DOCUMENT RESUME

ED 136 449 EA 009 415

| | |
|---|---|
| AUTHOR | Giertz, L. M.; Dijkgraaf, C. |
| TITLE | School Building in Early Development. Part 3. Project Implementation. |
| INSTITUTION | Information Centre for School Building, Rotterdam (Netherlands). |
| PUB DATE | Feb 77 |
| NOTE | 33p.; For related documents, see ED 114 919 and ED 123 784 |
| JOURNAL CIT | International School Building News; v13 n1 1977 |
| EDRS PRICE | MF-$0.83 HC-$2.06 Plus Postage. |
| DESCRIPTORS | Architects; Building Materials; Decision Making; *Developing Nations; Facility Requirements; Foreign Countries; *Organization; Performance Specifications; Problem Solving; *Resource Allocations; *School Construction; *School Planning; Urbanization |

ABSTRACT

The first two publications in this series dealt generally with school building problems in developing nations. This third part offers more direct guidance. Described in some detail are organizational fundamentals and tools that depend on universal similarities in building practice and have, therefore, been recommended for use internationally. A four-step sequence examining projects in developing countries is proposed as a way of solving problems that often arise in construction projects. The first step is the project as such--what normally is included in project administration, design, and construction--then analyzing the backgrounds: the building industry of which the project is a part, then the national scene on which the project itself as well as the building industry has to play its role, and last the international surroundings and relationships that may influence the project. Using building methods and materials that generate development of the domestic building industry is stressed as a responsibility of the implementor and the organizational consequences of this responsibility are described. (Author/MLF)

information centre for school building, rotterdam the n



# school building in early develop

# project implementation

ISN Vol. 13/1977/no. 1

by
L. M. Giertz
C. Dijkgraaf

# school building in early development

# part 3

*Cover shows a photograph made by Cor Dijkgraaf.*



*published by the information centre for school building, weena 700, p.o. box 299, rotterdam 3003, the netherlands, telephone 010 - 116181*

*february 1977*

Parts 1 and 2 of School Building in Early Development dealt with school building problems generally. When they were published this Part 3 was not yet planned. There seems to be a need, however, for a more direct guidance to the solutions of problems facing school building administrators, architects, consultants and constructors in practice.

Problems in early development are in many respects so different from the problems to be solved in the "industrialized" setting, that this third part dealing with project implementation may be wanted. It describes in some detail the organizational fundamentals, which are the same for building all over the world and under all circumstances and the organizational tools which depend on universal similarities (and not on differences) in building practice, and which therefore have been recommended for use internationally. It also discusses the differences between "industrialized" and "developing" and tries to show how the organizational fundamentals can be adapted for use under different circumstances.

Each project is a brick in the building of the society. It would be a mistake to consider its implementation in isolation. All the specific problems which meet a project "implementor" in early development may be symptomatic. They may meet all project implementors in the same development phase. Only co-ordinated efforts to solve these specific problems can promote the development by removing the obstacles. What this means is discussed in Chapter 1. *Project and Society*. The more direct guide to *Decisions and Actions* in Chapter 2. *Organization* is discussed in Chapter 3.

page **Contents**

*Introduction* Anyone who has tried to implement a school building project — or any other similar project — in early development knows well that the problems to be solved are not always those expected. Most of them may not be problems which "normally" (that is in later stages of development) would belong to the scope of the project.

In later stages of development, apparently, things are assumed, which cannot be expected in a "developing" society. We may approach the "unexpected" problems in a four-step sequence; starting from the project as such — what "normally" is included in project administration, design and construction — then analysing the "backgrounds": first the building industry of which the project is a part, then the national scene on which the project itself as well as the building industry has to play its role, and last but not least the international surroundings and the relationships internationally which may influence the project directly or indirectly.

*The project* The project itself may be a school building.
If more schools — or other buildings — are involved the problems may be multiplied, but principally "one building" faces the same problems as "many buildings". The only differences may be that for a project of one building it may be possible to find "extraordinary helpings" which cannot be repeated and which in fact present everyones fight against everyone for resources which do not legally exist for "my project". Since this is unacceptable all builders — especially "permanent clients" such as school building authorities — should consider the society as the developing totality of which the project is an integral part.
We shall have to come back to the "implementors" responsability in this sense.

In this study a "project" means "one building" with everything needed for this one building to be produced and to be used in the future as intended; the project as part of a continuously developing society.

The building may be considered from two aspects:
— its functioning when finished — internally for the users' activities and externally as an integral part of the society (its "environment")
— its production, the actual building of it, including land supply and municipal infrastructure.

Throughout this study there is a guiding principle for project implementation: to separate *what has to be done?* from *who is going to do it?*
Both questions are equally important but much confusion may be

avoided if they are not being mixed up.
At this stage anyhow — when defining the project — it is preferable not to include the second question (who shall do it) but to base the definitions on what has to be done.
The two aspects listed contain the substance; the reality which has to be sustained intellectually and financially.
This asks for studies and decisions which will make the production machinery work and which will safeguard that this work results in the best possible hardware, envelop and environment. They will be discussed in the following chapters.
We shall now concentrate on the definition of the project from the result aspect and the production aspect.

Let us start by discussing the result to be achieved. Regardless of any persons involved and regardless of any methods to be used the result itself may be analysed according to a simple — always applicable — list of "parts" (Figures 1 and 2).

Buildings are envelopes to protect *spaces (rooms) for users' activities* and the equipments, furniture and fittings they need. The users' activities create the demand for the project; the problem of financing is intimately linked to them, their needs and their capability of paying for space. *Structures and services* are secondary requirements. They make the space to be paid for. *Land and municipal infrastructures* are further conditions for the project. We shall discuss the relationship in chapter 2. For the time being our aim was only to define the project by identifying its parts. Figure 1 shows the result.

**Users' activities** *require* *:

**Spaces** *(rooms internally and externally) and related:*
equipment
furniture
fittings
enclosure surfaces

**Structure** *(to enclose the spaces) including:*
substructure
completions

**Services**
to supply drainage, water, gas, electricity, etc.; to control the indoor climate; for communication and transport etc.

**Land and municipal infrastructures**

*Figure 1. The "parts" of a project are always principally the same.*

Each part must be studied and the studies must lead to decision making. The decisions must include quantity, quality, cost target and mostly also the answers to the questions when and where. Figure 2 illustrates the pattern of decision making for a school building project. This pattern does not include any reference to persons involved. The functional pattern is independent of the organizational pattern of the

* for quality requirements see further page 16

| Users' **activities** (reference ISN Vol 9/1975, page 6) | | | pre-project conditions |
|---|---|---|---|
| | quantity | quality | price |
| The stream of students<br>*when and where?* | number of students | value added | per student |
| The software<br>*when and where?* | the courses (subjects) | the content of the course | per course |
| The equipment<br>*when and where?* | the units of equipment | teaching efficiency | per course — student |
| The instructors<br>*when and where?* | the number of instructors | their teaching efficiency | per course — student |

**Spaces** and related furniture, fittings, enclosure surfaces.

| | quantity | quality | price |
|---|---|---|---|
| The spaces (rooms)<br>*when and where?* | number, sizes | functional, architectural | per unit (e.g. m2); rent per course |
| The furniture<br>*when and where?* | the units of furniture | functional, architectural | per piece, rent per course |

Fittings and enclosures (= finishes) belong to Building.

