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Preservation Practice between Identity and Social Issues: The Case of Gayantou Ethnic Village in Yongzhou, China

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Abstract. Ganyantou village is located in the southern part of the Hunan Province in China. The village is located between Jingshui river and Xianshui river, not casually, Ganyantou means “village positioned between two rivers”. The Black Gate House, the studied site, is one of the six ancient rural residential complexes of the village. It was built in 1638, during the Ming Dynasty (1368-1644), and belonged to the Zhou family. In the last decades the Hunan Province Administration has been facing the decline of the cities’ quality of life, being overcrowding-related problems one of the main social issues in big cities. As an attempt to solve the problem the Administration in collaboration with Hunan University, is trying to encourage rural village residents to remain in the countryside by building new villages – with appealing urban standards – or in the best cases, by restoring the existing buildings. The aim of the research was also to investigate the site regarding its materials, its construction techniques and, above all, the problems and causes of its deterioration and its structural instability, resulting in a conservation and reuse draft project afterwards. The specificity of the survey was its limited use of technology, in order to give students a replicable methodology for any similar case study. The geometric, material and deterioration survey in fact, was carried out on a simple and traditional way, with precise and scientifically correct techniques. Students were able to learn a fast and low-cost, yet correct methodology concerning direct data acquisition, an essential phase prior a conservation and reuse project proposal.

1. Typological and historical overview

The courtyard-style building is one of the most widespread traditional typology of Chinese traditional architecture. Whether it is an Imperial Palace or a common residential building, it is usually composed by more than one building. These complexes are normally arranged according to a certain orientation, usually along a north-south axis with its main building facing south; only few architectural complexes present other provisions, which may be due to specific limits of topography, religious convictions, or geomantic customs. Small courtyard-style houses (with smaller courtyards with eaves on the perimeter) are found in climates with very hot summers. This typological variant allows the maximum use of air in the home. The central open space is the centre of daily life, which takes place equally inside and outside. This type of house is popular in the Yangzi valley and in the south, especially in provinces such as Jiangsu and Hunan. The buildings are generally composed - from the façade - of: shielding wall, porter, entrance hall, hallway, main room - where guests are received - and women's rooms - where women reside, also known as “upper house” [1].



Furthermore, grouped-court houses appeared to serve more than one family, and led entire clans live in this type of dwelling. In some cases, it can present some features that may it look from the outside as a huge fortified compound.

1.1 Chinese Ancient wooden architecture

The wooden structural system was used extensively as early as the Spring and Autumn Dynasties (770 - 476 BC), but it reached its greatest development during the Han Dynasty (206 BC - 220 AD). The timber system is considered the largest contribution by China in structural technologies. The main reference on the art of Chinese traditional timber is the *Yingzao Fashi* (营造法式), literally “Treatise on Architectural Methods or State Building Standards”. Imperial architect Li Jie (1065-1110) edited it and it is one of the most important instruments thanks to which the ruling authorities began an early standardization of construction methods [2].

Two or more parallel structural frames generally organize the timber structure. Columns and beams compose each frame, while crossbeams tie perpendicularly the frames together. At the top a combination of posts, secondary beams or other smaller connection elements, outline a gable roof with an inconstant slope due to punctual supports in contrast to Western structures where diagonal elements such as struts are used. In fact, while in the western truss system, the horizontal tie-beam works by traction applied through the diagonal struts, the trilitic system of the Chinese carpentry roofs involves a shear stress to the horizontal beam as it receives compressive loads through the posts. These structures often had false ceilings with simple ornaments made from strips of wood covered with paper, while for buildings of greater importance Chinese architects opted for elaborate structures with latticework or coffering. For roofing the most common solutions were ceramic tiles or terracotta roof tiles.

The dense forests along the Yellow River in ancient China provided abundant wood resources more accessible than other building materials. In formal terms the structural wooden frame provided great freedom when constructing dwellings and its plan could assume many shapes. In structural terms the main advantage is its resistance to earthquakes, since the elastic quality of the wood and the flexibility of the joints make these structures earthquake resistant; although sometimes masonry walls might fall apart, the wooden frame would usually stay stand [3]. In fact, exclusively the wooden frame supports all the loads of the buildings so the internal walls have mainly enclosure and distribution purposes (besides their contribution to the structure stiffening) which results in a great flexibility in the realization of doors and windows and their material choice. This feature made it possible to adapt the system to the multifarious conditions of the vast Chinese territory according to the local climate.



