

BUILDING CONSTRUCTION PROCEDURES OF UNITED NATIONS ORGANIZATIONS

Prepared by Mark E. Allen, Alfred N. Forde, Zakaria Sibahi, Earl D. Sohm
Joint Inspection Unit

Table of contents

	<u>Paragraphs</u>	<u>Pages</u>
I. INTRODUCTION	1-8	1
II. BUILDING REQUIREMENTS	9-16	3
III. ROLE OF PARTICIPANTS IN CONSTRUCTION	17-42	5
A. Organizations	18-21	5
B. Architects	22-29	6
C. Cost Estimators and Quantity Surveyors	30-32	8
D. Building Contractors and Construction Contracts	33-42	8
IV. BIDDING PROCEDURES	43-52	12
V. ROLE OF INTERGOVERNMENTAL BODIES	53-57	14
VI. BUILDING COSTS	58-68	15
VII. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS	69-82	17

Annexes

I	Determination of Building Requirements
II	Role of Architects
III	Summary of Functional Relationships of Participants in Construction
IV	Qualifications of Technical Staff of United Nations Organizations
V	Summary of Terms of Construction Contracts
VI	Building Costs

I. INTRODUCTION

1. This report has been prepared pursuant to General Assembly Resolution 34/233 of December 1979 which requested the Joint Inspection Unit to "conduct a full scale study of procedures for obtaining estimates and soliciting bids on United Nations construction projects at Headquarters and in other United Nations offices, with the assistance of outside expertise as necessary, it being understood that, in addition to covering procedures for major construction at all United Nations offices, the study should include comparative information with respect to other organizations in the United Nations system, should contain comments on the adequacy of practices and procedures now in place and should suggest such specific revisions and improvements as may be necessary". An interim report was submitted by JIU to the 35th Session of the General Assembly (Document A/C.5/35/6).

2. The Inspectors found that the question posed by the General Assembly on procedures for estimates and bids was inseparable from certain other aspects of building construction, in particular the role of the various participants in construction projects and the types of contracts used. They have expanded the scope of the report accordingly.

3. Although as requested the report compares the construction practices of several United Nations organizations, its conclusions and recommendations are addressed primarily to the United Nations. It is sent to other participating organizations of the Joint Inspection Unit for information.

4. Data were gathered from organizations by questionnaires and through visits. Information was sought on all construction projects of organizations of the United Nations system completed since 1970 and costing more than \$ 1 million, or now under way and expected to cost more than \$ 2 million. Six organizations (UN, ILO, ITU, UNESCO, WIPO and WHO) had the following 13 construction projects which met these criteria.

(a) Completed projects:

1. United Nations: extension of Palais des Nations (Geneva)
2. United Nations: extension of Africa Hall, ECA (Addis Ababa)
3. United Nations: building for ESCAP (Bangkok)
4. United Nations: ECLA documentation and research centre (Santiago)
5. United Nations: UNEP temporary office premises (Nairobi)
6. United Nations: expansion of Headquarters facilities (New York) (Phase 1)
7. ILO: Headquarters building (Geneva)
8. UNESCO: extension of Headquarters - Bonvin building (Paris)
9. ITU: extension of Headquarters building (Geneva)
10. WHO: extension of Headquarters - building "L" (Geneva)
11. WIPO 1/: new Headquarters building (Geneva)

1/ The World Intellectual Property Organization, which is not at present a participating organization of JIU, explained that it was unable to reply to the questionnaire because it would have had to conduct extensive research for which the necessary manpower was not available. Since WIPO was the last organization to complete a building in Geneva, the absence of information on this project reduces the comprehensiveness of the study.

