a ridge without any building or rock around to sustain the props.

The first supports were put in against the inclining wall and fixed in between the chörten. A plywood board covered with insulation foam of 5 mm width was attached to protect the paintings. But these seven props did not assure enough the stability of the building while working on the roof.

The local mason and carpenter came up with a good idea: tying a long trunk to and around the building as support for the oblique props that would sustain the screen (8 props) and the inclining wall (7 props). This trunk was hold up as well by 4 other props leaning against the house underneath the 8 chörten building.

The painted wood of the window was protected by pieces of insulation foam and non-woven tissue at the place of the supporting poles.

We also decided to secure the very damaged right wall and “balustrade” (column/beam) of the south façade to avoid it from shifting away during the demolition of the roof.



Achi Association India

Restoration of the 8 chörten building in Wanla

It took the mason and carpenter with 2 helpers 6 days to complete the propping (carrying trunks up from the village, fixing the beams and the props, cutting the plywood boards and foam that were brought from Leh, ...).



Fig. 34-35: Propping of the screen and of the inclining wall, with protected chörten (photos: Hilde Vets)



Fig. 36: Extra tying of the right wall and balustrade at the south façade (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.6. Structural restoration of the building

2.6.1. Demolition of the roof and the outer walls

2.6.1.1. Roof and 'balustrades'

Because of the risky situation, only two people were allowed to work on the roof.

While taking down the parapets and the roof, we noticed that the total thickness of the clay/earthen layer was indeed much more on the southern (Zomal) side of the building: 20 to 30 cm against 7 to 10 cm on the northern side. This unbalance explained the movement of the roof and building towards the side with the heavier load.

It also revealed that most of the roof joists (*dungma*) were not out of one piece, but resting with one end on the inclining wall, increasing the load on the latter.

To remove the wooden construction of the 'balustrades' (beam, capitals and columns), lots of workers were needed to hold each of the columns as to avoid the overturning of the construction.

The whole inner structure was then protected with plastic sheets.

All the materials – earth/clay, red painted willow twigs (*spedma talu*) and mud bricks of the parapets, willow branches (*talu*) of the ceiling, roof beams (*dungma*), flat boards in between the beams (*spang-leb*, numbered when painted) etc. - were stocked for re-use.



Fig. 37: Taking down the different layers of the roof (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 38: Taking out the roof joists - SLOWLY not to damage the paintings (photo: Hilde Vets)



Fig. 39: The students are holding the columns while removing the beam (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 40: View into the inner structure after the roof was removed. Screen, chörten and wall paintings were covered with plastic sheets. The wall paintings were secured with Japanese paper, the props kept the screen and wall stable. (photo: Anne Voll)

2.6.1.2. Adobe walls

As mentioned before, it was decided to take down all the walls of the outer structure while recuperating as much of the adobe bricks as possible.

Also here, a lot of workers were needed to help carrying down the bricks and to pile the whole ones on the road/path next to the building. The broken bricks were added to the pile of earth coming from the roof. They would be smashed later for re-use in the mud mortar.

The complete woodwork of the entrance door was stocked for re-use.

At the SW side of the building we discovered that the two red painted stone chörten next to the building must be older than the 8 chörten building¹⁵. The wall of the outer structure was partly built on the base of the nearest one.

¹⁵ There are quite some chörten built on this ridge which forms the edge of the village, probably to ward off evil (enemies in all kind of forms) from the river valley. They are all situated along the ritual circumambulation path (*rgya-skor*) of the village.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 41: Labours helping to carry the old mud bricks down (photo: Hilde Vets)



Fig. 42: Demolition of the outer wall at the SW side, next to the red painted chörten (photo: H. Vets)



Fig. 43: Only the inner structure of the building left. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.6.2. Redressing the wooden screen and the inclining painted wall

2.6.2.1. The wooden screen

The entire wooden screen was leaning very much outwards (idem inclining wall), also at its ends. This affected the short walls right and left of the screen. Certainly the right wall – being washed out at the inside and separating from the adjoining wall – was leaning badly and a lot of cracks had appeared.

We decided to take down a part of this wall and buttress to 6 rows above the ground level – the height where the crack in the wall, separating the corner, stopped. This way we could straighten the screen and mason it back into the newly built wall.

Revealing the sections of the screen, a measurement of the wooden sections was done (see sketch fig. 45).

At the corner, the walls were joined again by removing the half broken bricks and fixing full bricks in the adjoining wall (see fig. 47). The new wall was then plastered on both sides.

Also at the wall left of the screen, four rows of bricks were removed and replaced.

The different parts of the wooden sill of the screen were lined up again and fixed with iron flat parts.



Fig. 44: Breaking down the wall right of the screen to be able to straighten it. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

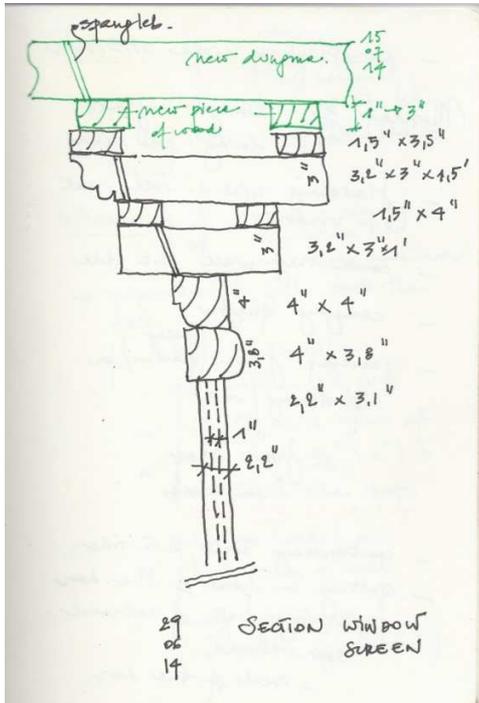


Fig. 45: Section of the wooden screen – with proposal for new *dungma* (sketch: Hilde Vets)
Fig. 46: Wooden screen after removal of the right adjoining wall (photo: Hilde Vets)



Fig. 47-48: Rejoining the two walls in the corner (sketch: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.6.2.2. The inclining wall with wall paintings

During the demolition phase, the idea of pushing the inclining wall (with wall paintings on the inside) to a more upright position got more grounded.

