Wall Building

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Case Study

BUILDING ADVISORY SERVICE AND INFORMATION NETWORK
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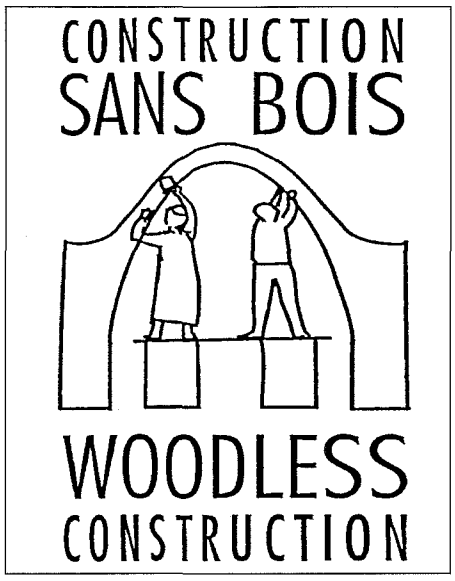


Woodless Construction – 2
The training of trainers and builders: A case study in Filingué, Niger

"Woodless Construction" is the name that has been given in the Sahel to the construction of buildings, in which all the structural elements, including the vault and dome roofs, are made of ordinary mud bricks.

Woodless Construction techniques were developed to provide a viable, affordable and accessible alternative to a dual problem: how to alleviate pressure on the threatened natural resources of the Sahel and at the same time to make building by the population easier (see *Woodless Construction – 1: An overview* in this series of BASIN case studies).

The bricks for both walls and roofs are formed in rectangular moulds, smoothed by hand and left to dry in the sun for a few days – a method very widely known in the region. During construction, the dried bricks are laid in mud mortar. The most important characteristic of Woodless Construction roofs is that they are built without any supporting shuttering. Thus the entire structure – walls, lintels, and roofs – is built with locally available earth.

The immediate aim is to develop within the Sahel a local, i.e. village and town based, capacity to build using these techniques, which does not depend on project funding or outside technical support. The principal means to achieve this aim is the organisation and provision of training at various levels:

- for builders new to the techniques, to enable them to build simple, safe structures without external help after a relatively short period of training;

• for builders with good experience of the techniques, to enable them to progressively take on the task of training;
• for experienced builders, and in some cases technicians, to enable them to acquire greater skills both in design and building.

Training strategies

Training is based on two key strategies.

Mobility
The training teams "migrate" to the places where the Woodless Construction techniques can be of help and where training is needed. Mobility means constantly having to adapt techniques and processes to local conditions and realities.

Training by local trainers
Local builder-trainers increasingly represent the channel through which these techniques can spread – through running the training sessions of cycles and through local advice and awareness-raising.

Training cycles

Each year, at the core of Woodless Construction activities is the organisation of 3-month training cycles, two or more of which may take place at the same time in different locations. *The training process is constantly reviewed and revised after each cycle,* but the Filingué (Niger) cycle in 1993, in the context of DW/UICN's Danida-funded programme, can be regarded as fairly typical. In this case training was divided into three phases.

