

Tendering of New Small and Medium-sized Institutional Buildings

by Tor Forsman



Tor Forsman was born in Sweden in 1944. He started his career in 1963 as a structural engineer. He has worked in Sweden as a controller, inspector and manager of projects up to 80 million Swedish crowns.

He also has extensive experience in developing countries. He worked for eight years for the Mekane Yesus Church in Ethiopia, as both planner and builder, and was responsible for projects dealing with buildings, roads, bridges and water supply. Since 1985 he has also been involved in building projects in Tanzania and Kenya, and more recently he was manager for a project to renovate 120 year old buildings in Jerusalem.

He is interested in appropriate technology.

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Introduction

The problem

Construction is an important part of economic development, not least in developing countries. A building project involves several actors, such as the client, designers, contractor, project manager, users, etc., which sets demands on organization, coordination and communication. If these do not function well, there are often problems such as higher costs, delays, low quality and poor function of the final product. There is often disagreement about who is responsible for problems that arise, but the usual cause is badly formulated or insufficiently detailed agreements stating the responsibilities of the client, the consultant and the contractor. Other causes of dispute are damages to the building, which might occur during or after construction, accidents to workers, etc. If there is inadequate control and monitoring during construction, there could be hidden defects that are not discovered during the final inspection. This is particularly serious for structural elements: carelessness with reinforcement and ballast in concrete elements has resulted in the collapse of buildings. Another problem is when the finished structure does not meet the users' needs, because there was insufficient communication between the client and the users. Problems often arise because the client does not know enough about how to procure new construction.

When one builds, one creates something new, but one does not do it alone. It involves several different actors. This is an exciting task that demands a common vision, coordination and clarity for a good product. This report deals with overall coordination of the building process and procurement of contractors from the perspective of the client.

Method

This report was written as a desk study. There is not much published material available describing the building process for small and medium-sized institutional buildings in developing countries. A list of relevant literature is found at the end of the report. The report is mainly based on the author's professional experience in Africa, the Middle East and Sweden.

Organization of the report

The report consists of three chapters. Chapter 1 describes common difficulties faced in planning and constructing buildings. This report concentrates on small and medium-sized institutional buildings.

Chapter 2 describes a typical building process. The model for this process comes from industrial countries, but it has been adapted to conditions in developing countries. It considers the actors and their roles in the process, as well as the influence of local culture, architectural styles and local authorities. There are many decisions made by various actors during the building process that affect, among other things, the cost of the project. The section headed "When can changes be made without too high cost" describes the financial consequences when changes are done "in time" and when they are done "too late." Writing a contract on

the basis of carefully detailed drawings and specifications and how the construction should be managed are described under the heading "Construction." This chapter also describes how the final and guarantee inspections are conducted, and an often overlooked part of the building process, "Handing over the project to the users."

Chapter 3 gives recommendations in the form of a checklist over the most important stages in the five phases of a building project.

Case study

One reaches the little town of Nedjo, in Ethiopia, by driving 520 km west from the capital Addis Ababa. The last 80 km is a dry weather road, and it was during the dry season that the following events took place. During the rain period between July and August, the road and river crossings are difficult to travel, and at times completely impassable.

There was to be a big new building in this town of small clay houses. Wood is scarce. There is an abundance of clay, straw and water, but limited production of bricks. It is possible to bring in cement during the dry period, but Westerners do not consider grey concrete especially attractive, aesthetically.

The young, enthusiastic foreign builder was excited to find beautiful natural stone on a hill nearby. Large, black stone slabs lay there, just waiting to be collected and turned into the most elegant floor for the new building. All the foreigners were very impressed with the result.

The local people were not at all impressed. Stone picked off the ground was much too cheap and not modern in their view, so as soon as the builder left, his floor was hidden by flat, grey cement.

General Considerations

The context

Country, culture, regulations

Most countries in the world have their own special building styles, developed over hundreds of years and adapted to the local climate and traditions. The client should therefore try to use architects from the country itself, if, for example, the aim is to have the new institutional building blend well with its environment. Consideration should also be taken to the local culture when designing the layout of a building.

One must follow national and municipal regulations concerning land issues, building permits and employment of workers. When buying land, one must make certain that the seller has the right to sell the land. One must also check how the area is zoned, what kind of building may be constructed on the very plot, and other municipal issues such as water and sewerage connections and extension of existing roads.