The arguments were:

- the rear wall of the inner construction consisted of a single adobe brick of only 20 cm width
- the inclination started at the bottom of the wall, opening two joints, and was fairly distributed over the entire surface of the wall. It went up to the roof joists where as well a big crack (see fig. 18) appeared at the side of the paintings (more or less like a bended 'piece of paper', held on the sides).
- the murals showed only few cracks near the corners, not in the middle part of the wall
- it would surely help the stability of the wall after the restoration. With the current inclination (40,5 cm at most over a height of 230 cm = 10°), the wall would probably need extra support by buttresses to avoid further movement.
- because there were props placed between every chörten and not near the corners, the force by pushing the props would be equally distributed over the middle part of the painted wall.



Fig. 49: The bottom of the inclined wall with the open joints. (photo: Hilde Vets)

Fig. 50: The inclination of the painted wall. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

On the 2nd of July, all the workers started with wetting the backside of the painted wall. This way the joints in between the adobe bricks would become more flexible.

Horizontal poles for pushing were tied around the oblique props. Stones were collected. Some volunteers were asked to give a hand.

In total 10 men were pressing the wall, using iron poles as lever, and 7 women were sticking stones behind the props. Meanwhile conservator Anne Voll and architect Hilde Vets were supervising the paintings that no cracks appeared or worsened during the process.

Each trial we managed to move the wall with some centimetres, at the end resulting in 31,5 cm (1'0,5") at the middle of the wall. We decided to stop pushing when the cracks near the northeast corner started to open more. The wall was left inclining about 9 cm at most (in the middle), meaning only half the width of the mud brick.



Fig. 51: Wetting the backside of the painted wall. (photo: Hilde Vets)

Fig. 52: Pushing of the painted wall. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 53: Situation before and after the pushing of the painted wall. (photos: Hilde Vets)

Once the painted wall was straightened to an almost upright position, the joints on the backsides of all the walls of the inner structure were filled again with a mud mortar.



Fig. 54: Filling the open joints of the backside of the painted wall. (photos: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

To enforce the stability of the walls and to protect the adobe bricks, a mud plaster (appr. thickness 10 mm) was applied. It took two trials to find out the right mixture, finally using a mixture of sand of the fields (*jing-sa*, sieved once), recuperated earth of the roof (sieved twice), river sand, straw and water. The plaster was smoothed and polished with cobble stones to make it more tough.

Around the wooden screen, a second layer of plaster was applied following the form of the woodwork, done in the same way as it was before.

A final protection layer with a mixture of fine clay (*markalag*) and river sand (*pema*) was then painted on the plaster.



Fig. 55: Plastering the backside of the walls of the inner structure. (photo: Hilde Vets)

Fig. 56: Anne Voll polishing the plaster. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 57: Anne Voll and Hilde Vets painting the final layer of *markalag* and *pema* at the walls of the inner structure. (photo: Hilde Vets)

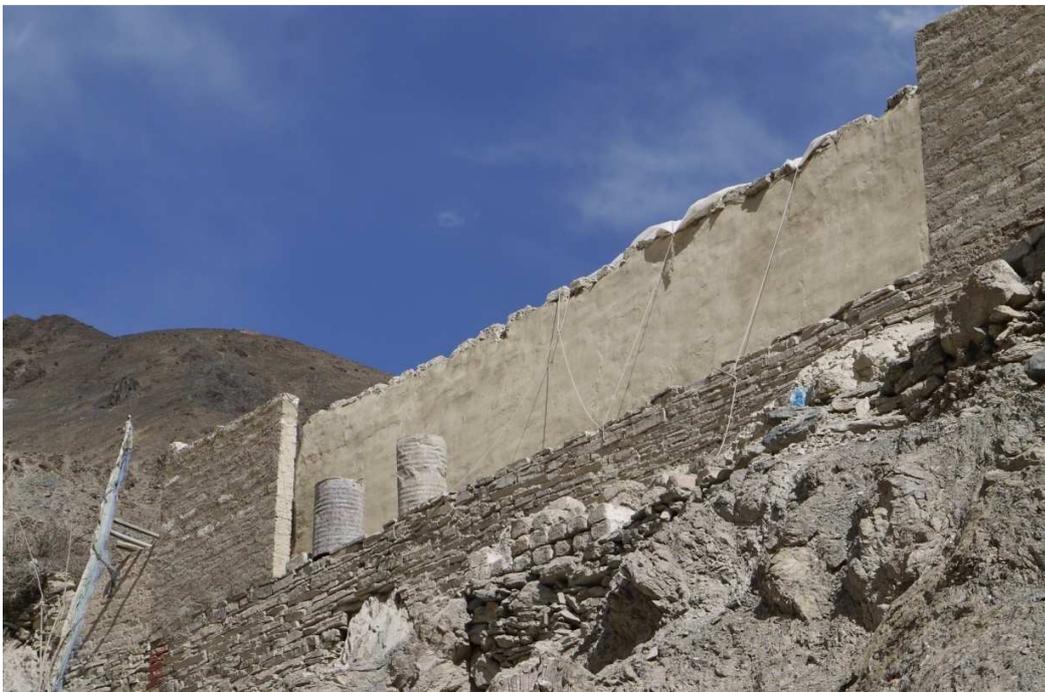


Fig. 58: Final layer of *markalag* and *pema* at the backside of the walls of the inner structure. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.6.3. Reconstructed parts

2.6.3.1. Materials

The restoration aimed to promote the use of traditional building materials like earth, clay, mountain grass, wood, slates and mud bricks, preferably from local resources.