(b) Projects under construction 2/:

12. United Nations: expansion of Headquarters facilities (New York) (Phase 2)
13. United Nations: expansion of Headquarters facilities (New York) (Phase 3)

5. The Inspectors then selected the following seven completed projects for in depth examination:

United Nations:	extension of meeting rooms and delegate servicing facilities Phase I (New York)
United Nations:	extension of Palais des Nations (Geneva)
United Nations:	building for ESCAP (Bangkok)
ILO:	Headquarters building (Geneva)
ITU:	extension of Headquarters building (Geneva) - (see para. 6 below)
UNESCO:	extension of Headquarters - Bonvin building (Paris)
WHO:	extension of Headquarters - building "L" (Geneva)

6. Information on these was sought by a detailed questionnaires and by visits to projects by Inspectors or a consultant. One organization - ITU - informed the Inspectors that it was not in a position to reply in extenso to the detailed questionnaire because of the amount of research that would be required and in view of the fact that more than 7 years had elapsed since the inauguration of the building and more than 5 since the closure of the accounts; also, many of the staff members involved in the construction had left the Organization.

7. Thus, the report is based upon information obtained from 5 organizations on their general construction practices for 12 projects and on detailed information for 6 of these.

8. During the study the Inspectors were assisted by consultants from several countries. They express their appreciation to them and to numerous officials of the organizations concerned.

2/ Since plans for the UNEP/UNCHS Headquarters building in Nairobi are being revised and construction has not started, this project is not covered by this report.

II. BUILDING REQUIREMENTS (see Annex I for details)

9. It is essential to bear in mind that the full cost of a construction project consists of much more than that of the initial building. Buildings are designed to serve for long periods - often over 50 years. A building with a relatively low initial cost can in the long run prove expensive if it requires large expenditures for heating or air conditioning, maintenance and repairs, and alterations. The overriding consideration in designing a building should be its cost-effectiveness over its entire life.

10. Each organization when undertaking a construction project has to estimate the space and specifications required for the building. Since a building should continue to meet the needs of an organization for many years, this is a critical step. It is difficult to determine many years in advance the requirements of the organization for office space, meeting rooms, technical space (printing, computers, etc.), garage space, etc. Nevertheless, the attempt has to be consciously made upon the best possible evidence.

11. Organizations have generally not been very successful in estimating their future requirements. They did not foresee the large increase in membership with its consequent requirements for larger meeting rooms, interpretation into more languages and more office space. Inadequate provisions were made for space for printing and storing documents, for computer installations, for restaurants and for parking. Organizations which will be building in the future will face some of these problems, and will have to attempt to foresee the effects of any decentralization of headquarters' activities, new technology for office work and layout, etc.

12. The Inspectors recognize that it is difficult accurately to anticipate requirements over long periods of time, although they think that more thought could have profitably been given to this for past constructions. In future, more stress should be put on flexibility - the possibility of converting floor space from one use to another, building design facilitating expansion of the number of offices, technical space, parking, storage, etc., meeting rooms that can be expanded or contracted according to needs. A good design allows for economical expansion and alteration during the life of the building, and some explicit assumption has to be made about the extent of that life. The longer the life the greater the need for flexibility.

13. Most organizations state that the buildings they have constructed adequately meet their requirements. The Inspectors feel that this is somewhat optimistic and that improvements in design could have been made with greater ingenuity, particularly as regards flexibility.

14. In 5 projects significant changes in specifications were made after the construction contracts were signed:

- (a) In two projects the modifications constituted essentially technical solutions to technical, aesthetic or security problems (UNESCO and ILO).
- (b) In the WHO and the UN Geneva projects, more substantial changes were introduced: additional storage and parking space was requested by WHO, while in the UN Geneva operation, floor surface initially foreseen for storage purposes was converted into parking space, and office space was increased to accommodate approximately 1,000 offices instead of 200.
- (c) In the New York, Phase 1 project, the initial plans had to be modified as the work progressed, because the project was essentially an alteration of existing premises and structural problems became apparent after the demolition of existing facilities.

15. The Inspectors also noted that long-term needs for office space have often been underestimated. For example the ESCAP building, five years after its completion, is already used at capacity. Furthermore, as flexibility was not originally considered it is now virtually impossible to enlarge the existing construction, and costly solutions will have to be sought in order to accommodate the growing staff.