In some countries a person who plants trees on a plot owns them, even if he does not own the land. If one has acquired such a plot, it is inappropriate to begin clearing the trees without first checking who owns them.

In earthquake-prone areas, there are special regulations for foundations and the load-bearing structure.

Building traditions

Every country has developed traditional forms of construction and building styles that people would like to retain. It is desirable to acknowledge these traditions as far as possible, so that the new buildings are appropriate for the environment and so that the craftsmen employed feel motivated to work on them.

It is therefore important to specify at a very early stage which building materials will be used and how the character of the building will be adapted to the surrounding environment. It must also be decided early in the process how to meet formal requirements for, for example, the load-bearing structure.

Competitive bidding

When the tender documents are ready, the client invites a number of contractors with good references to submit bids. To ensure good competition between the contractors, there should be at least three different bidders.

The actors

In most building projects they are the client, the users, architects, consultants, official agencies, building contractor, electricians and plumbers. In many cases banks and insurance companies might be involved at different stages of the process.

The client for institutional buildings is often a government ministry. In most countries the Ministry of Education is responsible for school buildings and the Ministry of Health builds and runs clinics and hospitals.

The client and the users usually come from different organizations. Sometimes they might work in the same organization, and in unusual cases they might be represented by the same person.

Buildings that are designed and built will be occupied by **users**. The users have an important role in the design process. For example, if one plans to build a new school, the civil servants in the ministry represent the client, and the teachers and school staff represent the users. Students, teachers and other school personnel are extremely important for describing the needs and desired functions in the new building. Unfortunately these groups are often forgotten both in the design process and during the final inspection before handing over the building.

The architect in a project helps the client and the users translate their desires and demands into the building design. The architect might be supported by building engineers who produce detailed technical drawings and descriptions.

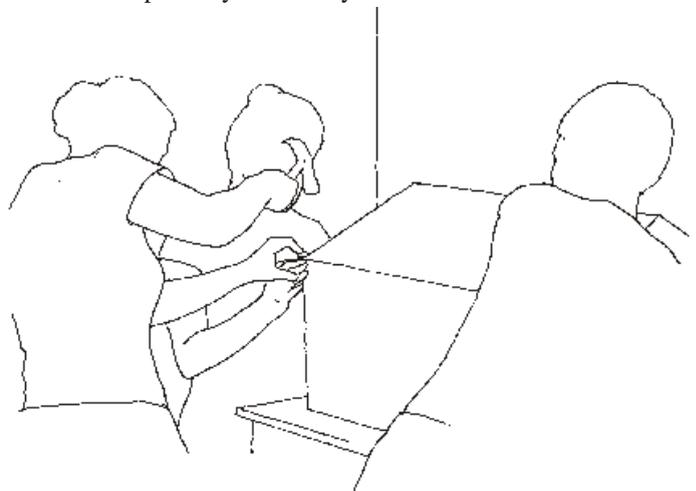
In addition to the engineers who support the architect, the client might need its own **consultants**, if the client does not have the necessary resources or experience. These consultants might have different functions, such as project manager, site manager and clerk of works.

The **authorities** involved in projects for institutional buildings vary between countries, and also between urban and rural areas. The agencies involved might include the land registry, the city planning office, municipal environment and health offices, authorities dealing with water supply and sewer connections, the roads department and others.

Construction and building services contractors are usually not involved in a project until they submit an offer on the basis of the tender documents. In rare cases, they may be involved during the preliminary design stage.

Clear systems of communication

To work together to create an institutional building for a given purpose requires teamwork. In team sports, for example, every player has a special task. Through training, each person learns what is expected and in which situations to act. To be a member of a group to design and construct a building can be compared to being on a football team. The main difference is that there is so little time to train together. In reality communication between the different group members tends to be best when the building is ready to be occupied. By then everyone has learned to know and



Teamwork – the design and construction of a building require collaboration of all the different actors

understand each other, but then the group is no longer needed.

The informal communication between persons is important, and many important decisions are often taken during informal meetings. There must however be a formal, hierarchical system for decision making in every project, in order to reach the goal on time. Each informal decision must be supported by a formal decision that is distributed to everyone involved. In small projects it can be much simpler with informal verbal communication. In larger projects it is necessary to record decisions formally in writing.

Incomplete or poor communication can create disorder, confusion, indifference and even bad will. This can result in wasting valuable time solving communication problems instead of using the time constructively to address, for example, economic or technical problems.