Figure 1. Aerial view of the village from North

2. The studio case

The Zhou family complex is located in the southern part of the Chinese province of Hunan in the village of Ganyantoucun (干岩头村), a village located between two rivers: Jingshui and Xianshui. (Figure 1) The residential complex faces north, towards the river, while its rear part overlooks a mountain range. This results in a grandiose desirable location according to the Feng Shui criteria.

The history of the village dates back to the Ming Dynasty (1368-1644) when the first members of the family migrated to this area. The complex consists of six groups of grouped-court residences or *mansions* (as called by locals), whose construction was carried out between the 15th and the 19th centuries. The oldest building was built during the Ming Dynasty, between 1450 and 1457, while the most recent one was finished during the Qing Dynasty, between 1875 and 1909.

Each mansion has interesting functional features as the result of geographical, climatic and social conditions. Drainage systems are developed making use of the land inclination on which the building is based, from the back of the buildings “upstream” to the front, which faces the river at a lower altitude. This way each courtyard is equipped with a perimetric system that allows the water to flow as each courtyard is connected to the next one in a progressively lower level. Each building inside the mansions is composed by the wooden timber structure plus two very high masonry perimeter walls that overhang even the ridge of the roofs. In case of fire, masonry walls contribute to block the flames propagation in lateral senses. The courtyards, on the other hand, would limit the propagation from the front and the back of each building; between one to the other. Some entrance courtyards were built specifically for defence and contain various elements such as turrets, surveillance balconies, loopholes and sturdier metal-clad doors. Furthermore, these extra-large courtyards were ideal places for family gatherings, ancestor worship, weddings and funerals.

The buildings have various carved wood masterworks on structural elements such as trusses, columns and corbels, on the fixtures and on wooden partitions. There are also stuccoed and coloured fixtures and some entrance doors have figure paintings. You will also find chromatic vestiges on wooden structures suggesting that in the past they might have been completely plastered and painted in black. There are also some masterpieces in sculpted stone on the thresholds of the gates, on some flooring elements as well as on the column bases themselves.

2.1. The Black Gate Mansion and its “main pavilion”

Zhou Ziji, the eldest son of Zhou Xisheng in 1638, built the mansion (Figure 2). Zhou Ziji wanted to show respect for his father's house, the Red Gate Mansion, so he decided to paint it black. The style and the ornaments of the building are similar to those of the Red Gate Mansion, but unlike it, its courtyards are wider and more ventilated, its structure is composed differently and it incorporates a garden in the back. The building occupies about 2,500 square meters. The Black Gate Mansion complex consists of a series of buildings arranged along a central axis. The oldest rooms are southernmost rear part - firstly home, then place of ancestry veneration - while the more recent environments were gradually built to the south.

The present study takes the main pavilion as example in order to deepen some aspects on material and structural deterioration. The main pavilion is the space in which host reception took; it was both a place of representation and of distribution to the rest of the mansion. It is about 12,50 meters wide and 9 meters deep and it is covered by a double-pitched roof. The smaller sides consist of two mixed- masonry walls 40 cm. thick and with a maximum height around 7 meters.



Figure 2. Main façade of the Black Gate Mansion. August, 2016.

2.2 Structural system: wooden timber and masonry

The artefact rests on a beaten earth floor limited on the long sides by slate drainage channels. The beaten earth technique is locally called “the three-earth combination”, as the mixture used contains three different components: loess sediment, lime and fine local sand.

The structure typology of the pavilion is Tingtang [1]. This typology is characterized by a repetition of frames (*liangjia* in Chinese) made of columns of different heights occasionally extending up to the roof supports. In formal terms, this typology is distinguished by having an exposed roof structure. (Figure 3)

The wood used in the Black Door Mansion comes from a conifer whose species is most probably *Cunninghamia lanceolata* (popular China fir), a native plant from central and southern China, characterized by a yellowish brown colour heartwood, thin grain and a fine and homogeneous texture. However, it has the disadvantage of not being very durable in situations of direct contact with moisture. The timber skeleton in fact, rests on a series of bases made of a granitoid stone; this shrewdness isolates it from the wet floor during humid seasons.