A lot of times it required quite some effort to collect all these materials. Not only because the correct equipment often lacked, but also because transport (pick-up) was rarely available due to the ritual ceremonies that were organised all over Ladakh. During the Kalachakra teachings of the Dalai Lama (3-14th of July) the whole village was empty, the mason disappeared for a week and the workers team varied every day.

The following materials were used:

- Water (*chu*):
Water had to be carried uphill in canisters from a water point in Zomal valley. Some days it was possible to get water through a self-constructed pipeline but we could not rely on this. It was stored in two barrels.
- Earth (*sa*):
The earth of the roof and of the broken bricks could be re-used for the mud mortar (for bricklaying). This earth, which was a mixture of earth and clay (*markalag*) had to be sieved once (rough) or twice (rough and fine) depending on its use. For the plaster of the walls and for the traditional roof though, we had to collect sand from the fields (*jing-sa*). Several loads were brought up with a pick-up.
- River sand (*pema*):
Also the river sand, necessary ingredient for the mud mortars, had to be shovelled up the pick-up from the river bank. Again several loads were needed. It was sieved before mixing.
- Fine clay (*markalag*)
The fine clay can be collected at several places in Ladakh. We decided to drive to Lamayuru (40 minutes uphill), which is the closest to Wanla, and to dig the *markalag* out of the so-called "moon landscape". Three pick-up loads were brought to Wanla.
- Straw (*phuqma*)
At first it was possible to obtain straw (of the harvest of the previous year) from Kharapa family in Zomal, but after finishing a few bags, we had to get it from their summer house in Bukbuksa. Luckily Rinchen Chupi, the *gomnjer* of Wanla and trainee of Achi Association, borrowed his motorbike twice.
- Willow branches for *tal*u (ceiling of the roof) and for the parapet (*spedma*)
Most of the *tal*u coming from the existing roof could be re-used. Kharapa gave the lacking rest from their stock in Zomal and in Shila. These branches were cut at site. The existing red painted *tal*u of the parapet were all sized to the same length and tied into bundles. More or less 20% was lacking and made from new thin branches. The tops were painted red with the *marts*i paint.



Achi Association India

Restoration of the 8 chörten building in Wanla

- Mountain grass (*rtsa*)

A traditional Ladakhi roof contains mountain grass on top of the *tal*u and under the mud layer. Some workers started early in the morning walking up high in the mountains (during 3 hours) to cut *burtse* grass and to carry it down in large bundles. A total of 8 bundles were needed for the new roof.
- Wood for new structures

At first we tried to find local poplar trunks that were suitable for the new structures and for the roof beams. But there weren't enough 'dry' and 'straight' trunks available and they were also very expensive. It was decided to buy the wood in Leh, the capital of Ladakh. During the visit to Leh (4 hours drive from Wanla) on purpose of the inauguration of the office of Achi Association India, architect Hilde Vets went to the carpenter shop and chose Kashmiri poplar trunks and fir beams that were cut on place to the proper size needed. A truck would deliver the wood appr. 1 week later.
- Slates (*yamang*)

Leftover *yamang* of the previous campaign (Revival of the Heritage Path, 2013) were brought from the gonpa to the site with a pick-up and sliced into thinner pieces. Some more had to be collected from the quarry in Bukbuksa, but as only thin pieces were needed they did not have to be cut out of the rock.
- White wash (*karts*i)

Karts*i* can be obtained from a place in the mountains behind Wanla and Lamayuru. Ladakhi Achi Association trainee Jigmet Namgyal and architect Hilde Vets went trekking from Lamayuru to Djagatse *drogsa*, a mountain pasture at 2,5 hour walk uphill including a crossing of a pass. Unfortunately, there was no *karts*i available at the time being.¹⁶
Jigmet Namgyal would take care of obtaining it in Leh or in the neighbourhood (if any available).
- Red wash (*marts*i)

The red mineral was bought in the market of Leh as again it was very hard to get in Wanla.
- Plastic sheets and foam

The wrapping material was brought from Leh.

¹⁶ According to geologist Christine Bläuer this can be explained: "In Wanla (on the Kagan chörten and other religious structures) the karts*i* consists of Hydromagnesite, a Mg carbonate hydrogencarbonate which is somewhat water soluble, so indeed it might be growing or disappearing according to humidity/rain or dryness.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 59: Carrying water canisters to the site. (photo: Hilde Vets)



Fig. 60: Collecting river sand at the river bank. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.6.3.2. Fabricating the adobe bricks (*phagbu*)

The size of the original mud bricks used in the 8 chörten building is 38 cm length x 20 cm width x 12,7 cm height (15" x 8" x 5"). This differs a lot from the adobe bricks that are made currently: 30,5 cm length x 10 cm width x 10 cm height (1' x 4" x 4").

As a lot of the original bricks were broken (recuperation percentage of 60%), new bricks had to be fabricated for the reconstruction of the walls (total of 700 bricks).

Sonam Angchuk Kharapa, the previous owner of the 8 chörten building, pointed us a place he owned in the valley of Zomal, where earth could be extracted. A water tap was in the close neighbourhood and straw was brought by Kharapa.

The carpenter Tsewang Gyaltzen hammered a wooden mould (*phak-shing*) as it was no longer available for this size.