Contact with authorities

The authorities must be contacted at the very beginning of the building process. Regulations and byelaws affect decisions that must be taken early in the project brief stage. Different countries have different requirements for such aspects as wind load, framework, child and fire safety. Since these regulations affect both the appearance and the layout of a building, a delay in contacting the authorities until the design stage can result in high extra costs.

Regulations related to hiring workers might affect the choice of contract form. Some countries do not allow self building, for tax or technical reasons. Since the form of contract can also affect the design of drawings and technical descriptions, it is wise to find out as early as possible what applies in the local situation and if certain forms of contract cannot be used.

When can changes be made without high extra costs?

Before addressing this question, one must first look at the five main stages of a building project.

- Project Brief
- Design
- Procurement
- Production
- Use and management

In this case we consider the different stages from the perspective of the client. The project is born during the project brief stage. The needs are specified, placement of the building is decided, technical requirements for the framework, facades and finishes are discussed. The general cost level is set at this stage. When the client approves the list of spaces and functions and agrees the levels of standards and quality, the total cost of the project is determined. If a calculation at this point shows a higher total building cost than budgeted, this is when savings have their greatest effect. When the project reaches the next stage, design, so much time and money have already been spent that it is extremely expensive to make any changes. It is even more expensive for the client to make changes during the production stage.

The importance of the project brief stage can not be emphasized too strongly. One should avoid making preliminary design sketches at this stage, since there might be a

temptation to skip over a painstaking and time-consuming identification of the demands the building should meet. Only after all the actors agree that the project brief is complete should the architect begin to visualize the brief through sketches.

Who decides?

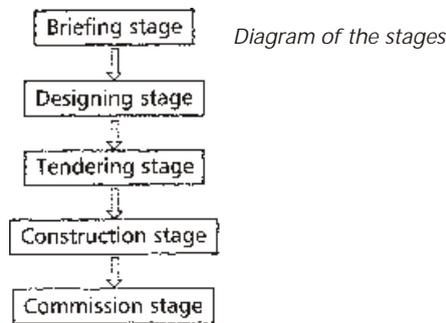
The client is the person or authority given the task to construct a building for a specific activity. The client has, therefore, a great deal of power over both the budget and the entire project organization for this building. The client acquires the land and hires, among others, the project manager, architects, engineers and clerk of works. The client is also responsible for ensuring that there is adequate insurance coverage for the project and that financing is secured.

The building process

Project brief stage

Specification of the need

Most buildings are specially designed to meet the need for appropriate space for specific activities. A room plan gives the opportunity to discuss and specify, among other things, the activities the building will house, what functional spaces are needed, communication between the spaces, the level of building standards, and the choice of exterior and interior materials with consideration for durability and maintenance requirements. If these needs are not explicitly identified, the final product will not meet the users' demands and expectations. Staff representatives should be consulted at this stage since they know best what rooms and other spaces are needed.



This is the stage that the client reviews the plans to construct an institutional building. One can describe this first part of the project brief stage as a kind of ideas period, where the client produces a *statement of needs*. This might include the background to the project, the way the activities are organized, the connection between the activities and their need for functional space, the environment and infrastructural services. If there is a budget at this stage, it can be useful to help all the actors interpret the client's desires. Needs should not be expressed in technical building terms, since these are usually not part of the normal language of the client.

The next step is to translate the statement of needs to needs in building terms. This requires participation of professionals. A building project manager is engaged to assist the client in finding the most suitable architects, engineers and other specialists who might be needed to develop the

design. When the architect and other consultants are chosen, a contract is written with them. In most countries there is a standard contract for consultants that can be used.

The *building programme* is a translation of the statement of needs to building terms. The programme must be done very carefully, because any deficiencies in the programme documents create risks for mistakes in design and construction.

Project management

The aim of management is to realize the project goals

Managing a building project is very different from, for example, managing a team designing a new car model in a factory, or doing research and development for a new drug. There are permanent organizations in industry that are accustomed to dealing with the issues and that have developed routines for making decisions. Many of the actors in a building project are unaccustomed to seeing the concrete results of their decisions. Many of them are perhaps involved in just one the building project. It is important to take the time to explain to them how the project is managed, which decisions must be taken at what times, and who decides what.

Steering committee

The actors in a building project are: the client, users, architects and engineers, the building contractor and the building services contractors. The coordinating links between these actors is often a steering committee. The members of the committee might change during the project, but at each phase it should include the actors actively engaged in the project. The client must always be present, or represented on the committee.