**Building** (structures, services and fittings to be paid by the rent for the spaces) see Chapter 2.

**Land, infrastructure and environment**

| | quantity | quality | price |
|---|---|---|---|
| The land<br>*when and where?* | size of site, m2 | situation and properties | per plot (to be included in the rent for the spaces) |
| The infrastructure<br>*when and where?* | service rendered | performance/ properties | per service (course cost) |
| The environment<br>*when and where?* | unlimited | to be taken care of | to be paid for' how? |

*Figure 2. The functional pattern of decision making for a school project.*

project preparation.

The relationship between the price for each student to be educated and trained (the value added) and the cost target for each part of the project is complicated. Not until the society has reached its "developed" (post-development stabilization) stage this relationship can be studied. Normally a certain percentage (5-15% depending on interest rates and durability) of the production cost is added to the annual expenditures for the school.

In early development however, this capitalistic evaluation of investment may not be suitable. The immediate "writing off" of investment in school buildings in early development is probably the only way of

achieving real development.
Basically schools must be built by the people themselves for the future of their children (Compare part 1 page 8).
It should not be forgotten, however, that the cost target for a school project ultimately is a cost target per student for his education and training — that is a cost target for development, a relationship between result and investment.

The investment may be considered in three "budgets":
— clients administration; including finance, land supply, design and consultancy costs and also authority charges of all kinds;
— equipment and furniture;
— building.

We are now proceding to the production aspect of the project, which may be equally challenging in the second as in the third budget; the problems are principally the same. Financially the project is the sum of the three budgets (they must list all the relevant parts to be paid for) but this study concentrates on the "building project" in a restricted sense.

Building production may be considered as a five level organization to make buildings out of natural resources (figure 3).

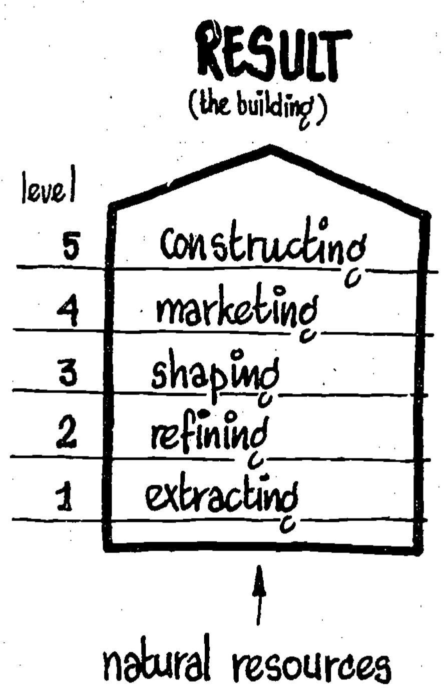


*Figure 3. Production of a building from natural resources to result.*

Four levels — (1) extracting the raw materials from nature, (2) refining them to useful materials, (3) shaping them to formed materials and building components and then (4) distributing them to various building sites — these four levels are all parts of what we may call the "building materials market" which in the industrialized countries operates as a production and distribution machinery in the society, not as part of any building project. Only level (5) belongs to the project.

In early development the situation is different. The production and distribution machinery for all the building materials wanted has not yet been developed. Building materials production from domestic natural resources must develop from the demand of building projects. This is where project implementation in early development is different from project implementation in industrialized countries with fully developed materials industries. Co-ordinated efforts of project "implementors" must be geared towards improving the supply.
This takes us out of the restricted scope of one particular project into a discussion on the developing building industry of which the project is part and parcel.

*The Building Industry* The development as such is "software" but this software cannot exist and increase on earth without a "hardware" to carry it along and the "envelop" and "environment" to protect it.

The building industry is our machinery for building; for making the envelopes and the environments in which the hardware can bring the software to perfection for our human development. It is a stream of developing matter, taken raw from nature, being refined, shaped, transported and combined into buildings.
Buildings add up to human settlements; human settlements in the setting of living nature constitute the environment.
This is the charm of it. Growth for later manifestations of existence. Looking forward and enjoying the building up. Making the machinery to build with at the same time as we build.
Our project is part of it. The project must be finished now, a product of the present building industry* and at the same time an active promoter of improvement in this industry. Each and every project in early development must fulfill its double mission: to grow into its place in society to fulfill its task there (the result aspect) and to take part in the process of development within the industry of which the project is a part (the production aspect).

Mostly the production aspect of a project is reduced to mean overcoming the difficulties presented by an underdeveloped production machinery. The result aspect, then, dominates; "the end justifies the means".
The domestic building industry — and especially the domestic building materials industry — is left aside as "unsuited for the purpose" and "suitable" resources are supplied from abroad. Project implementors are tempted to do so especially when foreign financing is involved.

*The National Development* The circle widens. The question arises: *Why* is import of building materials for better building not acceptable in national development?
Because national development must aim at national selfreliance. The answer may be illustrated (figure 4 and figure 5).

The world has now been divided among nations — each nation is a defined population, which is the owner of the country alotted to it and of the natural resources of this country —. All nations have the same right to develop; the development is only restricted by the limits to their own resources.
Under these circumstances each nation is — and has to be — selfreliant. It has its own money system for domestic exchange of goods and

* reference: School Building in Early Development, figure 10 on page 31 (part 2).

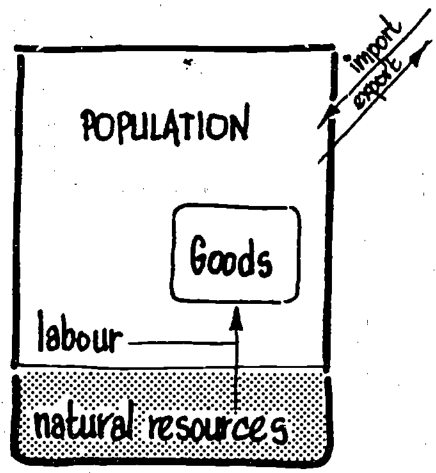


*Figure 4. The selfreliant nation.*

services. The nation is a more or less closed economic system, trading with other nations on equal basis: "We may do for you what you want us to do, if you do for us what we want you to do". Exports and imports must — in the long run anyhow — be of "equal value". *

Each nation as far as it wants to remain respected as a sovereign nation, must in this sense be selfreliant. One of its main problems is to "develop" within this framework (figure 4).

To rely on imports for basic building is irresponsible to the overall objective of national development. It is an example of a target contradicting the goal. Unfortunately it happens too often also in cases where responsible acting for national development could be expected.

Imports, of course, should not be denounced since they are important promoters of development but the basic need for national selfreliance as a base for national sovereignty should not be neglected. The neglect of the need for a long-term development strategy and the refusal to join with other for the improvement of the domestic building industry (as illustrated in figure 3 and figure 5 rather than importing at level 5 only is irresponsible).