16. The operating and maintenance costs of buildings have seldom been thoroughly considered during the design phase. Detailed statistics and data banks are now being developed in an increasing number of countries on the operating and maintenance costs of commercial buildings (e.g. the cost of cleaning, heating, electricity, air conditioning, water, security, maintenance, administrative costs, etc.). This information can be a useful guide during the design phase and can help in identifying economical solutions. Experience has shown that for some buildings (e.g. ESCAP) operating and maintenance expenses add up to a sizable yearly amount. In some cases, air conditioning was installed in temperate climates and now, particularly in view of the cost of energy, it is apparent that other options (e.g. smaller glass surfaces) could have been considered.

III. ROLE OF PARTICIPANTS IN CONSTRUCTION

17. In general too much responsibility is delegated to architects and contractors and not enough is exercised under the direct control of the organizations - the owners of the projects. Annex III summarizes for the 6 construction projects studied in detail the distribution of responsibilities for advising and deciding upon various construction activities among the participants.

A. The Organizations

18. In any construction project the owner must not only be able to specify his needs and requirements, but must also be in a position to ensure that they are fulfilled.

19. Annex IV summarizes for seven construction projects the number and qualifications of the technical staff of the organization's secretariat. In the view of the Inspectors, no organization had all the technical expertise needed to ensure that its requirements were well defined and economically met. Organizations tended to delegate responsibility excessively to architects and other contractors and were unable to control their work sufficiently. This was the main factor affecting the quality and cost of constructions. Some organizations (e.g. UNESCO) have recognized this fact and have taken appropriate measures to strengthen their in-house expertise.

20. In order to cope with construction problems, including alterations, an organization must have under its direct authority persons with the required technical expertise capable first of translating its needs into technical specifications and then of supervising the work of architects and contractors so as to ensure that they are executed economically. This involves technical responsibilities such as feasibility studies, definition of building requirements, preliminary design, selection of technical options, cost estimating and budget control, time scheduling, documentation for tenders, tests and acceptance inspection, etc.

21. Organizations could obtain this technical expertise in three ways:

- (a) They could recruit qualified persons as members of their secretariats to form an in-house technical team. This solution would probably be more costly than the alternatives given below, but it would give the organization the possibility of dealing on a continuing basis with problems of maintenance, repair and alteration by retaining some of the personnel after the construction is completed. It would be particularly advantageous for an organization which planned to embark on an extensive construction programme over a number of years in one or several duty stations. It would be less useful than the second alternative when only one construction project was envisaged, unless it was possible to work out some sort of pooling of specialized staff among organizations. But the building schedules of organizations would probably not be sufficiently synchronized to facilitate such an arrangement. An organization which now has the required technical competence, such as UNESCO, could share its experience and provide technical assistance to other organizations.

- (b) The Inspectors believe that the United Nations, which does not now envisage an extensive building programme, should use specialized consultant firms independent of architects or building contractors. Such firms provide services in many parts of the world. Since they do not themselves engage in construction, for the projects for which they provide construction management services, their loyalty is to the owners of the project (the organizations) who pay them. An experienced consulting firm can carry out the functions listed in para. 20 on behalf of the owner of the project for from 1.2 to 1.5 per cent of the construction costs. Additional services can be provided such as organization of the work site, management of contractors and technical co-ordination. Contracts with such firms should specifically require that the consultant take into account operating and maintenance costs so as to achieve a balance between these and construction costs.
- (c) It would be possible to combine aspects of the two methods by having a small staff of qualified specialists and a contract with a specialized consultant firm.

B. Architects

22. The functions of architects generally include building design, construction supervision and quality control. However, as can be seen from Annexes II and III, there were in the various projects, differences in the extent of the architects' responsibilities. On the whole the architects' responsibilities were extensive and at times went beyond what might be expected. For example in the United Nations Geneva project, the architect had the overall responsibility for the execution of the project; his work was supervised by the consultative Committee of Architects and only indirectly by the UN Administration. Much the same situation existed in ILO where the architects were also in charge of the negotiation of contracts with the building firms. In the ILO and ESCAP projects the secretariats seem to have had practically no responsibility for the actual construction management. In the opinion of the Inspectors, the owners of a construction project should retain overall responsibility for the control and supervision of the project by one of the means suggested in para. 21.