Project manager

Since many clients have little or no experience of managing a building project, most understand the importance of hiring a project manager. To reach the goals of a building project, there must be a person who understands the client and the users. The person's task is to interpret their message to architects and engineers, who in turn, with the help of drawings and descriptions, show the contractors how the building should be constructed. It is very important to choose the right person as project manager. Check the person's qualifications and experience of similar projects. Ask for references. Since the project manager is the link between so many different actors in the process, her/his personal qualifications and leadership ability are crucial for continued cooperation.

Who might be suitable as a building project manager for an institutional building with a budget ceiling of about one million Euros? This is a relatively large project in a developing country, and therefore requires a project manager to coordinate all the actors involved. In industrial countries the building project manager is a special consultant with specific skills. In many developing countries, it is common to hire an architect as the building project manager. Check carefully to identify the common practice in the country. It is not suitable to have the same architect as the building project manager and as the project architect. If the project manager and the consultants come from another country, it

is very important that they have experience of local design and construction

Some government ministries might have building project managers on their permanent staff. Nowadays it is probably most common to hire a consultant for this task.

Forms of contract

The form of contract the client chooses crucially affects the rest of the planning process of an institutional building. The following forms of contract are the most common.

Self building. The client has its own construction department and uses it for its building projects. An alternative is to employ workers for the project. In both cases the work is done according to the client's own contract documents. Some sub-contractors might also be procured.

Divided Contract. The client appoints all the main contractors on the basis of its own brief and contract documents. The client often also procures some materials and components.

General Contract. The client appoints a contractor who is responsible for following the client's brief and contract documents. The contractor may appoint sub-contractors and is responsible with them for procurement of all materials and labour on the work site.

All-in Contract. The client appoints a contractor who on the basis of the client's brief, and with the help of sub-contractors, is responsible for design, procurement of materials and all labour on the work site.

The role of the client can be very different, depending on the form of contract chosen. The Divided Contract approach gives a client, with previous experience of construction, good control over both design and construction. To be certain that the assignment of responsibilities is clear and unambiguous, the client must have the resources and ability to coordinate the contractors.

With a General Contract the client is responsible for the design, which makes it relatively easy to assess the tenders. If the client wishes to know which sub-contractors a contractor plans to use, this question should be included in the tender documents.

In a Divided Contract the client might also assign coordination of the sub-contractors to another party, such as a building contractor.

The greatest advantages of an All-in Contract for the client are that there is relatively little administration; there are fewer problems with coordination, and construction time is often shorter. When producing the offer to tender, the client must be clear and explicit in stating the functional requirements (the performance specifications) for the planned building in the general description. It might happen that the client begins the design and then procures a contractor to complete the design and production.

Budget

Financing, loans and cost calculations

All building projects involve money. Many of the actors in a building project would prefer that money were not such an important factor as it is. When a budget is set, a lot of time and energy is used to follow it.

A building project can be financed by the client's own capital, a loan, a grant or a combination of these.

During the building process there must be careful follow up of the total project cost, to ensure that the cost of the final product will be within the agreed budget. The running costs for a building are very closely related to the capital costs of construction. An estimate of the total cost at the beginning provides guidelines to the proportion own capital, loan and grant.

During the building process, there must be careful follow-up of the total cost for the project, to ensure that the final cost is within the budget set.

A first cost estimate is often done by the client when the programme is decided. This estimate is based on experience from similar institutional building projects in the country, and, just like the programme, it provides a framework for the more detailed planning and design. The costs for administration and management, for consultants, for land, fees and taxes are often forgotten at this stage.

A more detailed cost estimate is produced later by the building committee using quantity surveyors who estimate the volume of materials and labour required on the basis of the working drawings, and from experience of comparable previous projects.

When tenders from competing firms are delivered to the client, the building committee has a last chance to make necessary adjustments to the project to meet the budget frame. A wise client has an extra reserve fund to be used only if there are changes in the basic conditions on which the budget was based.

Quality and standards: Reference object

Everyone uses the word "quality." If we discuss what we mean by good or bad quality of any project, we can usually agree, whether it has to do with vegetables, fruit or anything we buy often. It is much more difficult to define "quality" in a complex object such as a building.