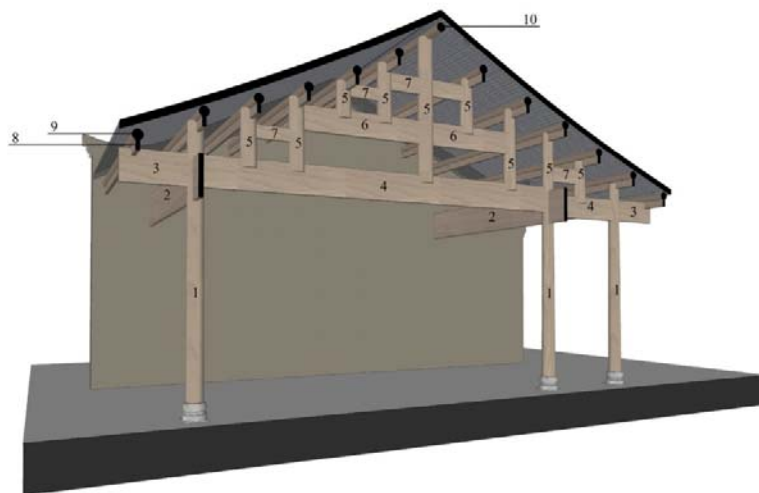


Figure 3. Diagram of a wooden frame (1. Columns, 2. Crossbeams, 3. Cantilever beams, 4. Beams, 5. Posts, 6. Secondary beams, 7. Secondary crossbeams, 8. Joists, 9. Purlins, 10. Ridge purli)

The connection between timber elements takes place with the use of mortise and tenon joints or with the use of wooden wedges. The only exceptions are the ends of the perpendicular crossbeams, which are simply

supported by the masonry walls (without any further connecting element). The internal partitions, of which only a few traces remain, gave in the past a further stiffening to the structure as they kept in place the joints between the columns and the beams.

The pavilion also features special connectors that we will call *set squares*. These fan-shaped beautifully carved wooden elements are stuck on the top of the columns or the posts. These transfer the load of purlins to the underlying beams or cantilever beams. In this hypothesis set squares would help to keep the cantilever beam horizontally in place just as the main beam, otherwise it would naturally tend to rotate downwards.

The timber skeleton is enclosed between two masonry walls. Lateral masonry walls are one of the typological foundations of traditional courtyard-style dwellings. In this case in addition to confining one residence to the other and organizing the buildings according to a central symmetry axis, it has an important role in fire prevention and provides support to part of the wooden roofing structures; crossbeams and purlins.

Lateral walls are composed of three different masonry bands. The basement (Type I masonry) is formed by two wall facing of small and medium-sized pebbles arranged with an *opus spicatum*-like pattern. Pebbles are held together with a *coccio pesto*-like mortar. The intermediate wall zone (Type II masonry) has a height of around one meter and is made up of traditional local bricks featuring a very particular colour scheme that varies from yellow ochre to grey mixed with cerulean blue, not casually they are locally called “Blue Bricks”. Their average size is around 25 x 15 x 5 cm. and are arranged in two simply apposed wall facings made of stretcher courses, without any connecting elements between them. The upper wall zone (Type III masonry) has the typical gabled shape and the peculiar pinnacles at its ends, which distinguishes, with infinite variations, traditional Chinese architecture. This zone is made up again of “Blue Bricks”, arranged though differently; in this case they constitute box-shaped courses, by its particular arrangement (rowlock either shiner), resulting, additionally, in a noteworthy pattern on façade. However, wall section remains somewhat devoid of material, resulting on a great disadvantage in structural terms.

2.3 Site survey

The site was subject of study during a high formation workshop held in August 2016 organized by the Architecture College of Hunan University and by the Polytechnic University of Milan. The main intent of the workshop was to show locals good practices of maintenance while training new generations of experts.

The workshop was attended mainly by Chinese architecture students (grads, master and PhD students), plus two exchange undergrad students from Princeton University (USA) and two graduate students from the Graduate School in Architectural and Landscape Heritage of the Polytechnic University of Milan.