23. Annex II shows that none of the architects of projects for which information was obtained was chosen through a formal competition. Either an international panel of architects was created to choose between one and 3 architects (ILO and UN Geneva) or a single architect was chosen on the basis of his performance on other projects of the organization (UNESCO; UN New York, Phase I). The architect for the ESCAP project was provided without cost by the Royal Thai Government; WHO had an in-house architect. There is no evidence to show that competitive selection of architects would have led to better quality or lower costs, but it is clear that the absence of competition restricted the choice of the organizations amongst ways for transforming their needs and requirements into a building. The Inspectors believe that many competent architects would enter competitions for the larger buildings and that this would give the organizations a better choice of options.

24. International competitions for architects, even if in certain countries at least one of the architects selected must be a national of the country, would also serve to maintain the "international" image of the United Nations. In most cases the architect or at least one of the members of a team of architects was a national of the country in which the construction was located. The only exception was the UN building in Geneva for which a French architect was selected, but he was also Director of the Geneva School of Fine Arts.

25. Architects' honoraria were calculated on the basis of the building costs, except for ESCAP and WHO (see para. 23 above). For construction projects in Paris and Geneva, local practices for the calculation of architects' fees were followed. In France, the fee is based on a percentage of the actual construction costs, but the percentage varies with the size and complexity of the project and the precise functions entrusted to the architect. For the UN New York, Phase 1 project, the honorarium comprised a cost element expressed as a percentage of actual construction costs and a lump sum fee, but its amount seems to have been negotiated without reference to locally used rates. Architects' honoraria ranged from 5.5% of actual construction costs (UN Geneva) to 6% (UNESCO), 7.2% (ILO) and, including the lump sum fee, the equivalent of 13.7% (UN New York, Phase 1).

26. No major errors or omissions by architects were reported by any of the organizations, except as regards the work of an architect's sub-contractor (see para. 32). This could be explained by the fact that the organizations were usually not technically capable of judging whether there were errors or omissions.

27. If errors or omissions had been identified they would have been subject to local laws and regulations in New York, covered by compulsory professional insurance in Geneva and subject to French regulations and a contractual international arbitration clause in Paris. Article 10 of the architect's contract for the ILO project states that in case of a professional error having financial impact the ILO would be entitled to claim a penalty at most equal to the architect's fee. At UNESCO, the architect's contract allowed for early termination if the architect ceased to perform his duties or was responsible for a delay of more than two weeks. For the three phases of the UN New York project there was no provision in the contract regarding the architect's liability. Local legislation generally has provisions concerning any problems arising from hidden structural faults.

28. Architects' contracts should contain a clear clause regarding the financial liabilities of the architect in case of errors or omissions, including those of the architect's sub-contractors such as cost estimators or quantity surveyors. The lack of such a clause was a weakness of the three UN New York phases. In countries where such clauses cannot be included in architects' contracts it would be even more important to adopt the solutions recommended in para. 21 (b) or (c).

29. Since the architect's fee is based on a percentage of the actual construction costs he is paid more in case of cost overruns, except those due to currency fluctuations. Particularly in the absence of competitive selection of architects, it would be prudent for organizations to control more closely the work of architects and to retain project supervision and control by one of the methods suggested in para. 21. This shift in responsibility might be reflected in the architect's fee. An alternative approach is to put an upper limit, expressed as a percentage of a maximum agreed cost, to the fee payable to the architect and other consultants. In such a manner, no extra benefit would be received for cost overruns.

C. Cost Estimators and Quantity Surveyors

30. These are not distinct professions in some countries where cost estimating or quantity surveying is done by the architect or the owner or by building contractors. However, such specialists are useful in controlling costs and ensuring that building materials paid for are actually required and used. They should be provided for all projects by one of the methods described in para. 21 so that they are independent of the architect or contractor and directly responsible to the organization.

31. The organizations did not generally directly engage independent cost estimators or quantity surveyors. When these functions were entrusted to the architect (or the consulting engineer as in the case of ILO), the architect hired cost estimators and/or quantity surveyors (UN New York, Phase 1, 2, and 3, UN Geneva, UNESCO, ILO). Their fees were negotiated and paid by the architect. In the ESCAP Bangkok and ECLA Santiago and WHO Geneva projects, it appears that no cost estimators or quantity surveyors were used.