The quality of an object or phenomenon can be defined as all its properties (or qualities) that give it the ability to meet both explicit and implicit needs. Early in the building process the client must explain to all the actors involved exactly what qualities he expects to find in the building when it is ready to be used. It is easy to determine the quality of an object that one can see and feel before buying. In the case of a building, one must make certain that the drawings and descriptions show the qualities that are specified, such as on a façade, and this should be clear to the client as well as the designers and builders.

The best way to ensure that the final product, the building, has the qualities that the client ordered from the designers is to establish routines for each actor to monitor continuously how well they meet the quality requirements.

Building standards vary from country to country, and differ between rural and urban areas. National or local building regulations often set a certain minimum standard, for example for the building framework. There are often special regulations to ensure that no one in or around the building is injured. The client often wishes a certain standard, for example the surface finish in different areas of a hospital or clinic. There are requirements related to hygiene, need for maintenance, safety and appearance. A high



A boarding school under construction in Mizque, Bolivia

standard for materials means high initial costs, but often lower maintenance costs for the building; it is important to choose the appropriate and best standard in each case.

Identifying a reference object is a way to define and describe the standard and quality desired in the new building. If it is difficult to describe the standards and quality, the reference object can be named in the description.

Design stage

Planning

Planning is the backbone of a building project and is based on clearly specified goals. Good planning means that the necessary resources are available at the right time. The resources include materials, equipment, money or labour. There is a wide misunderstanding that planning is only necessary during the construction stage. Even for small projects, the time between the decision to build and handing over the finished building might be two to three years. Of this total time, construction normally takes no more than six months to one year. The building project manager is responsible for planning during the entire building process.

Time schedule

Planning includes making a time schedule putting important activities along a time axis. The time schedule also notes important time points when, for example, financing should be clear, when the authorities issue their permits, when the final inspection should take place, and so forth. The building project manager is responsible for ensuring that a time schedule is produced. During the project brief stage, there is also a time schedule with important points for the project, but it is not nearly as detailed as the timetable drawn up at the beginning of the design stage.

The timetable must be both realistic and flexible. Learn from other similar projects in the country. How long did the various steps of the building process take, and what were the difficulties, if any.

Producing the contract documents

When the client approves the programme, the architect begins to sketch solutions for the building that fits the site and meets the local regulations. Since the representative of the client on the steering committee is often not skilled at reading drawings, models can be a simple and useful aid to help the architect explain her/his vision of how the building will look. Remember that all the documentation should be in the language best understood by all the actors.

It can take a long time to reach agreement on the final designs of the layout and facades. Often one must discuss

many alternative solutions before making a decision. It is a waste of time to start the working drawings while discussions continue, and there are still new ideas. The architect's floor plan is the basis for structural and installations drawings. Any modification in the architect's drawings will have consequences for the drawings of all the other consultants.

Working drawings and descriptions, the contract documents, explain to the building contractor and the sub-contractors how the work should be done. They are also the basis for tendering. To get a building permit, it is often sufficient to present the architect's drawing in scale 1:100 with the application forms. Sometimes other documentation is required, such as plans for ventilation and fire alarms.

The quality and standards of installations and building parts are set when the building documents are produced.

When deciding on the materials, it is extremely important to consider maintenance of the building. First one must be reasonably certain that the material chosen will also be available if anything must be replaced in the future. One must also consider the skills of local workers. It is an expensive solution to introduce new technology that cannot be installed or maintained by local workers.

Wet areas such as bathrooms, facades and roofs are some of the building parts where it could be worth investing in high quality materials and workmanship, from a maintenance point of view. This is also relevant for parts of the building that are difficult to reach.

The preliminary cost estimate might have to be revised as one learns more about the different components of the building. Cost estimates might be divided into several sub-posts, if there are different consultants in the project.

Contract documents

What contract documents are required depends on the form of contract selected. For an All-in contract, where the building contractor is responsible for both the contract documents and construction, the client need only provide a framework description of the functions and requirements to be met by the finished building. Usually a client has bought the land and arranged the necessary permits from the authorities already. The client may also have decided on the arrangement of the spaces, but these aspects might also be part of the building contractor's tasks. This form of contract is only possible where there are experienced and competent contractors, and where the clients are accustomed to specifying their demands in performance specifications, describing the desired functions and requirements. This contract form allows the client very limited influence on the choice of technical solutions.

A more common form is the *general contract*. The client produces all the building documents and guarantees their correctness to the general contractor.

With a *divided contract* the client is responsible for all the contract documents and for coordinating the different contractors. In this case the client takes in bids from all the contractors.