A geometric survey was carried out on a simple traditional way with precise and adequate techniques, in order to give students a valuable graphic basis to represent on data regarding material and deterioration survey. Students were able to learn a fast and low-cost, yet correct methodology concerning direct data acquisition, an essential phase prior a conservation and reuse project proposal. (Figure 4 and 5)

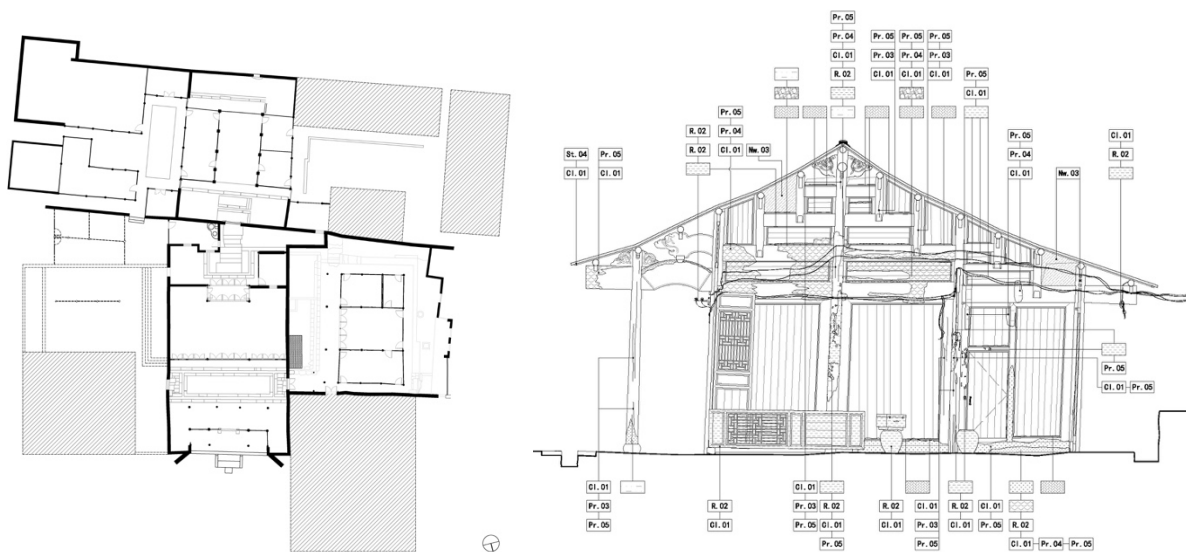


Figure 4-5. Floor plan and section plane of the Black Door Mansion.

3. Wood deterioration

3.1. Adopted standards and recommendations

Lacking specific Chinese standards on wooden cultural heritage, the ones in force in Italy (UNI) and being adopted throughout the European Union (CEN standards) have been adopted.

The main documents used in the Red Gate Mansion were those on inspection methods and those on the identification of wood species. Other main general reference standards have been those related to wood defects and to the qualitative classification of timbers. Also used during the in site works and during the return of data, the ICOMOS International Wood Committee principles and guidelines were used. [4]

3.2. Main characteristics of the wood species and local climatic conditions

As previously mentioned, the wood species used for the structures is *Cunninghamia Lanceolata* (also called China-fir), a species belonging to the genus of Cupressaceae (conifers), a family of gymnosperms plants. It presents itself as a large evergreen tree (They may reach 50 m in height) of conical bearing with horizontal growth branches, often tending towards the bottom.

The Hunan Province is located in the central-southern area of China, which is well known for its mild winters and its hot and muggy summers. The rainfalls throughout the year determine rather high humidity rates and consequently water facilitates the proliferation of several types of insects and fungi.

3.3. Wood fissures

Almost all the fissures detected are attributable to the effects of the hygrometric shrinkage. Although it is a completely natural phenomenon, shrinkage fissures are considered to be wood defects (mostly if they are in the slope of grain condition) as they constitute points of discontinuity in structural terms and provide an ideal environment for the develop of biotic aggressions. Among the analysed fissures, there are no worrisome cases such as to compromise wood mechanical characteristics; fissures do not go through any element's section moreover China-fir wood rarely determines slope of grain.