32. In the UN New York, Phases 2 and 3 projects, major errors were made by the cost estimators hired by the architectural firm. This resulted in a large excess of actual costs over approved estimates.

D. Building Contractors and Construction Contracts

33. The practices of the organizations varied. In several cases the construction manager's function was entrusted to a general contractor (ESCAP Bangkok, UN New York, Phases 1, 2 and 3 and WHO), while in others it was the responsibility of the architect (UN Geneva, UNESCO, ILO, ITU). The number of contractors involved in a given project varied widely, from 2 (one main contractor and one contractor for simultaneous interpretation installations in the UN New York, Phase 1, operation), to 5 (including a general contractor in the ESCAP project), and up to more than 20 in some instances (e.g., 23 for ILO), with no general contractor for ILO, UNESCO and UN Geneva. Multiple contracting can be advantageous in certain situations.

34. All sub-contractors had to be approved either by the organization (ECLA, UN New York, Phases 2 and 3, UNESCO, ITU, ILO, WHO) or by the organization and the architect (ECA, ESCAP). In the ESCAP project it appears that the contractor repeatedly hired subcontractors without informing the ESCAP secretariat despite provisions to the contrary in the contract. In certain cases, some sub-contractors were assigned to the main contractor by the organization and the architect (UNEP and ESCAP).

35. Building materials were in general supplied by contractors. The only exceptions mentioned concern some building equipment bought by the UN in order to obtain discounts (UN Geneva project), aluminium façade elements which the ILO ordered from Japan, and elevators purchased in Switzerland by WHO. More frequent purchase of materials by organizations might be considered when this results in tax or other advantages.

36. The relations between building contractors and the organizations are specified in contracts. Examination of a sample of contracts revealed considerable differences and some improvisation.

37. Types of contracts. Three main types were identified:

- (a) Non-revisable fixed price in 4 projects: ECA, ESCAP, UN Geneva and WHO. While lump sum prices are common practice for building contracts to be executed over a fairly short period (12 or 18 months at most), they are less frequent for longer jobs like the ECA project (31 months) or the ESCAP project (27 months). For the contracts concerning the UN Geneva project, the UN finally agreed to bear a share of the inflation-generated cost increases even though this was not foreseen by any of the contract clauses (the UN took into consideration the effects of inflation from the 13th month onwards for jobs covering more than a 12 month period). It goes without saying that in fixed price contracts, inflation and/or cost overruns are normally borne by the contractor.
- (b) Cost plus fee in 4 projects: ECLA and New York, Phases 1, 2 and 3. In all 4 cases a guaranteed maximum was included to provide a ceiling cost. The cost plus fee type of contract is fairly common in North America, even for short jobs (the longest of the 4 above-mentioned projects was New York, Phase 3, the shortest ECLA Santiago with 12 months). Inflation is taken into account in determining the cost element of the contract. Cost overruns are paid by the contractor.
- (c) Revisable price in 4 projects: UNEP, UNESCO, ILO and ITU. The revisable price system is common in Western Europe, especially for jobs extending over more than 12 to 18 months. Contracts generally include a detailed escalation formula (or several formulae) using price indexes reflecting the impact of inflation on building supplies and workers' wages. The UNEP contract provides for increases based upon price fluctuations in material and labour as determined by a joint building industry-Government body. The UNESCO contract includes an escalation clause which excludes the first 15% (except for very short jobs for which prices were not revisable). Those ILO contracts which include an escalation clause, contain a formula which refers only to the level of on-site workers' wages and remains unaffected by increases in the cost of supplies or in the wages of off-site personnel. Finally, the longer ITU contracts (the shorter ones have non-revisable fixed prices) include a ceiling on the impact of their escalation formulae, thus protecting the organization against exceptionally high inflation levels. In all these cases, inflation is taken into account to the extent that it is adequately reflected by the various escalation formulae. Cost increases beyond those covered by an escalation clause remain the liability of the contractors.