The contract documents should include all the specifications necessary to allow the contractor to determine the costs for all the materials and labour in the contract. During

the tendering period the bidders may ask questions about the specifications and the solutions proposed. It is important that one person, such as the building project manager, receives and answers these questions, preferably in writing. All bidders must be treated equally during the tendering. When a tender is submitted to the client, it must be guaranteed that each contractor has had the same conditions for its offer.

Tendering

The *conditions of contract* in the contract documents state the date, time and place the offer must be submitted to the client, if the payments will be fixed price or open account, the unit prices, and if the offer should be index regulated or not. There should also be a clear statement about the conditions under which the client may reject a bid.

Tendering may be done on special forms provided by the client or according to the forms that each contractor normally uses.

Procurement

Selecting the procurement committee

Procurement normally takes place without involvement of the project design group. The tender documents state the procurement procedures and who is responsible for procurement and signing the contract.

National and municipal authorities and large institutions often have their own procedures for procurement and signing agreements with contractors. In other cases it is common to create a procurement committee, including a representative of the client.

There should be written protocol from the final negotiations with a contractor, listing any agreements between the client and the contractors made after the tender was submitted and any further questions are answered. The procurement protocol is often followed by the client giving the contractor a written order.

Contract documents. Common types of contracts

The contract and its attachments: drawings, descriptions, time schedule, payment schedule, etc. are the documents that the partners agree will be followed from the moment the contractor accepts responsibility for the work defined by the contract until the building has passed the final inspection.

Using standard contract forms can be recommended, since the contents is usually known and understood by all parties. These forms have sometimes also been tested in the courts. It is both time consuming and expensive to design new contract forms oneself. It can take a long time to design the forms, and it can also be a costly experiment if there are, for example, ambiguous phrases that are difficult to interpret. Most contract forms include a list of the tender documents required in a contract.

Production stage

Administration for the client and contractors

Even if the tender documents are very carefully produced, the contractor often has many questions to be answered by the building project manager. Often the questions can be answered on the spot, but it happens that both the client

and the project group must be consulted. A good method to get the parties together is to hold progress meetings with representatives of the contractor, the sub-contractors and the client. It is a good idea for the project manager to write minutes from the meeting and for the different parties to give formal approval by signing the minutes.

The client has no reasonable cause to interfere in the contractor's administration of the work site or the office as long as the work is done and progresses according to plans.

To monitor that the contract documents are being followed, and that the contractor is meeting the agreed standards and quality of work, the client might have one or more clerks of works who are responsible to the project manager. These inspectors might also be responsible to different consultants in the project group, depending on the normal practice in the country.

Finances, schedule of payments, performance bond

Financial follow up is usually done by the project manager. When a contractor's tender is accepted, the main project costs are largely known. It is still wise to keep a post for unforeseen contract costs, as a rule about 5–10 % of the total contract sum. It is difficult to know if the currency exchange rates will be stable throughout the project period, and if the project involves more than one currency, there might be gains or losses. Authorities might introduce new fees and service charges that could affect a building project.

The contractor draws up a payment plan specifying the amount to transfer every month if he continues to work according to the contract and agreed time schedule. About 5–10% is withheld from each payment. This retention is released to the contractor when the contract is satisfactorily completed, normally 50% at practical completion and the rest at final completion after the *defects liability inspection*.

The contractor normally sends the client a bill for the amount specified in the payment plan. If work is proceeding according the contract, and the client is satisfied with the quality and progress, the project manager can approve the bill for payment.

The performance bond, often in the form of a bank guarantee, is deposited by the contractor. If the bond is posted in cash with the client before work begins, it must be kept safely during the period. In case of an All-in contract, the client holds the sum until the project passes the final inspection. In the case of a general contract or a divided contract the guarantee sum is often reduced to about half after practical completion. At final completion, after a successful inspection at the end of the defects liability period, and when all the defects noted are satisfactorily remedied, the client returns the retention sum to the contractors.

Inspection at practical completion.

Handing over the building to the users.

If there are regular progress meetings, the date for inspection is set at one of the last meetings. The contract between the client and contractor specifies how to select an inspector. In many countries representatives of the architect and other designers conduct the inspection with the project manager. One should try to appoint an independent inspector, who is not involved in the work of the client or the contractors. The client alone, or in consultation with the

general contractor, appoints an inspector, who in turn appoints sub-inspectors who review the work of the sub-contractors. There should be at least a representative of the client and the contractor present during an inspection. It is also wise of the client to have a representative of the end users present.