3.4. Wood-damaging insects

The research was based on the only visible traces: the exit holes on wood surface, as data regarding geographical area or regarding frass typology were not sufficient at the time. Two types of exit holes were found on wood surface:

- Small holes: superficial and widespread rounded exit holes. They have a diameter of around 1,5 – 2 mm and do not have any particular colouring on their edges. This type of holes is compatible with the *Anobiidae* family.
- Big hole: round shaped holes with sporadic and radial appearance. Their diameter can go from 4 mm up to 7mm and have no particular colouring on their edges. This type of holes is compatible with the *Hymenoptera* order.

The presence of at least one case of termites' infestation (*Isoptera*) deserves a separate mention. This kind of infestation was easily recognizable for the distinctive self-produced tunnel on the wood surface as well as for serious damage produced inside the wooden section.

3.5. Fungal attack

Fungal attacks are difficult to represent as they are homogeneously distributed over most surfaces of infected elements. The infection develops in wood humidity condition over 18%. The precarious conditions of the roof and the poor ventilation of some structural joints (particularly on wooden elements inserted on the wall) are the primary cause of this kind of deterioration. Deterioration initially manifests through chromatic alteration (either darkening or clearing up) while the progression of the pathology determines in the last phase decay; wood caries with consequent reduction of the resistant section of the profiles.

The rottenness level found in some points is very advanced; this is particularly worrisome when localized on crucial nodes of the structure. The visible past substitution of several portions of elements (or even entire elements), gave us a rather significant picture about the fast propagation of fungus. This situation could threaten the most basic conditions of security. We believe that a continuous repair (or substitution) of the damaged parts can only constitute a temporary solution to the problem. It can just be solved through an intervention on the primary cause, the roof covering and the installation of an adequate drainage system for rainwater.

4. Structural deterioration

The visual inspections conducted in on site and on the returned geometric survey allowed us to formulate hypotheses about the origin of the structural instabilities. Most of the cracking phenomena is located near the purlins dovetails in the wall, and have a certain correspondence between one wall facing and the other. This could be the result of concentrated loads of compression. The main injuries can be traced immediately under the tothing points, and due to the particular construction technique described in the entry "Masonry type III", cannot be defined as real cracks, but rather the effect of two bricks moving away from each other. The lack of resistant mass of this kind of masonry, transfers the load on the vertical mortar joints, which obviously are not suitable to stand such tensile stresses and they break. This results on the opening of the box system of the wall section.

The lower part, identified as "Type II Masonry" suffers from a bulging phenomenon in both wall facings due to crushing press-flexion, resulting on an important gap visible at the East wall South-end. The remaining cracks are superficial and concern the plaster, often corresponding to the influence areas of more consistent cracks. The scenario does not currently appear to have repercussions on the base area of the walls "Type I Masonry", which is instead more affected by problems related to rising damp.

4.1. Structural failure points

The mechanisms of structural instability affecting the structure can be classified into two categories: an out-of-plane horizontal mechanism and a vertical mechanism on the wall plane. The obvious out of plumb wall was determined by a failure of the entire structural organism. To understand these phenomena, it will therefore be appropriate to consider the two structural systems in their mutual interactions; the wooden timber and the wall's masonry.

Two parallel timber frames form the wooden structure and by a series of crossbeams going from wall to wall, tying the timber frames through its columns. Crossbeam extremities transmit part of the loads to the wall, thus acting as supports. Under normal conditions this system is able to transmit the loads to the ground

with vertical compression stress. The lack of maintenance of the timber joints, as well as the lack of internal partitions, has made the structure unstable. The crossbeams to the masonry through their support holes transmit the new horizontal loads, as they do not have any opposite axial constraint. This resulted on an out-of-plane force causing the overturning wall. The inclination of the wall though, is not constant along its entire height; it undergoes instead some variations corresponding mainly to the interface levels between the different masonry zones mentioned above.

There is a second mechanism identified as in-plane collapse mechanism. This contributed or caused the main cracking phenomena of the wall. The masonry is not able to give adequate response to the compressive stress concentrated loads of purlins' and crossbeams' support holes. The shearing force is transmitted as tensile stress on bricks and mortar joints. At a macroscopic scale, the action manifests itself as evident vertical cracks due to the rotary tendency of the two pinnacle wall-ends.

The deterioration of the roof covering is the main cause of wood deterioration. The timber structure presents a general laxity when it comes to the joints maintenance. Cantilever beams' movements determine a failure on the roof as they are the main support for the eave purlins, causing serious water.