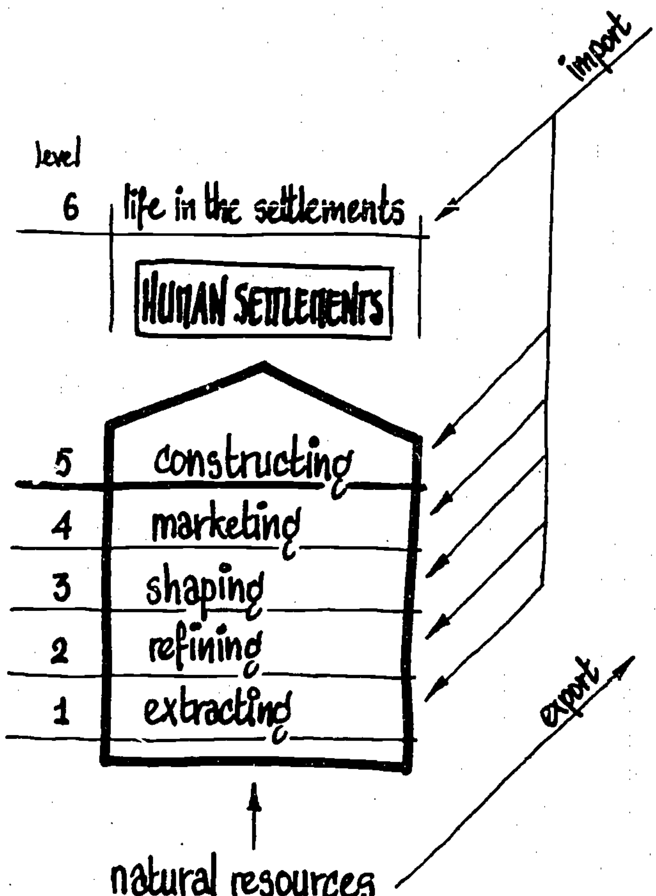


*Figure 5.*

Seen from the point of view of national development imports — as far as the nation can afford them — have to be used for maximum acceleration of the national development.

The building industry has to share the restricted imports with other developing activities and within the building industry itself. "Import priority" must be given to the basic domestic materials industry.

* not to be discussed here how this equality in values will be assessed.

*All* projects should rely on the developing domestic materials industry for supply, as far as ever possible, to make it develop*.
The willingness and ability to promote the domestic building materials industry is a test of the implementors' responsibility; especially to those who act in such fields as housing and school-building.

*The International Co-operation* The basic principle of national sovereignty and — consequently — of national selfreliance does not imply, of course, that international trade should be restricted as "not wanted". The restriction is forced by nature and by the fact that ownership — that is the responsibility for the best possible use — had to be defined, and has been defined, internationally by the acceptance of nations as the owners of countries.

Contrary to isolationism, selfreliance pleads that there should be an open trade as far as resources allow for it between nations for the benefit of everybody.
The condition for trade internationally, however, is this "benefit of everybody". Trade between upperclass merchants benefitting from "cheap labour" (where people are starving) and "cheap minerals" (where these are found abundantly) is contrary to the interests of the peoples generally. Selfreliance requires selfsustaining activities of each nation for basic survival, housing and building and — complementary to that — maximum of trade exchange internationally to make life rich and variable.
The problem at present is presented by the difference in life-styles between recently independent nations which are considered to be in a stage of "early development" and those nations which have developed towards an "industrialized" way of living already over several generations.

"Early development" implies that a nation desires development and — whether rightly or wrongly — this development stretches for "industrialization".
Wrongly, no doubt, desires for development tend to tempt people to expect the industrialized life-style with cars and colour TVs and comfortable air-conditioned bungalows for everybody like the "colonialists" who now left the peoples in the former colonies to take care of themselves.
Perhaps the most evil scar of the colonial strike is a disabled population in the sense that things are expected to come about "without me making them" and people's expectations have been exaggerated beyond the limits of their own resources.

Anyhow: The desire for a "perfect" result of a building project may well counteract development. This was said before. It is now repeated in the context of international co-operation.
No doubt the "rich countries" must help those who are taking off for development.
And they do so — both by bilateral and by multilateral aid — but how? This is a question that has to be answered by project implementation as decided by both parties: the donor or banker on the financing side and the implementor on the receiving side. Both are under pressure of the same temptation: to make a result to "show off" regardless of the production aspect — the multiplying development effect on the domestic production industry — of the project.

* this is valid also for nations with temporarily rich export resources. There will be no national dignity without a national building culture, based on a domestic industry.

Apparently this temptation is equally strong in multilaterally assisted projects as in the bilaterally assisted ones, at least in the field of building projects for the promotion of national education; but it should be firmly resisted. Responsible developers know that. Even if a building project has to serve education it cannot be allowed to demonstrate building methods which do not — and cannot — generate development of the domestic building industry.

The following chapter on the decisions and the actions in project implementation takes the criteria for project evaluation mentioned in this chapter — both the result aspects and the production aspects — into account.

## 2. Decisions and Actions

### *1. Introduction*

Project implementation includes two definite questions: *what* to build and *how* to build it.
There are other aspects, too, which may be equally important when the implementation comes to execution: *who* is going to do the job? This question raised the whole problem of project organization, planning and control.
Related to this question is the question: *how much* will it cost and how is the financing to be arranged?
These four questions may be related to the project as a totality but also to defined parts of it. By dividing the project (the building) into suitable parts we may be able to specify and answer two further questions related to the construction of the parts: *where* and *when*?

The division of the project into parts to which the six questions listed above may be referred is crucial for the whole procedure. Each part, then, must be identifiable as to:

1. What is it? (what is required from it?)
2. Where is it?

3. How shall it be made?
4. By whom, when?

5. What will it cost?
6. From which budget? To be paid when?

Advanced building organization uses this kind of identification of the parts of the project.
It is suitable for computerized work planning and management. It is also suitable for manual handling. As long as the criteria for identifying the parts are respected the parts may be selected as smaller units (for detailed analyses needing computer aid for project management) or bigger units (for a clear survey of the situation at regular intervals based on manual accounting).

Analysing the nature of the questions by which the parts must be identified we find that only questions 1 and 3 are "generai" in the sense that they may be grouped in classes identically for all projects.
When we speak of the parts of a building from the functional point of view (answering to: what is it? – a wall, a window, a floor etc. –) we call each part a "building element". An "element", thus, is known by the answer to the two first questions: what and where. (Because each element has to be located although the location is identifiable only in the particular project.)

When we speak of the parts of a project from the constructional point of view (answering: how shall it be made? — a block work, a cast in situ (concrete) work, a tile work, a glazing work, a painting work etc.) then we call the part a "construction".
The constructions may be classified universally without any reference to who is going to make the work or when it is going to be made (which in project organization, however, are crucial classifications)

Part 2 of School Building in Early Development describes SfB as an information and classification system recommended and administrated by CIB and shows how SfB can be used for cost breakdown.*
In this part 3 we shall make full use of the SfB system for rational project management because it adheres to the above mentioned criteria for identification of parts of building projects.
The parts, according to SfB, can always — that is in any building project — be classified as "elemental constructions". That is: Any project may — and should — be broken down in parts, which — each part separately — must be known both as an element and as a construction and classified accordingly. Each part thus, throughout the entire process of design and production, remains classified and coded (grouped for easy retrieval) according to SfB international standard.
Arrangement may be either by element — the way in which the user understands the part, for instance "a wall" — or by construction — the way in which it has to be (or has been) constructed, for instance a "concrete construction".
The advantage of applying this logic to project implementation will be further clarified by the example to be published in Part 4 of this series.