38. The type of contract (cost plus fee, non revisable or revisable fixed price) should be carefully chosen. The objective of the contracting organization is to pay a fair price for fair work:

- (a) Non-revisable fixed price contracts should be eliminated except for short jobs (12 months or less) since when the full weight of inflation falls entirely on the contractor, he is forced to foresee in his bid a margin for inflation which is either too high (and the final price is higher than it should have been) or too low (and the contractor will cut down on quality and try to reduce his loss through legal claims) but seldom right.
- (b) In the context of international competition, revisable fixed price contracts including a price escalation clause generally lead to reasonable profits for the contractors. They can thus be considered fair to the organization as well.
- (c) Cost plus fee contracts can lead to good results too if a true competition between several firms takes place; also, they can facilitate auditing. But the cost plus fee contract is more risk-free for the contractor (who is guaranteed a profit through the fee) than the revisable price system. Conversely, the organization bears a greater share of the risk.

39. Contract terms. The main provisions of building contracts are summarized briefly in Annex V. See also Annex III for analysis of the relationship between the parties involved.

40. The Inspectors recognize that the choice of the type of contract and the clauses it should contain has to be decided in the light of the requirements of specific projects. In making the decision the criteria mentioned in para. 38 should be kept in mind. As regards specific clauses in the contracts, it would be advisable to use internationally accepted standards or national standards where these are sufficiently developed. A publication entitled "Conditions of Contract (International) for Works of Civil Engineering Construction", prepared and sponsored by FIDIC (Fédération Internationale des Ingénieurs-Conseils) contains detailed standard clauses for all aspects of construction. It has been approved by major federations of building organizations in over 70 countries throughout the world, and is available in many languages. Its use would help to minimize divergent interpretations and conflicts and would help organizations to ensure that they are obtaining all reasonable benefits and protection.

41. Bonds. It is now common practice amongst outside organizations to protect themselves against a contractor not fulfilling his obligations through the provision of various bonds. United Nations organizations for the most part did not use this technique sufficiently and exposed themselves to risk. The most common types are:

- (a) The bid bond: this bond is intended to prevent a contractor from submitting a very low-priced bid to secure the contract and then refusing to execute the work according to the terms of his own bid. Such an event can occur in particular if the contractor has priced his proposal in order to undercut his competitors, and knows in advance that he will incur a loss unless he can obtain a reevaluation of the contract cost. The bid bond amount is generally equal to 2 to 3 per cent of the contract price, as estimated in the bid.

- (b) The advance payment bond: this bond should be used when it is in the interest of the organization to make an advance payment (see Annex V, para. 4 (c)). It prevents an unscrupulous contractor from pocketing the advance payment and abandoning the work. It also protects the organization in case of bankruptcy of the contractor after the advance payment has been made.

- (c) The performance bond: this bond is meant to protect the organization in case the contractor is unable to complete the work for reasons for which he is responsible (faulty organization, mismanagement, bankruptcy, etc.). The amount of the bond varies according to the country of the project; it is generally not above 20 or 25 per cent of the contract cost, though it can reach 100 per cent in some cases (in the USA for instance in which case it also covers the obligations of the contractor during the guarantee period).

- (d) The retention money bond: its purpose is to ensure that the contractor will fulfill his obligations during the contractual maintenance or guarantee period, once the work has been completed and the contract paid.

42. It is recommended that the organization in consultation with its legal advisers and bankers make use of appropriate bonds in the light of local practice and specific problems. Under normal circumstances, no contract should be signed without the provisions of at least the performance bond and the retention money bond.

IV. BIDDING PROCEDURES

43. Two main types of procedure have been used:

- (a) With pre-qualification: ESCAP, UN Geneva, UNESCO, ILO, ITU. As a first stage, advertisements were published (local press only for ESCAP, local and foreign press in the other cases) to invite interested contractors to submit pre-qualification documents. In some instances, all permanent missions to the organizations were contacted so as to permit them to inform national contracting firms (UN Geneva, UNESCO, ILO). In some cases too, notice was given to various chambers of commerce (UN Geneva) or to international professional associations (ILO) to widen the sources of pre-qualifying firms. The pre-qualification was decided by the architects and the organization; pre-qualified contractors were then permitted to bid.
- (b) Without pre-qualification: UNEP, New York, Phase 1, WHO. Upon the advice of the architect and/or consulting engineers a limited number of firms were invited to bid. Invited contractors were national firms only in the New York and WHO projects, national contractors plus local subsidiaries of foreign contractors in Nairobi.