Besides that, both structural frames are in fair conditions, except for the main beams' inflection, the concentrate loads given by posts positioned on them determined a considerable deformation. This also caused its extremity joints to move down their original position on the columns. Although there are no particular degradation phenomena due to wood-damaging insects or fungus, the widespread humidity stains prelude future risk scenarios.

5. Past strengthening interventions

5.1. Traditional maintenance: testimonials of a local elderly man

There was the opportunity to interview a local inhabitant during the site survey. The oral testimonies are very relevant in order to learn which were the best past maintenance practices that could be repeated under today's conservative approach. Furthermore, the interview let the testimony of how strong their wish to remain is, nonetheless their still difficult life conditions.

"We have amended this mansion four times. It has to be done every five or six years. The house I live in needs to be amended every two years. Otherwise it won't last a hundred years. How to repair? Changing the tiles on the roof. Repairing the broken ones. If wood components broke, one should buy new timber and hire carpenters make new one. Local, timber and tiles all local materials. We produced roof tiles ourselves. Mainly China fir wood, because it lasts longer, better than other wood. There is China fir wood here in this area, quite abundant. We had to hire carpenters, since we do not know the carpentry. There were carpenters came from other places, and local ones. Those from other places were more skilled. We rarely check the roof, unless it is leaking. [...] When it is leaking, we would reorganize the roof tiles of that part. We hire carpenters. Some of them would come to the house and show the host their crafts. Electricity was set up in 2001, organized by the village government. Other works like telephone lines were set up by the families". "The black Mansion faces north, with good airflow. The mansions over there do not have such condition, with blocks. The other mansions were built nicely. The main direction is bad, but the sides are slightly better. Not balanced, no good. It is indeed inconvenient to have no bathroom inside, but I do have a kitchen. We all have kitchens, which left by ancestors, old kitchens. In my opinion, we could figure something out if we move back in this mansion. It is inconvenient without a bathroom. Probably there is a solution; maybe we would walk a longer way. [...] I hope it could be restored sooner, for us to move back in. It is good enough to restore it as it used to be. After all, it won't be fantastic anyway. One can only amend some parts, or replace the beams. Fix the roof tiles, reorganize the floor, and that will do. Now there are very few young carpenters. [...] The carpentry is not need now. It is useless to learn it. It is bricks everywhere; even doors are made with aluminum alloy, not wood. Carpenters are not needed even to set up beams. Those new buildings are not better than our wooden houses. [...] Those new buildings look good outside, but do not last long. This Black Mansion is comfortable to live in. It is broken now without restorations. I would move back in once it is restored. We the old move back in, while the young are moving to the town. All my five children moved to there, and also their

children. Only the sixth child of mine stayed here. His children need to go to school. It is inconvenient to rent, better to have his own place. They can deal with it after the children's education. I am willing to move back in here. It is spacy, and no wet feet in rainy days. It is good to do everything, like holding banquets. In those apartments, different family have to cross each other's' place, no good. Yes, it is ok to develop tourism. Who would disagree? How much time do we still have? Our offspring could work on it. We could benefit from tourism development. It is good to have a better life. My grandchild is nine years old. My son has had a daughter then would not have more child. I told to have more children he refused. My grandchild won't live here. Her father has already arranged for her to study outside. After education who would know where she goes? No one! I would wish for her to live in another place. It is not good here"¹.

5.2. Contemporary maintenance

They are mainly realized with insufficient means and with very basic masonry techniques. In general terms they are destined to remedy in-plane collapse mechanisms of the East wall through two different operations.

On the North end, there were already some contemporary shacks stuck to the outer wall facing of the northernmost pavilion of the Black Gate House. These shacks, together with the wall North end, determined a door-like passage as inhabitants built a reinforced concrete lintel with an overlaying brick wall. This intervention, probably unthinkingly, provides in-plane support to the old wall portions.

The South end instead, not having any past supporting structures, showed consequences attributable to excessive compression due to the collapse mechanism; the pinnacle-end rotation determined the expulsion of part of the base masonry. The operation carried out on this portion, reintegrated the expelled section with concrete blocks, which is more resistant to compression than blue traditional bricks. In this sense, the new *spur*, together with the underlying foundation, respond to the compression load with an equal and opposite strong action. This action concentrates in the first area of lesser resistance that is the interface between the pillar and the overlying masonry wall section, determining the gap between both wall facings.