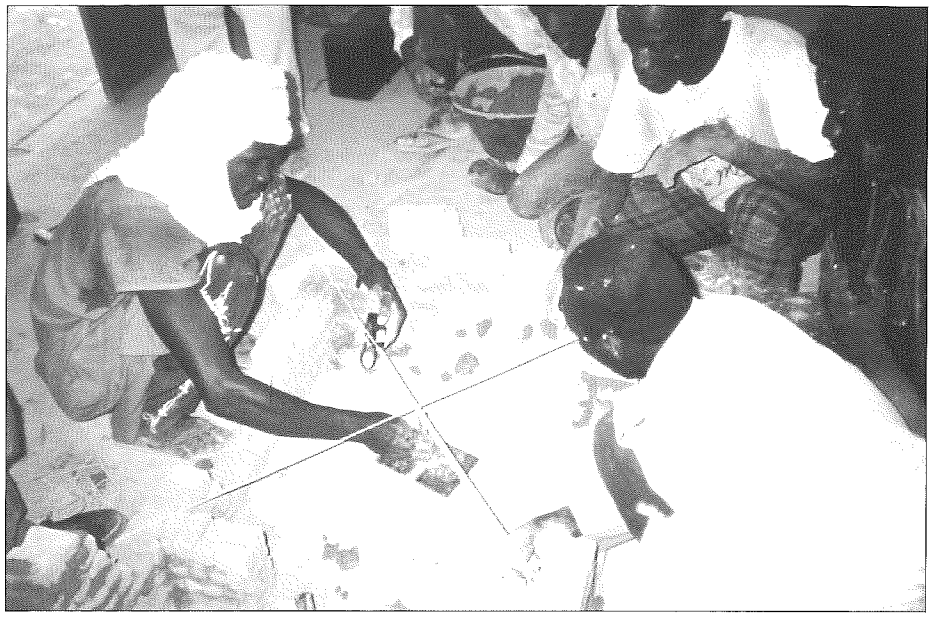
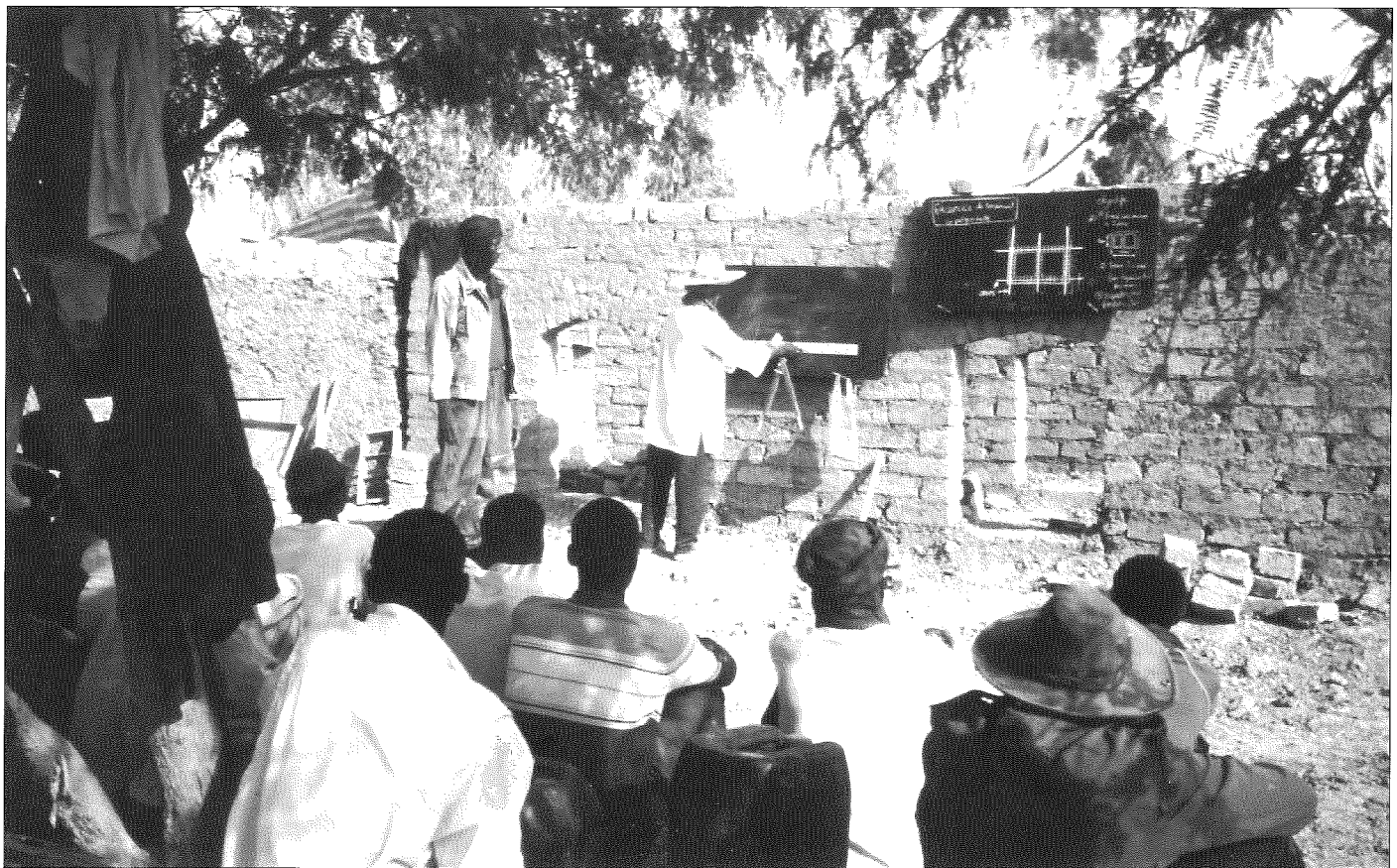


Figure 2 Principal trainers preparing each training module beforehand; here, building a scale model to use as a training tool (phase 2)

Phase 1: Advanced training of trainers and experienced woodless construction builders

An 3-week period of advanced technical and "teacher" training –
• for experienced builders, to improve their skills in working on more complex buildings;
• for future trainers (builders with good communication ability), to take them as "trainee-trainers" through all the elements of a basic builders' training programme, including methods for explaining or demonstrating techniques, and for checking that the information has been understood.