The earth was cleared of stones and sieved before mixing it with straw and water. This mortar was then pressed into the mould with a wooden tamper. Once the mould was full, it was pulled to relieve the wet mud. This had to dry for appr. a week, though turned on its sides every other day.



Fig. 61: Tamping the mud mortar in the wooden mould (*phag-shing*). (photo: Hilde Vets)

After a discussion with the mason and the carpenter, we decided to use the smaller sized bricks for the parapets. They are more light-weight and thus easier to carry on to the roof. It would also fit better with the height of the parapets in the red painted *talu (spedma)*.

A iron mould could be borrowed and 500 pieces were made in the same way.



Achi Association India

Restoration of the 8 chörten building in Wanla

All the bricks had to be carried up to the site though, meaning a walk of 180 steps. It took a lot of time and labours.



Fig. 62: Turning the mud bricks on the side for drying. (photo: Hilde Vets)

Fig. 63: Carrying the *phagbu* up to the construction site (photo: Hilde Vets)

2.6.3.3. Reconstruction of the walls of the outer structure.

For reason of easy access the masons started with the walls at the west side of the building. We decided to extend the original length of the short walls at the north side of the veranda to gain more stability at the ends of the building.

The vertical joints of the single brick walls were as well filled with a course mortar to add more strength to this rather thin walls. It was hard to convince the masons to do so, as presently this is not the custom any more.

Scaffolding was made by barrels and the recuperated roof joists.

The proposal by the local community to construct a separate niche for the butter lamps (*chod-me*) was accepted by the conservation architect and the conservators because of its preventive character. Before, the butter lamps were burned inside the shrine, in front of a chörten, causing soot on the ceiling and oil stains on the chörten and floor. It was constructed in the southwest corner, leaning against the neighbouring house, with a small wooden 'window' to open the niche from the circumambulation way.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 64: Reconstruction of the outer walls on the west side. (photo: Hilde Vets)

Fig. 65: Tsewang making the roof of the niche for the butter lamps. (photo: Hilde Vets)

Once the west side was finished, the walls at the entrance side were built. The original door was re-placed. Again, the local craftsmen were not so willing to re-use it due to the limited height (133 cm) of the door opening. But they came with a solution that was suitable and acceptable for the whole team: the door frame was put on a sill of one row of mud bricks, heightening the opening with appr. 15 cm. It made quite a difference.

As the original woodwork (horizontal bar with cut-out circles - *mutik shing*¹⁷) at the overhang of the roof was in a very bad condition and parts of it were lacking, we had new parts cut according to the original design (which is different from present).

Around the door opening a plaster layer was applied, similar to the former one (see fig. 68).

The entrance niche was then closed with a traditional layered roof: beams, *talu*, grass, earth.

All the outer walls (where accessible without scaffolding) were protected as well with a paint layer of *markalag* and *pema*. (The other parts would be protected before whitewashing.)

¹⁷ *Mutik* = pearl or the form of a pearl (white, round). *Shing* = wood or wooden piece.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 66-67: Re-placement of the original door and new '*mutik shing*'. (photo: Hilde Vets)



Fig. 68: All the new outer walls reconstructed and painted with *markalag* where reachable. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.6.3.4. New wooden structures

After the delivery of the wooden beams (rectangular beam sizes 10 cm x 17,5 cm or 4"x7" - column sizes 10 cm x 10 cm or 4"x4") and trunks, we noticed that some of the beams were not straight and some were broken. This forced us to alter the planned partition of the supporting beams.

The following was calculated and decided:

1. 'Balustrade' construction at the south side: 3 beams supported by 5 columns with 3 entire capitals and 2 half capitals (to be fixed in the side walls).
2. Behind the wooden screen: 4 beams supported by 5 columns with 5 entire capitals. The beams were running from the east outer wall till the west outer wall and would be fixed to the ring beams.
3. 'Balustrade' construction at the north side: 3 beams supported by 5 columns with 3 entire capitals and 2 half capitals (to be fixed in the side walls).
4. Ring beams placed on top of the outer walls and fixed to the supporting beams of the 'balustrade' structures.

Carpenter Tsewang Gyaltsen and his assistant Ngawang Dorjay converted the entrance place of the neighbouring house into a carpenter atelier and fixed a plastic sheet to shield against the burning sun.

All the beams and columns first needed to be planed.

The decoration curves of an original capital (*kaju*) was used as example for the new capitals. We used the rectangular beams (*kari*) to cut out the capitals. This altered the height (17,5cm instead of 10 cm) and thus the strength of the capital.

Same for the columns: the original decoration at the top was copied to the new columns.

The beams were laid along the road according to each planned structure and then made ready for placement.

For the railings we could re-use some of the old ones. Thicker willow branches were collected from Kharapa and prepared.

All the wooden parts were jointed with tenon and mortise. Cutting out the mortises was quite an effort and took a long time.

After 6 days mason Puntsok Dorjay started helping as we started to overrun our planned time.