We can conclude, affirming that the contemporary interventions do not solve static problems; they rather simply move them elsewhere. An effective consolidation intervention, once again, must operate on the primary cause of the failure and not on its effects.

6. Conclusions

Regarding the protection of historical built heritage, and in particular villages of the rural tradition, the national legislation of the People's Republic of China provides general indications for the drafting of a protection and development project [6]. In order to establish a scientific procedure - that is manageable in objective terms - the legislation organizes the project on the basis of some steps. These steps define, beside the overall requirements and objectives, the scope of protection, the delineation of zoning, the characteristics analysis and values evaluation, the protection measures and timing and the basic requirements of the development planning.

The first step defines the safeguard priorities; in accordance to the law, the planning should aim to protect natural resources and landscape, respect traditional style and maintain local ethnic characteristics, promote the coordinated development of economy, public health and safety and adapt to the material and spiritual needs of modern life.

The following step provides an analysis of historical, artistic, scientific and social values in order to obtain a deep knowledge of the heritage. In particular, the law [7] suggests to compare the traditional villages with the most famous ones considering the following characteristics: natural landscape environment, traditional pattern and overall style features, traditional architectural features, elements of historical environment and intangible cultural heritage. This type of analysis should be oriented to acquire a better definition of protection measures, which is a basic requirement for the third step. According to the law, this planning phase should include: protection principle and scope, protection measures and

¹ Interview to 68-year old Mr. Zhou Quiming done on 4th August 2016.

construction control requirements, requirements for protection of traditional pattern and historical style and a five-years phased program of works and maintenance.

The last step is about the fundamental requirements for the village development planning [8], which basically means to analyze the advantages and disadvantages of the environment development in order to put forward suggestions and establish an orientation path for the village. Through this kind of planning it should be possible to improve living conditions and residential comfort, enhance building safety and propose a village road network – public transport management, parking facilities, possible tourists' routes – without changing the street scale and style of the situation.

Even within this research limits we have seen that the Chinese legislation gave proof to be up with the times regarding the modern protection challenges, such as the infrastructural and touristic development of villages, the attention to environmental resources and the local economies, the living conditions of the inhabitants and the focus on the intangible cultural heritage.

We believe that the only way in order to guarantee the most efficient protection of the huge Chinese traditional built heritage is by keep using it for the same function it was built. Nevertheless, this is not possible without creating strong economical perspectives for the inhabitants and let them live in comfortable houses. The interview we took from the locals gave us a better understanding of the reasons why the younger part of the population is increasingly abandoning the villages, that is to find easier jobs and cleaner houses in the cities. This is not strictly a heritage protection issue, but also a social and economic one, for these villages are food production center, and without the work of the farmers it will be impossible, in the next future, to sustain the Chinese population needs. The Province administration seems to be aware of the problem and is currently trying to reverse the trend following two different ways, apparently depending on the condition of the structures.

The first way consists in building brand new villages next to the ancient ones, which are maintained only for tourism purposes. This seems not to be a proper solution, because on one side a “death” village will necessary provides a poor educational touristic experience, and, moreover, the inhabitants usually prefer to live in the same homes of their ancestors.

The second way implies the restoration of the ancient villages, which theoretically represents a better approach than the first one provided that the works are carried out properly. As a matter of facts, the cases we had the opportunity to explore were conducted with a non-scientific approach, and mainly constituted by different techniques attempts largely applied without methodic principles. On all these aspects, and above all on those related to the techniques of materials conservation, the local law suggests a generic approach without ever providing detailed specifications – which is proper of the scientific method it would like to aspire to. The results of this invasive way of working completely change the perception of the identity of the villages.

In order to preserve the authenticity of the site – both of the materials and of the living function – a preferable approach would be based on the minimum conservative intervention to guarantee safe and decent life condition. This would mean providing the necessary facilities according to modern living standard (toilets, electricity, clean and waste water supplies, cooking stoves) and teaching local inhabitants the ordinary maintenance techniques to enable them to be responsible and take care of their own homes.

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