Use and management stage

Instructions for use and maintenance, insurance

One of the inspector's tasks is to be sure that the client receives adequate drawings and instructions for use and maintenance. The client in turn should be sure to give the end user the drawings, descriptions and instruction necessary to be able to manage the parts of the building he is responsible for.

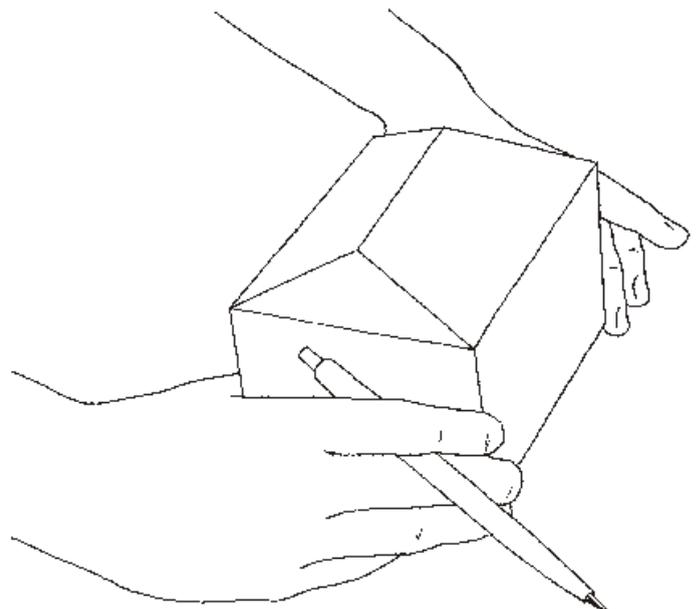
The contractor usually arranges any necessary insurance for the building and the workers during the production stage. When the building has passed the final inspection and is handed over to the client, the contractor's insurance is no longer valid. The client or the user must arrange in good time for the necessary insurance coverage for both the building and the staff.

It could happen that the contractor receives approval but that the users are still not satisfied with, for example, functions in certain spaces. This might be because the designers did not get sufficient information during the programme or design stages. Correcting these defects is expensive, because this is not the responsibility of the contractor.

When the client hands over the building to the user, it is important to allow time to go through all the technical installations and how they should be managed. Usually the sub-contractors are responsible for instructing the staff in the management and maintenance of the technical installations.

Final inspection

This is conducted a few days before the end of the defects liability period. It is in the client's interest to notify in good time all the parties that should be present. The client should ask the users to note all the defects that they find in the



Before the final inspection the users should note any defects that they find in the building and the installations

building and the installations before the inspection. This includes such things as cracks in walls, roof leakage, blocks in the sewer system, fuses that go without obvious reason. The inspector determines the contractor's responsibility for the satisfactory performance of the building and the installations. In the case of a general or a divided contract, the client provides the drawings and descriptions, and is thus responsible that they are correct. In this case the contractor is only responsible for the construction work. The contractor is responsible if, for example, the wall rendering cracks because too little cement was used or if paint loosens because the pre-treatment specified in the specifications was not done, and is obliged to fix the defects. If the plumbing system is under-dimensioned by the client's consultant, the contractor is not responsible for the low pressure in the taps.

The final inspection of an All-in contract covers both function (according to the performance specifications) and production quality. This is the final approval for the contractor, since under an All-in contract the contractor is also responsible for the technical solutions.

There might be parts of a contract that have guarantee periods of five or ten years, for example, the waterproofing layer, insulation glass panes, roofing tiles. These parts should be inspected separately immediately before the end of the defects liability period.

Evaluation of the finished institutional building

One can learn something from every project. Much can be learned from a post-occupancy evaluation about five years after practical completion. The evaluators should be familiar with the reasons for the project, and it is an advantage if they were not involved in it. By comparing the results with the project goals, one sees if the building meets the original needs for space.