44. Under both types, the criteria for determining whether a contractor would be invited to bid were similar and included: financial status; general reputation; past performance on similar projects; previous work with international organizations; other references.

45. Information given to potential contractors normally included: detailed drawings and specifications; bills of quantities, general and special conditions. The organizations did not inform potential bidders of their own cost estimates but these were usually available in public documents which had been submitted to the organizations' legislative bodies. For the ILO building, many elements of information provided were incomplete or only rough estimates since, in order to gain time, the bidding competition and contract awards were arranged before the conception stage of the building had been completed.

46. The determination of the winning bids was made according to the following criteria:

- (a) Lowest cost for the UN New York, ESCAP, UNEP, WHO and UN Geneva projects, although this criterion was not overriding in at least the last 2 cases.
- (b) Cost to quality ratio, duration of time required through completion for UNESCO.
- (c) Cost, quality of work, capacity to respect deadline, financial situation for ILO.
- (d) For New York, Phase 1, only one of the 4 main bids submitted was deemed receivable.

47. In general, once the bids were opened, no formal re-negotiation was undertaken, but some discussions took place in most cases in order to clarify certain details of the bids, or to adapt some provisions. Apparently, New York, Phase 1, was the only example where discussions led to a substantial reduction (\$ 800,000) in the contract cost, but since there was only one bidder the significance of this reduction is doubtful.

48. The Inspectors consider that cost is very important but not the only factor that should be taken into account in assessing bids. Less tangible but also important factors have to be considered such as the reputation, financial status and technical competence of the potential contractors. These will affect quality and the timely completion of work and are thus related to cost. The judgements required have to be made by fully qualified specialists who have only the interests of the organization in view and this lends weight to the proposals in para. 21.

49. The Inspectors believe that undue importance was given in the UN New York, Phase 2 and 3, projects to the desirability of entrusting the contractor who was already on the site with the next phase.

50. When in the UN New York, Phase 1, project it was found that there was only one receivable bid, it would have been desirable to reopen the bidding procedure with wider participation instead of negotiating the price with the sole bidder. The organization must protect itself by ensuring that there is truly open competition. The Inspectors were informed that time constraints prevented the reopening of the bidding.

51. In inviting bids with or without pre-qualification, more attention is required, particularly in New York, to ensuring that many contractors participate. Where possible, bids should be invited internationally or at least from the local subsidiaries of foreign contractors as well as from local contractors.

52. The prevention of fraud is not always easy. Several measures already suggested make it less likely to occur - rigorous application of competitive bidding; careful selection of the types and clauses of construction contracts; use of bonds and increasing the technical competence of the organizations to control quality and quantities and to assess claims.

V. ROLE OF INTER-GOVERNMENTAL BODIES

53. Primary responsibility for planning and carrying out construction projects should rest with the executive head of each organization. In doing this he applies financial rules and regulations and other decisions adopted by legislative bodies.

54. Inter-governmental legislative bodies also have major responsibilities for construction projects. In the first place, they must decide whether construction is necessary and whether the specifications proposed by the executive head best meet the foreseeable requirements of the organization. They must consider and approve the budget for construction and its method of financing. Finally, during the planning and construction stages they have to consider any significant changes in specifications, particularly those with financial implications and any action needed in response to unforeseen circumstances such as currency fluctuations, extreme inflation or claims.

55. Decision-making must be expeditious if construction delays, which almost always increase costs, are to be avoided. In the United Nations, the Advisory Committee on Administrative and Budgetary Questions (ACABQ) and the Fifth Committee have devoted considerable time to reviewing proposals on construction projects, seeking additional information and clarifications and recommending solutions to the General Assembly. But these bodies have crowded agendas and do not always have the time needed to follow closely the major aspects of construction and make prompt and informed decisions.