*2. Design for Construction*

We started off in Chapter 1 by mentioning two main groups of aspects to be taken care of in the implementation of a project; the functioning of the building when finished and the production of it (page 5).
These aspects relate to design and construction; requirements and supply.

There is a fixed sequence in which decisions have to be made (preceded of course by relevant studies) and actions have to be taken. This sequence is well known and practised by architects all over the world.
Even if the steps in the sequence and the meaning of them may differ,

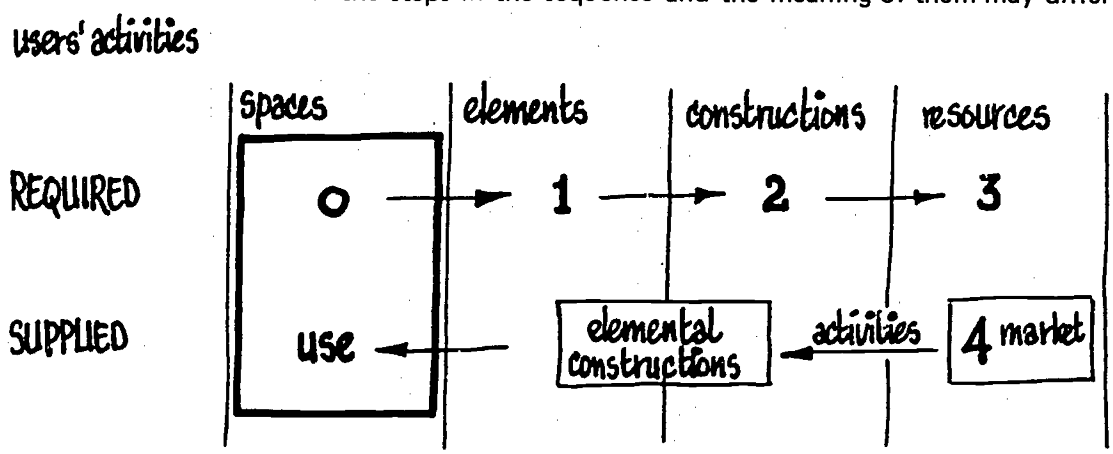


*Figure 6. The Building Project — sequence of design, construction, use —.*

* Part 2 pages 24 and 25.

SfB definitions and management philosophy* may be applied (figure 6). It can be used anywhere, regardless of who may be involved and which techniques may be applied.
From left to right in the upper row are a series of studies and decisions indicated 0, 1, 2 and 3.
From right to left in the lower is the corresponding realization 4, the actual building process.
In the upper row gradually the requirements are specified for production; in the lower row production is organized, carried out and controlled. The building is constructed und used. We may look at the five phases, numbered 0 to 4.
By doing so we must realize however, that requirements must be realistic in the sense of the responsibility discussed in Chapter 1: Long term optimum quality rather than shortsighted "maximum" quality.

*Phase 0 — defining the basic requirements* The first thing to do is to define the project; both in terms of requirements related to the result and of feasibility related to the resources available including the condition presented by the present development stage of the manufacturing and construction industries of the country as described in Chapter 1, *Project and Society.*

Following the general pattern of the step-by-step implementation just referred to (page 14) the implementor must as a basic condition state in which kind of industrial and economic environment (degree of sophistication, see Part 2, page 31) the project is going to be realized, and what kind of production pattern the architect has to foresee in his design. This information is an important part of the "programme of requirements".
Although the phase 0 is in fact a pre-project study its result — the programme of requirements — is the most important document in the whole process. If there are basic mistakes in the programme the whole project may be a failure. Some of these types of mistakes may be listed. The project may be for instance:
— wrongly situated
— unrelated to present and/or future basic needs
— unrelated to present production conditions
— not fitting in any "production stream".

The "production stream" aspect is important. We will come back to it later.

Assuming that the project is rightly initiated and that the production methods have been given due consideration already at this stage we may look a moment at the phase 0 studies and their result. We may follow the "modern" way of attacking the problems involved.
Phase 0 includes the studies necessary to specify the client's requirements in terms of space (rooms) and related equipment, furniture, fittings and room surfaces. It includes an economic total target for the project and a plan of financing.

The studies result in a "programme of requirements" and a "preliminary design" on which the design team can base its work aiming at solving technical problems and gradually producing the documents which specify the parts to be produced.
The studies closely follow the pattern outlined in chapter 1 (figures 1 and 2 on page 6 and 7) We shall here consider only the building (budget

* introduced by Dr. Bjørn Bindslev, CBC, Denmark.

3). The space requirements may be studied for stream production* and for internal adaptability to future needs ("flexible plan").
In that case — which is strongly recommended in modern school building — three main agreements must be reached.
1. On the space grouping (related among others to different needs of services)
2. On the dimensioning of spaces
3. On the quality (related to the basic methods of construction, which have been chosen).

These agreements will ultimately (chapter 3) be translated into two different types of contracts:
*1. Construction works* for rigid (not to be altered for other needs in the future) site elements, substructural elements and carcass elements (supports, external walls, floors and roofs). The placing of the support according to a defined modular grid is one of the most fundamental features of a modern school with flexible room dimensions.
Another main feature is the free height between floor and ceiling. These features, together with pipe planning for main services, constitutes the "zoning" for the activities to be housed in the building.
*2. Completion packages* are a new kind of sub-contracts. Each package contains a certain set of completion elements which is suitable for a certain type of producer (subcontractor) to deliver. Examples may be partitions (movable); toilet fittings, laboratory fixed furniture, library shelving etc.

The quality of elements — whether parts of the carcass or parts of the completion packages–should be related to the requirements of the spaces which they enclose and serve.
The checklist of such requirements may include:
— Climate conditions related to temperature, air quality (ventilation), light and sound
— Safety (protection) related to fire and other risks
— Surface and durability requirements
— Other (special) requirements such as for instance cleaning.

In early development this kind of checklist may seem too sophisticated. It should be recognized however, that a classification of this type is equally applicable to all levels of development although the solutions to problems arising may be entirely different.
The studies in phase 0 of the project — whether sophisticated or not — must result in a programme of requirements, including agreed preliminary design, construction directives (level of sophistication) and cost target.

*Phase 1. Listing the elements of the project and indicating requirements and cost targets for them.* The term elements of the project has to be understood to include all what has to be made; all "costs".
We have distinguished three budgets (page 8):
— Budget 1: client's administration and design; land and land development
— Budget 2: equipment and furniture
— Budget 3: building elements (incl. site)

* By "stream production" is meant continuous building of a series of projects whereby, as far as possible, similar things in the projects should be produced continuously (without interruption) according to a fixed plan. Guaranteed continuity in production is a major promotor of industrial development.