Participation and assessment
12 experienced masons participated in this first phase. After joint evaluation it was agreed that:

- 4 were of a high enough standard to become *principal trainers* for Phase 2 (see below);
- the remaining 8, as *assistant trainers*, would each be assigned (according to their language and/or village of origin) their "own" group of four new masons to supervise.

Phase 2: Basic training for new builders

Following on immediately from Phase 1, a 3-week period, for builders new to the techniques, intended to –

- explain the principles of Woodless Construction, and
- enable training structures to be built to practice key skills without the pressure of a real building site.

Training by local trainers
During this phase:

- the 4 principal trainers (trained in phase 1) were responsible for preparing and teaching each training session, under the overall supervision and guidance of the core training team;
- the 8 assistant trainers (also trained in phase 1) were responsible for supervising and assisting the four trainees assigned to each of them.

Participation
32 trainee builders participated, the majority (22) from Filingué, in order to develop a significant builder capacity that the population could choose from. The languages used were Haussa and Zarma, with certain trainers and trainees also speaking some French and Arabic.

A detailed curriculum
Each training session was based on a detailed curriculum, which had been prepared in the form of a *Guide des formateurs* (guide for trainers). The *Guide* was used for the first time, and thus "tested", during phase 1, the training of trainers –

- to ensure that phase 1 trainees had a sound understanding of the *principles* underlying the techniques they were already familiar with and
- to suggest methods they could use for communicating these (including models, diagrams, etc.)

A local language (Haussa) version was quickly prepared and used by the trainers –

- to provide a structured, time-tabled approach ensuring that all key points were
- as a tool enabling the trainers to prepare each training session beforehand; and
- as an *aide-mémoire* during each training session itself.

It is important to realise that the *Guide* is not regarded as a finalised "publication". Drawing from a base of teaching notes and modules, the specific curriculum is prepared in the light of an evaluation of the preceding training sessions and the specific needs of the locality where the training session will be taking place. In the case of Filingué, the curriculum covered 36 training modules, and dealt with each stage in the construction of the building, from laying out through to each basic type of roof building.

Organisation of training sessions
Each training module is studied by the trainers several days in advance, to give them time to prepare for teaching the subject – which invariably includes both theory and demonstration. They also collect soil samples from the region to make test samples and explain differences in brick quality.

Phase 3: Practical training on start-to-finish buildings for local clients

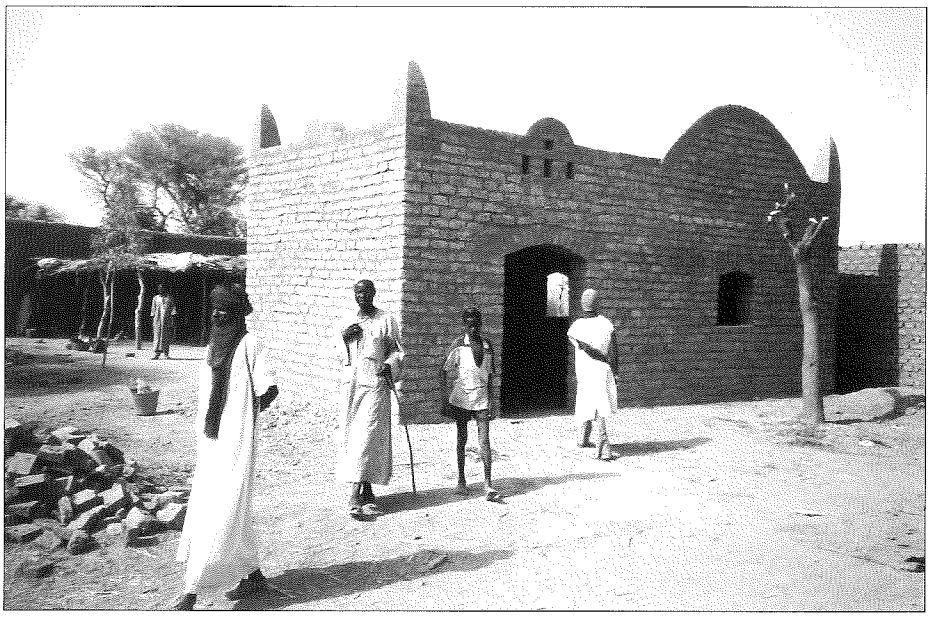
During this follow-on 5 week phase, the phase 2 trainee builders went on to undertake the construction of small and medium sized buildings for local clients.