I took a total of 7,5 working days to make the new wooden structures (not counting the *mutik shing*, etc. of the roof)



Achi Association India

Restoration of the 8 chörten building in Wanla

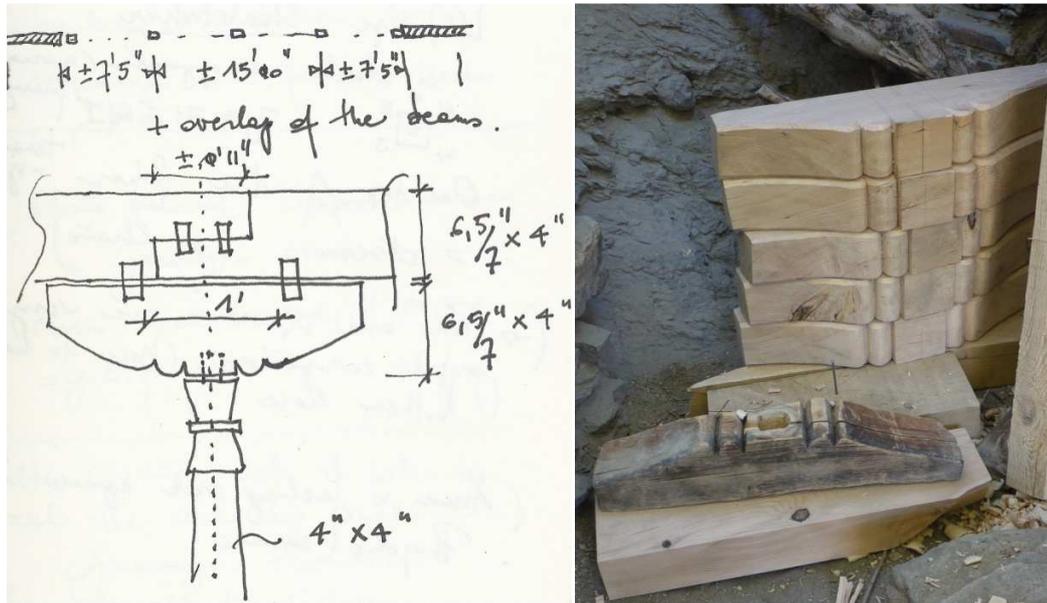


Fig. 69: Sketch of the new structures. (photo: Hilde Vets)

Fig. 70: Capitals made similar to the original capital. (photo: Hilde Vets)



Fig. 71: Puntsok Dorjay planing the beams. (photo: Hilde Vets)

Fig. 72: Puntsok Dorjay and Tsewang Gyaltsen making mortises in the beams. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

Once all wood work was prepared, we started putting up the first structure at the south facade. The heights of the supporting walls were levelled; the bases (floor of the circumambulation veranda) of the columns were repaired where necessary; the columns were laid out at their respective place; the capitals were fixed on the columns and the beams were raised with ropes from the neighbouring roof to the inside of the building.

Again a lot of workers were helping to hold the beams and columns during the actual construction.

For the second structure behind the wooden screen, natural stones were positioned between the screen and the chörten as base for the columns. A rectangular hole was carefully cut out the eastern wall with the paintings. At the west wall, this part already had been left open during the reconstruction of the upper part of the wall. The painted plaster at that particular place had fallen off earlier (but recuperated).

The north structure was put in the same way as the southern one.

Then ring beams were put on top of the surrounding walls and the three structures were fixed with them, either with screws and nuts and bolts, either with tenons.



Fig. 73: Holding the supporting beam before putting in the columns . (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 74: Raising one beam of the second structure inside the shrine . (photo: Hilde Vets)



Fig. 75: The three structures put in place . (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.6.3.5. Traditionally layered roof and parapets

The new joists (*dungma*, fir tree) were positioned in the previously provided holes of the painted wall, taking utmost care of the decoration on the bricks between the holes. The level was slightly higher than before to assure that the ceiling would not touch the tops of the chörten any more. This implied that the joists were no longer resting on the wooden screen. Long pieces of wood were fixed to close the gap and to fasten the screen to the joists (see sketch fig. 45).

Every fourth joist was connected with the underlying beam (*kari*) by lap joints (or ‘halving joints’). Then the joists were sawn off at 10 cm (4”) from the wall (ring beams) and at 20 cm (8”) from the new wooden structures to form the overhang of the roof.

At the short ends of the building, short rafters were arranged.

The original wooden boards (*spang-leb*) were replaced in the traditional way by cutting out grooves in the joists. On the north side we decided to copy the situation at the south ‘balustrade’ where there used to be (not painted) boards as well.

Then the willow branches were arranged on the roof, as support for the traditional layered roof: a layer of mountain grass, two layers of mud mortar (mixture of earth from the fields, recuperated earth, river sand and straw) and one layer of fine clay (*markalag*).

The bundles of willow twigs (*talu*) of the parapet (*spedma*) were piled in the original way above the opening at the south side of the veranda. The old and new (appr. 20%) twigs were first soaked in red paint (*martsu*) and mixed before assembling.



Fig. 76: Placing the joists on the roof. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 77: Cutting the joists to the correct length. (photo: Hilde Vets)



Fig. 78: Positioning the painted boards (*spang-leb*) above the screen. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 79: Arranging the *talu*, putting the mountain grass and fixing it with mud. (photo: Hilde Vets)

The wooden bars underneath and on top of the parapets were re-made out of the rest of the beams and out of recuperated trunks (the carpenter in the village cut them to the right size with a saw machine). The parts positioned at the *spedma* (parapet made with *talu*), were decorated with small circles or *mutik*, like it was before.

The rest of the parapets were constructed with two layers of mud bricks (small size), covered with a double row of slates (*yamang*) and topped with a mud mortar.

Three drainage pipes in black hard plastic (easier to maintain than traditional wooden ones) were inserted.

The supports of the religious banners (prayer flags) were reconstructed with mud bricks on the southern corners of the roof.

When architect Hilde Vets and conservator Anne Voll left, the entire restoration was not yet completed. The roof still needed the second layer of earth (to make the right slopes) and the layer of *markalag*. These works were planned in the next days, as well as the topping (*yamang*) and the plastering of the parapets.