At this stage — we assume — there is already a division of the project into these three separate budgets. Most important is the completeness. Each budget must contain a detailed list of the elements with cost targets to safeguard that nothing has been forgotten.
The costs for land, (with infrastructural services), finance, authorities, design, client's supervision and project management may come in the first budget.
The things which have to be supplied for use when the building is ready will be allocated to budgets two and three.

Our discussion will be restricted to the building (incl. site) elements to be constructed; budget number three. In this budget at this stage the building elements are listed. We may discuss how this is made.
— First: All the building elements must be in; the "listing of all elements" is important.
— Second: There must be a suitable "arrangement" in the listing; a grouping of the elements; a classification which should not need to be changed but should be suitable for all relevant purposes throughout the project.

This second requirement asks for a double class-code for each element telling:
— its function (wall, floor, roof, services etc.)
— its location (west wing, third floor etc.)
The location code is important. A big project can always be divided into manageable (smaller) units by division into "blocks". Each block, then, may be considered as one project. Within each block there must be subcodes or agreed location names by which the building element — functionally classified by a bracketed number from SfB Basic Table 1 — can be located.
*The macro-arrangement according to blocks is assumed to remain in all contract documents and will not be mentioned further.*
The standard classification according to the SfB Basic Table 1 may have to be explained to those who are not yet acquainted with it. It was shown in Part 2 (figure 7 on page 24 and 25) and its relation to the list presented in figure 1 of this study is as shown in figure 7.

Users' activities *require:*

| | | |
|---|---|---|
| Spaces *(internally and externally)*<br>equipment<br>furniture | | |
| fittings | (7) | |
| finishes | (4) | |
| **Structural elements** | (2) | *Building project* |
| substructure | (1) | *(budget 3)* |
| completions | (3) | |
| **Services** | (5) | |
| | (6) | |
| **Land and municipal infrastructure** | | |

*Figure 7. Building elements in the Project. Compare figure 1, page 4. Bracketed numbers indicate agreed main classes according to SfB.*

## I Cost Summary Total

| | | *100 sh* | *sh/m2* | % |
|---|---|---|---|---|
| 8udget 1 | Land, design, administration | 1214 | 151:80 | 13.8 |
| 8udget 2 | Equipment, furniture | 1426 | 178:20 | 16.2 |
| 8udget 3 | 8uilding construction | 8800 | 1100:00 | 100.0 |
| **Project Total** | | 11440 | 1430:00 | 130.0 |

## II Budget 3 Construction Cost Summary

| SfB | | | | *100 sh* | *sh/m2* | % |
|---|---|---|---|---|---|---|
| (19) | Foundation | | | 212 | 26:50 | 2.41 |
| (29) | Structure | – | carcass | 4600 | 575:00 | 52.27 |
| (39) | | – | completions | 930 | 116:25 | 10.57 |
| (49) | | – | finishes | 310 | 38:75 | 3.52 |
| (59) | Services | – | piped | 468 | 58:50 | 5.32 |
| (69) | | – | electrical | 126 | 15:75 | 1.43 |
| (79) | Fittings | | | 94 | 11:75 | 1.07 |
| (99) | **Building Elements** | | | 6740 | 842:50 | 76.59 |
| (90) | + Site elements | | | 240 | 30:00 | 2.73 |
| (9 -) | **All Elements** | | | 6980 | 872:50 | 79.32 |
| (0 -) | + Construction generalities | | | 1820 | 227:50 | 20.68 |
| (- -) | **Total Construction Cost** | | | 8800 | 1100:00 | 100.0 |

## III Cost of Structure Carcass (2) and Completions (3)

| | | *Carcass (2)* | *Completions (3)* | *Total* |
|---|---|---|---|---|
| ( -1) | External walls | 128,000.– | 35,000.– | 163,000.– |
| ( -2) | Internal walls | 106,000.– | 16,000.– | 122,000.– |
| ( -3) | Floors | 91,000.– | 12,000.– | 103,000.– |
| ( -4) | Stairs | 22,000.– | – | 22,000.– |
| ( -5) | Suspended ceilings | – | 30,000.– | 30,000.– |
| ( -6) | – | – | – | – |
| ( -7) | Roofs | 113,000.– | – | 113,000.– |
| ( -8) | – | – | – | – |
| ( -9) | **Total Structure** (excl. finishes) | 460,000.– | 93,000.– | 553,000.– |

## IV Cost Analysis – Structural Elements *(arbitrary)*

| | *100 sh.* | *sh/m2* | % |
|---|---|---|---|
| External walls | 1630 | 203:75 | 18.52 |
| Internal walls | 1220 | 152:50 | 13.86 |
| Floors, stairs | 1250 | 156:25 | 14.20 |
| Roofs and ceilings | 1430 | 178:75 | 16.25 |
| | 5530 | 691:25 | 62.83 |
| of which carcass | 4600 | 575:00 | 52.27 |
| completions | 930 | 116:25 | 10.56 |

*Figure 8. Four levels of cost break-down. The "Construction cost summary" and "Cost of structure" show the SfB standard arrangement.*

When rearranged according to the SfB (the bracketed numbers) the standard list of building elements will appear as shown in figure 8 (compare figure 7 in Part 2).
It may be added here that coding is only for reference and for the establishment of a standard sequence in the arrangement of the building elements which have to be listed. Headings for easy reading and understanding of the arrangements must be applied.

The phase 1 studies of the building elements should (theoretically) result in a specification (element by element as far as this is considered important) of performance requirements without entering into any statement relating to constructions. The phase 1 "performance specification", then, is a translation of the programme of requirements for the spaces (phase 0) into a programme of requirements for the building elements (phase 1). It should not be forgotten, however, that the construction ability of the society in which the project is going to be implemented is the main regulator of the requirements, as explained on page 9 (see further "the differences" on page 22). In practice, therefore, the phase 1 studies cannot be entirely separated from those of phase 2.
The arrangement of the text items for the specification of the elements is important. It should be:
– Chapters (with suitable verbal headings) arranged in the sequence of the bracketed numbers of "SfB Basic Table 1".
– Elements within each chapter arranged by the agreed "location classification".

The specification of elements includes the cost target per element.
The specification is related to the "location drawings" where all the elements are to be found (located) and from which their sizes (quantities) are known.

*Phase 2. Listing the elemental constructions and indicating construction quality levels within the targeted cost limits.* In phase 2 the list of elements (with requirements) develops into a list of "elemental constructions" classified as such with a bracketed number for the element class and a capital letter for the construction class. This is for main arrangement and easy reference.*

The specifier has now to tell how the elements have to be made. This is where specific national or local practices may ask for arrangements; sooner or later there must be a grouping into separate contracts and within each contract a plan of activities. As said before, however, the answer to the question *"what has to be done?"* should preferably not be mixed up with the question *"who is going to do it?"* Phase 2 deals with the first question: Phase 4 deals with the second one. This is possible because the SfB table 2, classifying the constructions, is structured in such a way that later (phase 4) allocation of elemental constructions to separate contracts is easy. What is now (phase 2) produced is a "bill of elemental constructions" in which required quantities, qualities and the assessed prices of the different elemental constructions may be indicated. Alternatives may be studied and compared.