Organisation of site work
The average building consisted of two or three rooms, and responsibility for the construction of each room was given to one pair of builders. Each pair thus had the chance to work on each stage of construction, from laying out and building the foundations, through to building the roof structure and ensuring proper rainwater run-off. For example, a small two room building was constructed by two pairs of masons, under the direct supervision of one assistant trainer, and supported by labourers provided by the client.

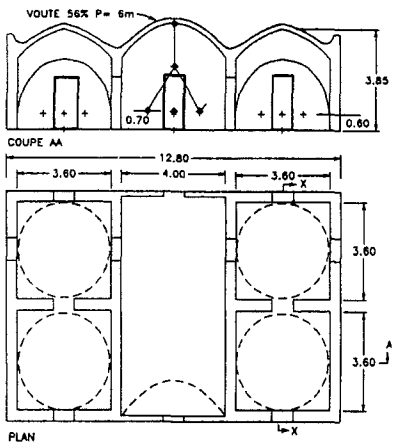
The client-partner relationship
All the buildings constructed during this phase of the training cycle were commissioned by local clients, in the framework of a "client-partner" relationship: the client is provided with a tailor-made design for the building and with the skilled labour input i.e. Woodless Construction trainee builders and supervisors. In return, the client agrees to cover all other construction costs bricks, water, soil for mortar and any renders; finishing – doors, windows, paint, internal fixtures; manual labour to assist the builders on site; and "normal" site tools – scaffolding, ladders, wheelbarrows, etc.

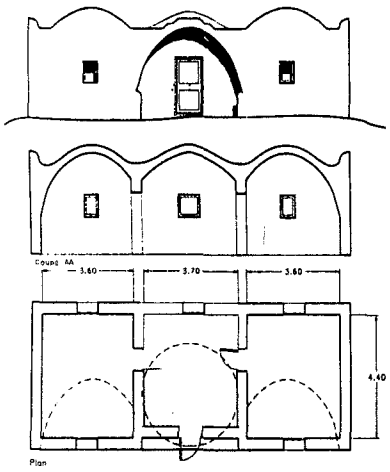
The benefits of the client-partnership relationship are numerous and diverse.

- In addition to gaining practical skills on the building site, the trainee builders also start to acquire experience in dealing with the needs of the client.
- The involvement of "real" clients minimises discrepancies with normal construction costs that would undoubtedly exist were the programme to fully subsidise buildings during training.
- Involving clients in this major commitment (some 75% of the real costs of the building) helps to ensure their responsibility in the future care and maintenance of the building.



COMBINATIONS OF SIMPLE VAULTS AND DOMES
easily mastered by masons who have received basic training





• Responding to the clients' needs encourages the Programme to promote diversity amongst the examples that are built. In turn, future clients have a greater range of examples to choose from, although in no case are these buildings considered as inflexible prototypes.

In the case of Filingué, eight clients commissioned ten buildings, ranging from small, single-room, round, domed houses through to large, multiple-room buildings with a combination of vaults and domes for the roofing.

Performance assessment
All 32 trainees were considered capable, as a minimum, of building one or two-roomed structures using vaults and/or domes for the roofs without assistance and were issued with a certificate. Many of them, however, were also clearly capable of undertaking more sophisticated combinations of rooms (see box).

After training

Versions of all the types of buildings constructed during phase 3 of the training cycle have subsequently been built in the Filingué region by the newly trained builders for local clients. Three months after the end of the cycle, ten new woodless construction buildings were complete or nearing completion, and these included buildings designed by local masons, and a new mosque.

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What is BASIN?

Building materials and construction technologies that are appropriate for developing countries, particularly in the low-income sector, are being developed, applied and documented in many parts of the world. This is an important prerequisite for providing safe, decent and affordable buildings for an ever-growing population.

But such new developments can do little to improve the building situation, as long as the information does not reach potential builders. The types and sources of information on standard and innovative building technologies are numerous and very diverse, making access to them difficult.

Thus, in order to remedy this drawback, GATE, ITDG, SKAT and CRATerre are co-operating in the Building Advisory Service and Information Network, which covers four principal subject areas and co-ordinates the documentation, evaluation and dissemination of information.

All four groups have a co-ordinated database from which information is available on Documents, Technologies, Equipment, Institutions, Consultants as well as on Projects and Programmes. In addition, printed material or individual advice on certain special subjects is provided on request. Research projects, training programmes and other field work can be implemented in co-operation with local organizations, if a distinct need can be identified and the circumstances permit.

BASIN is a service available to all institutions and individuals concerned with housing, building and planning in developing countries, but can only function efficiently if there is a regular feedback. Therefore, any publications, information, personal experiences, etc. that can be made available to BASIN are always welcome and will help BASIN to help others.

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