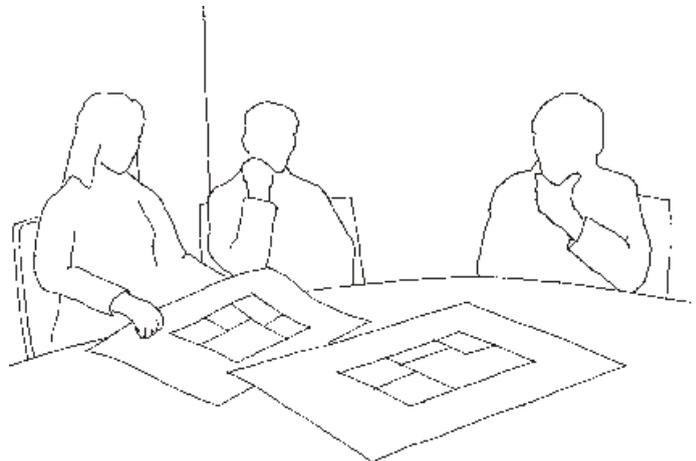
The evaluation report could be a help for other clients who must go through a similar process.

Recommendations

There are four important observations and lessons from my own experience, and also reported by experienced clients, designers and building contractors in different journals and publications.

Good communication

We have all had the experience that a message passed down through different people becomes very different at the end. In the process of planning and producing a building, where so many actors are involved, it is especially important that the lines of communication are defined in advance. It is also important that all the actors are identified, know their tasks and understand what should and should not be communicated. Projects can be delayed, unnecessarily expensive and fail to meet the client's wishes because of failures in communication.



Good communication and clear documents are crucial for a successful project that meets the client's needs and expectations

Good documents

Anyone constructing a building must be clear about how it will look, its qualities and when it will be ready. Unclear documents will negatively affect the final result.

Adaptation to culture

Experts from industrial countries have often been given the task to construct in developing countries. They carry with them their building culture from home. This might be related to finding out about how the building should function. It might be related to standards. It might also reflect different views on, for example, democracy, participation and technology. One must consider the local culture, in particular the building culture, to avoid the risk that the building is perceived as a foreign element, and to ensure that it functions for the intended activities.

Standards and quality of buildings vary greatly in the work. The way people work in different countries also varies greatly. It must be obvious that one must adapt the entire construction process to the culture of the country.

Clear division of responsibilities

There is usually a client, different designers, a contractor and sub-contractors in a construction project. There are also financiers, authorities, building committees and tenants. The responsibilities of these parties vary in different construction projects. It is not always obvious that at the beginning of the construction process one should define who is responsible for what, and this has caused problems in many projects all over the world.

Check list

These points are a summary of the most important steps in the five stages of a construction project. All of these points are discussed in the previous pages.

Programme stage

- Do a preliminary study of what spaces are needed. Can the needs be met by conversion or alteration of the old building, or is new construction necessary?
- Write a project description and a simple time schedule for the entire project.
- Be clear about land and financing, and observe the local building regulations.
- Prepare a budget for the entire project.
- Analyse the functions and costs of alternative solutions.
- Ensure financing of the project.
- Choose a project manager. Appoint a building committee.
- Communication. Make clear what is necessary and what information is restricted.
- Choose consultants for designs and procure their work on standard contract forms.
- Costs for maintenance, how do these affect design?
- Approve the programme, schedule of spaces and budget.

Design stage

- Prepare a detailed time schedule for the design work.
- Arrange planning meetings with the design groups.
- Be sure all necessary approvals are available.
- Check that update production costs are within the budget.
- Check that the specification set for quality standard, environmental and maintenance costs are followed.
- Approve the tender documents.
- Decide how to choose who may offer tenders.
- Appoint a group to be responsible for the entire procurement process.

Procurement stage

- Opening of tenders. Should one disqualify offers that arrive late?
- Assessment of offers. Complementary information.

- Procurement of contractor and building services companies.
- Write to all contractors who did not win tenders.
- Contract writing. Use standard contract blanks.
- Revise the time schedule.
- Call progress meetings.

Production stage

- Inform the supervisors about the contract.
- Check that there is adequate insurance coverage.
- Hand over the site to the contractor.
- Hold regular progress meetings and record all decisions in writing.
- Record in writing all agreements of savings or additional costs.
- Invite the client, users, authorities and contractors to the final inspection.
- Calculate the total cost of the project.
- Hand over the project. Inspection of building service systems, etc.

Use and management stage

- Hand over the keys to the users.
- Review the inspection report.
- See that the management and maintenance staff are trained.
- Give the plans and management and maintenance instructions to the staff.
- Ensure that any breaks in service or other defects in the building are recorded and reported.
- Arrange the guarantee inspection. Collect information about defects during the defects liability period.
- Guarantee inspection. Collect everything that has happened with the building during defects liability period.
- Evaluate the project. Request a written evaluation report.

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