In early development much more effort should be devoted to achieving good standards in how to produce building elements from indigenous raw materials. What was said in the first chapter of this study is eminently applicable during this phase 2 of the project study.

* Details to be presented in Part 4.

It applies to the design team as well as to the decision makers.
Demands for materials are created by the project specifiers. There is a strong need for designers' — and project implementors' — co-operation so that national standard components may be produced in the country. They should be specified for supply in projects whether these are financed domestically or with foreign assistance.

This leads us to phase 3.

*Phase 3. Editing the basic "bill of quantities" with specification of constructions attached.* The sequence of the project development is (theoretically) as follows:

— phase 1: Listing the "elements" of the building in a suitable sequence and telling what the client requires from them.
— phase 2: Using the list of elements from phase 1 telling what kind of "constructions" must be used to meet the client's requirements; indicating the quality of the constructions.
— phase 3: Specifying the "resources" (labour and materials) which will constitute the quality and cost of the constructions.

In practice these phases are interrelated. The result of the studies and decisions should be the final "bill of quantities" with related drawings and specifications which have their precise functions regardless of simplicity or sophistication.

The "bill lists the elemental constructions" indicating quantity by reference to the drawings (or directly in the bill by measurements from the drawings) and quality by reference to the specification.

The "quantities" of the (elemental) constructions must be known from the "drawings".

The "qualities" required must be known from the "specification"; the document in which the materials (and other resources) for the constructions are specified.
Obviously the specification in question can be more or less detailed. That presents a difficulty; how to limit the number of words without causing later disagreement between the contracting parties. This is where the discussion on a national specification comes in (page 21).

It might seem too sophisticated to discuss at this stage the creation of NBS for developing countries. This may not be so. Standards related to prevailing conditions may help foreign architects working in the country to adapt their thinking to the conditions. It may strongly promote the development of the domestic materials industry. In many cases the starting of a new factory promoted by the government may in itself enforce a national standard (for good or bad). What is missing, however, is the devoted co-operation between government, financiers, permanent clients (school builders and housing corporations), architects and producers of materials in the country with the aim of gradually easing that bottleneck in domestic building industry which is located in the materials production sector.

A gradual development of a suitable NBS may well be a target for the co-operation needed in which all project implementors should be involved.
This may also reduce the damage now caused by careless cutting and pasting from old specifications with their origin in former colonial powers. It may influence the renewal of inhibiting by-laws inherited from colonial times and in some cases still defended by civil servants with foreign education.

With phase 3 the substantial part of the client's studies, decisions and

*The task of the National Building Specification, NBS, is to introduce standard methods of indicating construction quality.*
*There are two possibilities:*

*1. The NBS is a printed book with a series of different constructions specified, to which the text in the bill (or project specification) will automatically refer by using the vocabulary and numbering defined in the NBS. How to indicate quality level in the bill is also advised by the NBS. The legal enforcement of the NBS "advice" and the references necessary are safeguarded by an introductory statement in each contract. Only those items in NBS, which are indicated in the project bill are valid for the project in question.*
*This is automatically achieved by the use of the SfB coding and related numbering.*
*The project specifications, then, will only deal with eventual amendments to NBS and non-standard constructions used in the project. Specific reference numbers in the bill will tell when to look for information in the project specification, which may be very short (Scandinavian method).*

*2. The NBS is a set of standard items (sentences), which may be copied as required in the project specification. It is meant to serve as a refined (well studied and well arranged) set of specification clauses for "cutting and pasting" (U.K. method, of which the Irish model may be of interest for developing countries).* *

*figure 9*

preparations leading to full information for adequate production activities is completed. The rest is from his point of view pure management. From the constructors' point of view, however, the "substantial part" starts with phase 4.

In the analysis of the development of the design of the project no reference has been made to the division of work (who is responsible for the decisions and by whom are the supporting studies to be made).
The design team may well include members of the production sector. It should be clearly understood, however, that design and decisions related to design (on what has to be produced) are fundamental for the decision to be taken in the production sector — but they are different and should be treated as such.

### 3. *Construction*

*Phase 4. Executing the work.* When the constructor gets the project documents in his hands, he has to look for those who will supply the materials and carry out the work; he has to extract from the documents the right items for each actor.
The division of the chapters (sections) of the bill (with the related drawings and specifications) into "contracts" has to be done, but it presents no difficulties if the elemental constructions are grouped and classified in the way that SfB proposes. This is an organizational matter

* Irish NBS published by An Foras Forbartha (The National Institute for Physical Planning and Construction Research), St. Martin's House, Waterloo Road, Dublin 4, Ireland.

to be dealt with in the following Chapter 3.
The contractors collect (buy) materials and other resources from the market, bring them together at proper times and places and combine them by activities which produce the elemental constructions (figure 6, page 14).
Each activity produces one defined elemental construction — a defined part of the building which is at the same time a defined construction (e.g. a defined type of blockwork for which the resources needed are well known both in qualities and quantities) and a defined element (defined by types, for instance an external wall, and by location, for instance south elevation, third floor). It takes place at a certain time involving a certain number of selected workers, using selected tools.

The criteria required for defining the "part" are thus fulfilled (page 14).

The activity is the elemental construction in its dynamic stage of coming into existence and the bill developed and refined by the design team through the phases 1, 2 and 3 turns out to be the backbone also for the constructors' management.

Each contractor has agreed to supply a certain number of the designed elemental constructions, he has given his price for each one of them, and he can easily check by his own management organization whether his price gave him a profit or a loss.
Thus also the contractor benefits from the logic applied in the double definition of the parts of the building by "elements" and "constructions".
It may be noted that the elements and the constructions can be separated only in theory, for the alternatives to be studied. When we come to construction activities in reality, every piece of construction is in an element and every piece of element has to be constructed, it is a construction (or several constructions).
The related system works as well for simple self-help building methods as for complicated multimillion projects managed by help of computers. The basic codes for elements, constructions and resources remain the same. Nevertheless there are large differences in methods of building and we will have to see how they influence the project implementation.

*The differences.* The most significant differences appear in the choice of contractors — or rather constructors.
Three "levels" were characterized in Part 2 (page 31).
1. self reliance (building by self-help methods)
2. small contractors (with limited possibilities of understanding sophisticated drawings and specifications)
3. medium size or large contractors (using industrialized methods, more or less sophisticated).

Although the actual decision on "who is going to do the job" does not appear until phase 4 of the project implementation programme, it is obvious that the choice of building methods — related to the level of development of the local industry — has to be taken into account right from the beginning of the project.

A strong plea was made in chapter 1 for the use — and development — of locally relevant building methods, using domestic products. If the total society is still in "early development" the whole process of project implementation has to be adapted to the characteristics of this "early development". Much damage may be done — and has been done — to the people because the attitudes of the "implementor" and the methods used for implementing the project were foreign to them. Developers have now learnt that "development" needs popular participation to become real. This applies especially to housing and education. School-building is in the focus of interest.