The control over the construction site was taken over by Konchok Rinchen (*gomnjer* and trainee). He confirmed that these works were finished three days later. Jigmet Namgyal visited and checked the site one week later.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 80: Construction of the parapets with willow twigs and small *phagbu*. (photo: Hilde Vets)



Fig. 81: View at south facade with the (almost finished) parapet, at the moment that architect Hilde Vets and conservator Anne Voll left. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

2.7. Conservation and restoration of the chörten, wall paintings and wooden screen – protection of the new wooden structures

After the structural restoration had completed (end of July), a second team of conservators could start the conservation and restoration work at the wall paintings, chörten and wooden screen. They started with clearing the building of tools etc. and cleaning the veranda from mud.

2.7.1. Wall paintings

Plaster

With the removal of the roof, the upper parts of the wall paintings had suffered quite some cracks and losses. To secure the loose plaster, these damaged upper areas and cracks were filled with mortar. Deeper cracks and lacunae had to be filled with three layers, starting with a rough mortar, then a middle rough one and finishing with a fine *markalag* mortar (see recipes used for restoration of the chörten).

Loose material and plaster which was overlapping the paint layer (remnants of the reconstruction of the roof) had to be removed.

Paint layer

With taking out the props, the Japanese paper could also go off. Carefully and slowly, the sheets, moistened with water and ethanol, could be removed.

Fixing of loose paint layers with fish glue was only necessary in some small areas.



Fig. 82: Condition of the wall after placing of the new roof with the Japanese paper still sticking (photo: Susanne Bosch)



Fig. 83: Condition of the wall after taking off the Japanese paper and after plaster consolidation in the upper area. Mud runners still have to be removed. (photo: Susanne Bosch)

2.7.2. Chörten

The chörten, now under a safe roof, could be unwrapped¹⁸. Their condition was assessed and accordingly, measures taken.

As some of the chörten suffered broken edges, these had to be fixed or reconstructed. For the fixing of the recuperated corners, dowels of carbon fibre were inserted and glued with a mortar of *markalak* and a bit of the cellulose glue Tylose (5% in H₂O).

The cracks around the newly applied corners were filled with a fine *markalag* mortar (*markalag*, sieved riversand and 5% Tylose in H₂O).

For the reconstruction of corners, same procedure was followed. The corners were reconstructed with a middle rough mortar (earth, straw, sieved river sand, *markalag*) and then smoothed with the fine *markalag* mortar.

Loose parts at the surface were consolidated with injections of a mixture of sieved *markalag* and 5% Tylose in H₂O.

The wooden staffs (*chuksum khorlo*) on top were controlled and loose paper strips consolidated again with fish glue in H₂O. This will have to be checked again next year.

¹⁸ The damaged plastic foils were taken to Leh for recycling. The foam and the rest of the plastic sheets were stored.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 84: Reconstruction of the corner of a chörten (photos: Susanne Bosch)

2.7.3. Wooden screen

At the wooden screen, the consolidation of loose paint layer with fish glue, executed during the preparatory phase, was controlled and carried on. The glue was applied by injections, via Japanese paper or by gently pressing the paint layer down through a non-sticky plastic foil.

The short walls left and right of the wooden screen were whitewashed carefully, thus not to leave splashes on the painted wood surface.

The rest of the building would be whitewashed by local people under the guidance of Jigmet Namgyal. By the time of the report, no pictures had arrived due to communication difficulties with Ladakh (caused by the floods in Kashmir and parts of Ladakh, September 2014).

2.7.4. Protection of the new wooden structures

To protect the new wooden structures against the elements, we decided to treat them with a protection paint.

First all the rough wooden parts were sanded.

Then the conservators applied linseed oil on the 'balustrade' structures:

- Two layers of a mixture of 1 part linseed oil and 1 part Turpentine
- One layer of a mixture of 1,5 parts linseed oil and 1 part Turpentine.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 85: Treatment of the new wooden structures by the second team: south facade. (photo: Susanne Bosch)



Fig. 86: Treatment of the new wooden structures by the second team: north facade. (photo: Susanne Bosch)



Achi Association India

Restoration of the 8 chörten building in Wanla

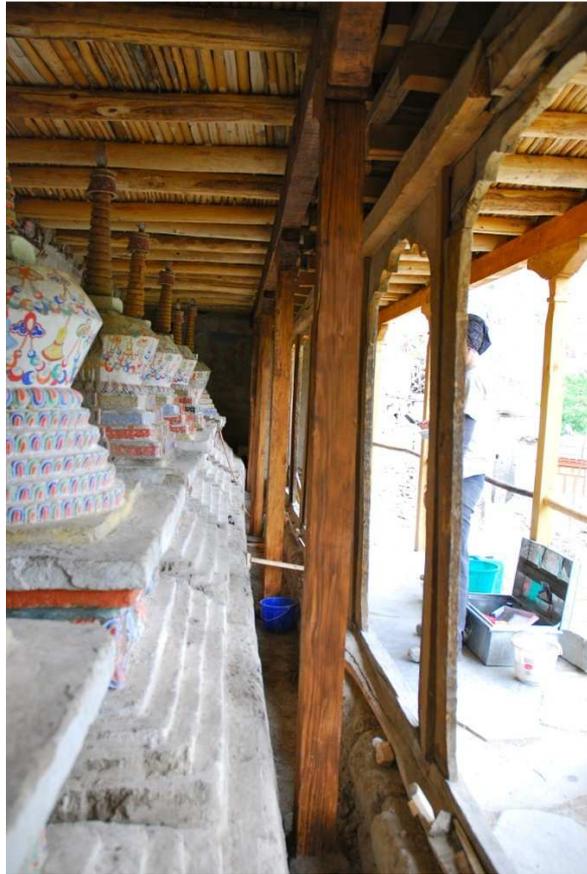


Fig. 87: Treatment of the new wooden structure behind the screen. (photo: Susanne Bosch)

The new wooden structure behind the wooden screen was protected with walnut shell stain (mixture of 1 spoon of burnt walnut shell on 1 litre of hot water). It was intended to take away the attention from the new structure by colouring it in a darker tone.