The differences do not affect the basic principle described in this study, but they affect the choice of the elemental constructions because these are — and must be — the result of the activities which differ. They also affect the means by which the information contained in the "contract documents" have to be transmitted from design to production.

Working with and for people on level 1 (self reliance) requires methods which are adapted to their way of making elemental constructions. But the fact that they are making elemental constructions when they build is fundamental. The reasoning remains unimportant, even if the transfer of the reasoning from theory to practice must rely on the communication means used by the practitioners.

The same, of course, applies to level 2 (small contractors) and level 3 (large contractors). Renewal of habits is difficult and reasoning may not always do the job. This may be true not only for construction but also for design.

Designers — supported by administrators and financiers — are inclined to stick to their national traditions on level 3 and may not be inclined to adapt their methods to the level of development prevailing in the region where the project is going to be implemented.

The heavy responsibility of foreign aid to adapt itself to real needs for basic development — not for superficial "decoration" — is vested in the project implementation team.

We will have to look at the organizational consequences of this responsibility.

*Introduction — Who decides?* This is a crucial question in society at any time anywhere. Mostly the question is avoided. People engaged and interested in a project try to make their opinions respected as far as possible. The limits of their possibilities in this sense may never be tested. Someone confirms "decisions" as presented in proposals (programmes of requirements, drawings, specifications and contracts) and the ball starts rolling.
But this is not always so. The one who pays — the owner — has by definition the right to decide what he shall pay for. This makes things easy in private capitalism but utterly complicated in societies where "everybody's money" (collected by taxes or otherwise) has to be handled; the more so when this money is handled internationally for "development".
In sophisticated building we may recognize four main parties who make decisions on top level, ruling (school) building in early development:

1. Banker (and related supervisors)
2. Administration (including advisers)
3. Architect (or design team)
4. Market (the habits and possibilities of the society at large)

With *banker* in this context is meant the one who supplies the money. The banker may be a bilateral donor, a multilateral money supplier, a national bank of a ministry of finance.
Wherever the money comes from (if not supplied by the owner himself) conditions will be attached to loans and other contributions. These conditions are basic decisions ruling the project.

With *administration* in this context is meant the one who represents the "owner" and acts as the "client". If the owner would contribute all the money needed for the project he would automatically be the final decision maker in all situations; but he does not, and the administration has to be careful not to "make mistakes".
The conditions under which the administration works may be complicated and thus its decision-making capacity weak. There is space for considerable variations here.
Legally, anyhow, all decisions concerning the project must be confirmed by the administration acting on behalf of the (formal) owner.
The legal establishment of the owner and the authorization of the administration to act on his behalf, therefore, are essential.
Advisers to the owner on legal, economic or management matters (sometimes even on technical and architectural matters) have mostly no legal power to decide anything; their eventual power is in their influence over those who have to sign for decision.

With *architect* in this context is meant one who presents drawings, specifications, bills and contracts to the administration for final decision (or may be delegated to decide on behalf of the administration). He is the "architect" even though the "design team" in modern project implementation may be a complex of responsible decision-makers.

Legal authorization of the architect — and thereby of his responsibility — varies widely from country to country. The architect, therefore, mostly relies on a personal contract with the administration for his assignment and his role in the project implementation.

It may be added here that both constructors and representatives of the materials industry may be engaged in decision making as separate consultants or members of the design team.

As contractors, however, they are not decision makers, but suppliers (as contracted) of elemental constructions (or resources for elemental constructions) according to decisions by the administration as advised by the architect (design team).

With *market* in this context is understood all those conditions in the society which as external factors influence the design and construction of the project. There are three main aspects of this influence:

1. The regulation system of the society including standards, laws and by-laws, municipal supervision and the supply of infrastructural services, land use regulations, system of land (real estate) ownership, mortgages etc.

Many of these are explicitly stated in regulation documents, but others may be traditions and implicitly valid rules of the society. This study cannot go further into details of this aspect.

2. The aspect of the national productions machinery as illustrated by figures 3, 4 and 5, page 8 and page 10, its level of development and its general capacity of supply especially with regard to building materials, components, plant and tools.

The implementors' responsibilities related to this aspect were discussed in Chapter 1.

3. The aspect of the contractors' level of sophistication as described in Part 2 (page 31) and mentioned in this study on pages 28 and 29).

We may consider the project organization related to the above mentioned parties under four headings. The Finance, the Administration, Management of Design and Supervision, and Production Management.

*Finance.* Depending on the type of "banker" involved his main objective may be:

— earning interest with the money and being repaid as contracted
— "value for money".

In both cases — mostly mixed — the banker will make his own evaluation of the project and will attach conditions to his loan (or contribution).

His evaluation is result-oriented and there may have to be pressure internationally, to make bankers respect also the production aspect since it requires the project to contribute socio-economically to the development rather than merely to compete individual-capitalistically for the best possible result.

Anyhow, the banker may require:

— firm project administration, organized and staffed according to agreement
— veto-right for employment (especially project manager, architect and contractor)
— a realistic plan of operations and related budgets.

Most bankers have their own forms to be filled in for the purpose and their routine for their handling.
For the organisation of design and the contracting the use of the SfB for accounting may be compulsory (part 2, figure 7).
A major financial problem is presented by the rate of inflation, which has to be foreseen since today's prices will not apply to building costs to paid next year. Any delay in the execution of the project will raise the costs. The consequences of inflation will have to be carefully balanced by suitable paragraphs (especially those relating to delay) not only in contracts related to supply, but also in loan agreements.

*Administration* Under the conditions established in the financial agreement between the banker and the administration, the latter will prosecute all the functions of "owner" and "client" for the project. The legal backing of this authority may be complicated but, nevertheless, has to be manifested. The internal organization within the administration and the responsibilities and duties of different staff members have to be known to those who are engaged in the project.

The project administration is ultimately responsible for all decisions made for the project and for all actions taken in accordance with the decisions. It may be added that the administration carries the ultimate responsibility also for not taking action when action is needed, or for acting wrongly.
The administration acts according to the *plan of operations* which is the main guiding document for the entire project. This plan must be carefully studied before it is decided upon. The first versions of the plan may be rough. It has to be updated refined and detailed at intervals. The making of this plan and the proper way of using it is the key to success in project implementation.
Each project has its own specific features and there is, therefore, no possibility of standardizing the form of the plan.
Two ways of illustrating plans of operation are common:
— bar chart
— network plan

We will not describe the way of making such illustrations. A very simple bar chart was presented in Part 2 (figure 9 on page 28). It is possible to detail the bar chart — or network plan, which is more sophisticated and good for computer manipulation during the total period of the project implementation — as much as one may want. There are no fixed rules for making such illustrations.
A list of main points to be remembered is presented in figure 10.

Each step in the process of decision making should be confirmed by a document signed by the legal decision maker and made known to all concerned. In project implementation on levels 2 and 3 this procedure is compulsory.