Achi Association India

Restoration of the 8 chörten building in Wanla



3. Participants

During the restoration process, the idea raised to paint all the names of the participants at the entrance wall as appreciation for their effort and to stimulate the community for heritage preservation.

The application of the participant list was done on a white *kartsa* ground by the local painter Stanzin and trainee Jigmet Namgyal. They used earthen pigments bound with Tylose (8% in H₂O).

Fig. 88: List of the participants on the entrance wall (inner structure) (photo: Susanne Bosch)

Ladakhi advanced trainees:

Thinlas Angchok Tokpopa (Urtsi), Tsewang Gyaltsen Gongmapa (Urtsi), Konchok Rinchen Chupipa (present *gomnjer* of Wanla), Jigmet Namgyal (present manager of the office of Achi Association in Leh)

Craftsman:

Puntsok Dorjay Zomalpa, stone mason
Tsewang Gyaltsen Lomapa, stone mason and carpenter
Ngawang Dorjay Pijungpa, trainee carpenter

Workers

Tsewang Rigzin Zagopa, Sonam Rigzin Rongstak Khangbu, Pasang Palmo Karbapa, Sonam Youdol Garbapa, Stanzin Dolkar Garbapa, Rinchen Dolkar Pijungpa, Tsewang Diskit, Sonam Gonbo Zagopa, Tashi Lobzang Pijungpa, Tashi Namgyel, Tsewang Dolkar, Tsewang Chospel, Stanzin Namgyel Rongstak Khangbu, Tsering Chotol, Tsering Chaskarpa, Sonam Tsering, Tsewang Gyatso, Angchuk Delegspa, Konchok Tinlas Kanjipa, Skalzang Norbu Rongstakpa

Conservation architect

Hilde Vets (Belgium)

Art conservators

First team: Heike Pfund (Germany), Anne Voll (Germany), Rocio Peinado Metsch (Germany), Björn Bühler (trainee, Germany)

Second team: Susanne Bosch (Germany), Janka Verhey (Germany), Theresia Knaapen (the Netherlands), Lisa-Mari Reichel (student, Germany)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 89: The first team starting from back row left: Hilde Vets, Ngawang Dorjay, Tsewang Gyaltsen, Konchok Thinlas Kanjipa, Puntsok Dorjay, Tsewang Rigzin. Front row: Heike Pfund, Anne Voll, Rocio Peinado Metsch, Björn Bühler (photo: unknown)



Fig. 90: The enthusiastic team of students, starting from left: Sonam Gonbo, Ngawang Dorjay, Pasang Palmo, Stanzin Dolkar, Tashi Lobzang, Sonam Youdol, Rinchen Dolkar (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

4. Outcome and outlook

All architectural restoration and conservation measures have been undertaken using traditional techniques and materials employed by the local masons and craftsmen.

The 8 chörten building is structurally preserved and its interiors, the wall paintings and the eight chörten, are saved.

The project aimed to maintain its authenticity of functions. Therefore, all restoration and conservation measures have been preceded by consent from both the resident monks as well as the village community.

During and after the restoration works we received a lot of appreciation from the locals – lay people as well as monks¹⁹.

All people involved certainly do have an increased sensibility and technical knowledge for and about heritage preservation.

During the restoration process, interesting discussions about heritage preservation took place between the conservators and the local craftsmen, workers and villagers. Often they didn't understand why a certain part had to be preserved and others not, why we didn't use cement/concrete to reinforce the walls, why such an effort was necessary to safeguard the painted walls, etc.

They tended anyway to 'contemporary' techniques, a lot of times of 'inferior quality'. We acknowledged that some traditional techniques are not used or even known any more. The oldest mason, Puntsok Dorjay (49 years) certainly had a better knowledge about the old ways than the younger one, Tsewang Gyaltsen (35 years).

We were very lucky as well to have some students (8) among the workers. They were all young people (between 17 and 24 years old) from Wanla, most of them studying in Jammu or Chandigarh. They had returned to Wanla for the summer vacation. As news was spread that we needed (paid) labour people for the work on the building, they proposed their help, earning this way a bit of pocket money for their studies.²⁰

Their enthusiasm and interest proved that they are aware of the importance of heritage preservation, as a source of pride for their culture. They all thanked the team of Achi Association for being allowed to work on this project and to learn from it²¹.

Although the trainees of the Youth Training Program had little time to spend on the project, during the short participations they were showing their capacity to follow up a restoration project.

¹⁹ Meditation master Dawa Norbu even mentioned that it is very fortunate to do such kind of work and that all of us (the whole team) should act not out of duty but out of interest and with a lot of endeavour.

²⁰ Rinchen Dolkar told that she would use the money for extra study courses on English language.

²¹ Sonam Gonbo got really interested in heritage and is thinking about studying in this field (archaeology, architecture..)



Achi Association India

Restoration of the 8 chörten building in Wanla

Over the years the Achi members have made efforts to involve local masons, carpenters and workers/volunteers in their activities. This project made it clear that a far-reaching and inclusive effort is needed to guarantee the interest and active participation of the community as a whole.

As the mentality about using modern materials like cement is getting rooted in the mind of the people, Achi Association really has to continue strenuously to transmit conservation strategies to the local communities and to support pride in traditional technical know-how by promoting the use of traditional building materials like clay, local grass and mud bricks etc. and by reviving traditional building techniques while interacting with local craftsmen and village people.