The check list (figure 10) is based on a "normal design and construction (contracting) procedure, with a warning in point 15 that some of the key materials may have to be ordered in advance to safeguard that the project will not be delayed because of short supply (part 2, pages 26 to 28).
The check list does not take the timing into account. The plan of operations must include a time schedule related to the happenings according to the check list. It also must relate the budgets (the financial plan) to the same time schedule. The risk of delay must be foreseen and the consequences of it be balanced by continuous follow-up control. The inflation factor (see also page 20) and the disturbing effect of delay

ure 10. *The Building Project,*
*ents memorandum*

| | A The Studies | B The Decisive Actions |
|---|---|---|
| 0. | | *Establishing* the "Client" |
| 1. | *Defining* the desires and the expectations | |
| 2. | *Assessing* the resources, the financing and the use value | |
| 3. | | *Deciding the targets* for the requirements, the economy and the dates |
| 4. | *Formulating:* the programme of requirements — the economic plan (preliminary) — the plan of actions (preliminary) (= plan of operation) + *Deciding* | |
| 5. | *Studying the feasibility* of the financing, the design, the production | |
| 6. | | *Agreeing on teams* (and technical assistance) |
| 7. | | *Employing the design team* for the architecture, the technology, the management |
| 8. | *Studying* the locations, site | |
| 9. | *Formulating* the preliminary design + *Deciding* | |
| 10. | *Formulating* the main design, the infrastructure | |
| 11. | | *Fixing* the land (supply), the permits, the infrastructure |
| 12. | *Studying the feasibility* of the supply | |
| 13. | | *Deciding* the supply, the methods of construction, the detail plan of action |
| 14. | *Formulating the project in detail* functionally, technically, economically, productionally + *Deciding* | |
| 15. | | *Ordering* the key products |
| 16. | | *Employing* the contractors |
| 17. | | *Arranging the control* of the quality, the time, the money |
| 18. | | *Taking over* |
| 19. | | *Starting the education* |
| 20. | | *Arranging* maintenance and real estate administration |

on dependent activities present big problems. The most important remedy — but also one of the most difficult ones to achieve — against underdevelopment is respect for time schedules (plan of operation); the ability to plan and to act according to plan. Development implies organized specialization and co-operation. This can only take place in a social climate of respect for agreements; "timing" is a key agreement. It should also be understood that the model presented in figure 10 may need detailing and perhaps also rearranging of some points before it is used in practice. It may be useful, nevertheless, as a reminder of what has to be done.

A special type of project preparation is related to "stream production" asking for a separation of contracts for the rigid "carcass" (supporting structure which will stay unaltered) from the "Completion packages" containing such parts of the building which may be moved and changed according to future needs. Such contractual separation may have to be foreseen at an early stage in the design process. In such cases the separation into contracts may not suitably be done between phase 3 and phase 4 (figure 6 on page 14) but right from the beginning. "Contracts", then will be used for a macro-arrangement similar to that described as "blocks" (page 14), without changing the basic principle of project development according to the SfB system, which in such case applies to each separated contract.

*Management of design and supervision* The "architect" in this study covers the "design team", which may be a complex organization of consultants for different specialities.
Again there is no rule for how this organization must be constituted: more than one legal entity being involved, it is important that their mutual responsibilities have been defined. Under all circumstances there must be a design team co-ordinator.

The architects' responsibility and relation to the administration must be defined by contract. In this study is assumed that the architect's role is to propose the studies and the documents on which the administration can decide (see figure 11).

*Production management* There will be entirely different procedures for construction according to level 1, level 2 and level 3 (part 2 figure 10 on page 31). The present study does not discuss these differences but emphasizes the basic principles for construction management which are the same regardless of the level of sophistication.

The construction management (level 3 application) basically includes:
— Pre-construction estimates, tendering
— Negotiating and contracting
— Planning (activities, resources, cash flow)
— Resource supply
— Activity organization and resource distribution
— Control
— Money management
— Hand-over and closing of accounts.

Far reaching simplifications of this procedure may be applied on levels 1 and 2. The architect must know and adapt his work to local conditions.

Except for money (which is a means rather than a resource) the resource to supply and manage belong to four categories:
— management itself

*The architect's assignment may include:*

*For the land and the authorities:*
– advising and assisting the administration for supply of the land (the site)
– checking that the municipality supply of infrastructures proceeds according to plan
– safeguard authority permits and obedience to building regulations.

*For the building production generally:*
– checking the local market for possibilities of production: co-ordinating the demand of the project as far as possible with that of other projects (present and future) for the development of the domestic building (including building materials) industry. Promoting stream production and related standardization of completion packages to modular design
– advising the administration on the types of constructions to be used and on the sources of supply generally (level 1, 2 or 3 according to figure 10 on page 31 in Part 2)

*For the outline design:*
– studying the programme of requirements and the preliminary budget which should be prepared by the administration (and specialist advisers); eventually proposing amendments
– preparing preliminary design alternatives (of which the most suitable solution will be agreed upon for realization)

*For the detailed design and construction:*
– preparing main drawings showing the location of all elements. Listing all elements (according to type and location) indicating elemental requirements of importance and proposing elemental cost targets
– studying alternative constructions. Preparing the bill of elemental constructions with preliminary cost assessments
– preparing bill according to SfB with related drawings and specifications as needed for production. Separated, if needed, documents for the ordering of key commodities prior to the general contracting (compare part 2, figure 9 page 28).
– assisting the administration in the tendering and contracting procedures
– supervising the work and authorising payments
– assisting in preliminary and final take-over and settling of disputes (if any)

*Figure 11. The duties of an architect in early development.*

– plant and tools
– labour
– materials and components

The differences in levels of development apply to each one of these categories of resources, but the basic principle remains anyhow: using these resources each construction activity produces an elemental construction, (that is a part of a building which at the same time is an "element" and a "construction", see page 11).
The client buys elemental construction from the constructor. Each

element of construction is a specific product in the contractor's management plan and any building project is the sum of a certain number of elemental construction.

The key to managerial succes both in design and construction regardless of the level of sophisitcation applied in the managerial process is the acceptance of this basic principle.

Several governments, therefore, have made the elemental breakdown according to the internationally recommended SfB System compulsory for building projects with governmental support.

The constructional organization may also be based on the SfB system as internationally recommended.

Examples will be presented in a following Part 4 of this series.

In the series International School Building News has been published recently:

*"Advisory and Information Services".*
Information sheet about the work and the function of the Information Centre for School building in the Netherlands.
ISN. Vol. 8/1974/no. 1.

*"School Building in Early Development" part 1.*
This study deals with the educational problems in developing countries, part 1 of this report deals with problems arising from the present rates of "drop out" in traditional primary education and proposes possible methods.
ISN. Vol. 9/1975/no. 1.

*"School Building in Early Development" part 2.*
School planning and school building in modern education.
ISN. Vol. 10/1975/no. 2.

*"School and Community"*
A programme and five architectural designs for an integrated accommodation in Amsterdam (area Banne-Buiksloot II).
ISN. Vol. 11/1976/no. 1.

*"Renovation" of Buildings for Basic Education.*
An inventory of the present situation and possibilities, and the promotion of a development in renovation. 10 Examples of renovated plans are included.
ISN. Vol. 12/1976/no. 2.