Achi Association India

Restoration of the 8 chörten building in Wanla

5. Annexure of photographs



Fig. 91: The ritual mirror in the *chodkhang* of Kharapa house. (photo: Hilde Vets)



Fig. 92: Condition of the southeast corner. (photo: Hilde Vets)



Fig. 93-94: Condition of the entrance and of the northeast corner. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 95: Condition of the east wall of the inner structure: cracks (photo: Hilde Vets)

Fig. 96: Condition of the south wall right of the screen, inclining and cracked. (photo: Hilde Vets)



Fig. 97: Condition of the south wall and 'balustrade' of the outer structure. (photo: Hilde Vets)

Fig. 98: Condition of the northwest corner. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 99: Condition of the west wall of the inner structure. (photo: Hilde Vets)

Fig. 100: Condition of the northeast corner: wall bulging out. (photo: Hilde Vets)



Fig. 101: Condition of the north 'balustrade': two carrying beams. (photo: Hilde Vets)

Fig. 102: Condition of the entrance walls: separating corners. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 103: Condition of the west painted wall: left side. (photo: Hilde Vets)

Fig. 104: Condition of the west painted wall: right side. (photo: Hilde Vets)



Fig. 105: Condition of the north painted wall: near W corner. (photo: Hilde Vets)

Fig. 106: Condition of the north painted wall: right of previous picture. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla

Fig. 107: Condition assessment: chart of the figures on the base of the chörten. (photos: Anne Voll)

Chörten
No.

Left figure

Right figure

1



Fig. 1: Peacock, facing to the right.



Fig. 2: Peacock, facing left, only dimly discernible; mostly washed away by water and covered in mud runners..

2



Fig. 3: Lion with red mane, holding something in its paw



Fig. 4: Lion with green mane. In its left paw a blue precious stone.



Achi Association India

Restoration of the 8 chörten building in Wanla

3



Fig. 5: Lion with green mane. Its left paw holds a blue precious stone, the right one a red stone.

Fig. 6: Lion with red mane. Its left paw holds a green precious stone, the right one a red stone.

4



Fig. 7: Grey elephant, facing right. On its saddle are three precious stones on a seat.

Fig. 8: Grey elephant, facing left. On its saddle are three precious stones on a seat.

5



Fig. 9: Birdlike Garuda (or Kinnara?), smiling face turned to the right. It is playing the cymbals.

Fig. 10: Birdlike Garuda (or Kinnara?), face turned to the front. Smiling, it seems about to blow the conch shell.



Achi Association India

Restoration of the 8 chörten building in Wanla

6



Fig. 11: Peacock, facing to the left.



Fig. 12: Peacock, facing to the front. The wings are spread.

7



Fig. 13: White horse with blue mane, prancing right. Probably: Windhorse (tib.: rlung rta). On its saddle the triple gem.



Fig. 14: Yellow horse with green mane, prancing to the left. The saddle is empty (lacking the triple gem?).

8



Fig. 15: White elephant, facing right but looking over its shoulder to the left.



Fig. 16: Elephant, damaged by water together with the whole corner.



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 109: Anne Voll checking the condition while pushing the wall. (photo: Hilde Vets)

Fig. 110: The men pushing the wall. (photo: Hilde Vets)



Fig. 111: Checking the inclination of the wall at the backside, during pushing. (photo: Hilde Vets)

Fig. 112: Stones put behind the props while pushing: max. of 30,5 cm. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 113: East wall of inner structure: reinforced crack filled with jute bag soaked in mortar. (photo: Hilde Vets)

Fig. 114: East wall of inner structure: cracks filled with coarse mortar. (photo: Hilde Vets)



Fig. 115: Making the roof of the entrance niche: *talus* and *burtse* (photo: Hilde Vets)

Fig. 116: Making the roof of the entrance niche: fixing the *burtse* with mud mortar (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 117: The carpenter atelier. (photo: Hilde Vets)

Fig. 118: The carpenters making the *mutik shing* (photo: Hilde Vets)



Fig. 119: Prepared columns and capitals for the new wooden structures(photo: Hilde Vets)

Fig. 120: Cutting and binding the *talu*, shaded under some plastic sheets. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 121: The columns and capitals positioned at their respective places: south. (photo: Hilde Vets)

Fig. 122: The columns and capitals positioned at their respective places: north. (photo: Hilde Vets)



Fig. 123: Putting in the wooden structure at the south veranda. (photo: Hilde Vets)

Fig. 124: Architect Hilde Vets checking the verticality of the columns. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 125: Holding the middle wooden structure. (photo: Hilde Vets)

Fig. 126: Our joyful mason Puntsok Dorjay. (photo: Hilde Vets)



Fig. 127: Anne cutting out a rectangular piece of painting for the new beam (photo: Hilde Vets)

Fig. 128: West side where the new beam will be positioned. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 129: The connection between the beam of the middle structure with the ring beam.

Fig. 130: The ring beam in the northeast corner. (photos: Hilde Vets)



Fig. 131: The materials: *yamang*, sand, *pema*, *burtse*, *markalag*, *talu*. (photo: Hilde Vets)

Fig. 132: The new *dungma* in the northwest corner. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 133: Construction of the roof. (photo: Hilde Vets)



Fig. 134: Cutting grooves in the *dungma* for the boards or *spang-leb*. (photo: Hilde Vets)



Fig. 135: Getting up the materials while singing! (photo: Hilde Vets)



Fig. 136: The roof with first layer of mud and materials for parapets. (photo: Hilde Vets)



Achi Association India

Restoration of the 8 chörten building in Wanla



Fig. 137: Construction of the parapet with *talus* (*spedma*). (photo: Hilde Vets)



Fig. 138: construction of the parapet with small *phagbu*, *yamang*, mud mortar. (photo: Hilde Vets)



Fig. 139: Tea break under a roof ! (photo: Hilde Vets)