56. In UNESCO, the General Conference has since 1953 renewed every two years a Headquarters Committee now composed of 21 governmental representatives. The terms of reference of this Committee have varied depending upon the specific construction problem the Organization was facing at the time. Its latest terms of reference are given in Resolution 21 C/35 of the General Conference.

57. The Inspectors do not propose the creation of a similar Committee of the General Assembly. They consider that it is in principle desirable not to create new intergovernmental Committees if this can be avoided; and since the General Assembly meets every year in regular session (as opposed to the biennial meetings of the UNESCO General Conference) the need for such a Committee in the United Nations is not so great. Instead, they recommend that the Assembly might specifically charge ACABQ, within its existing terms of reference, to pay special attention to all building projects, whether for new constructions or for large scale alterations, and to report on them promptly to the Fifth Committee. The ACABQ could also comment on all documents submitted by the Secretary-General to the General Assembly on these and related questions. The Inspectors have found consultants most useful on this very technical study; presumably the ACABQ will also consider engaging specialized consultants in case of need.

VI. BUILDING COSTS (see also Annex VI)

58. A main purpose of many of the proposals made in this report is to ensure that building costs - initial construction costs and the cost of operating and adapting the building over its entire life - are reasonable and permit the organizations' requirements to be met (see in particular Chapter II). Another aspect of costs is dealt with in this Chapter.

59. When legislative bodies consider and approve building construction they do so in the light of estimates of the cost. In many cases in the past and particularly for large projects the estimates have been very much below the actual costs. Cost overruns on the initial estimates approved by legislative bodies have been as high as 169 per cent. Large overruns are not normal for building construction - estimating techniques for this relatively common and simple form of construction have been perfected and except in cases of currency fluctuations or inflation drastically above what could have been projected, they now permit estimates to be within a few percentage points of reality.

60. Estimates grossly below actual costs may lead legislative bodies to approve projects which they would not have approved had they known the real cost. The Inspectors recommend that more attention be given to the preparation of accurate estimates and that the methods suggested in para. 21(b) or (c) should be used.

61. Of the 12 construction projects which met the criteria of JIU (see para. 4) - excluding the WIPO Headquarters for which no information was provided - the cost of 7 was more than 20 per cent above the initial cost estimate approved by the organization's legislative body:

- (a) For the 3 small projects (construction costs of less than \$ 5 million) actual costs were less than the approved cost estimates;
- (b) Of the 5 medium-sized projects (construction costs from \$ 5 to \$ 15 million) 2 had small cost overruns of less than 20 per cent and 3 had larger overruns ranging from 21 to 132 per cent;
- (c) The 4 large projects (over \$ 15 million) all showed large cost overruns ranging from 25 to 169 per cent, or a maximum of 98 per cent if extra costs due to currency fluctuations are excluded.

62. The Inspectors attempted to identify the causes of cost overruns. Although their significance varied from project to project the main causes are summarized in the following paragraphs.

63. Longer than expected time span between the approval of cost estimates and the start of construction. The 5 projects which had no or small cost overruns required an average of 27.5 months for this time span, whereas the 7 projects with large cost overruns required an average of 48 months. The projects with a larger time span suffered more from inflation and currency fluctuations. This points to the advantage of shortening the preparatory phase which, in the view of the Inspectors, could be done if the proposals in para. 21(b) or (c) and Chapter V are accepted.

64. Incorrect estimates of the effect of inflation. This was a problem particularly in phases 2 and 3 of the UN New York project, but its effect should not be exaggerated. An error of a few percentage points in the projection of inflation should not cause cost overruns approaching 100 per cent. A projection of inflation should be made on the basis of available information with a bias towards a higher figure to provide legislative bodies with cost estimates which will not have to be revised upwards later. That part of a cost estimate intended to compensate for the effect of inflation should be kept in a separate account and used only for this purpose.

65. Changes in requirements after the initial estimates were approved. Such changes increased the cost of 4 projects (see para. 14). The proposals in para. 21(b) or (c) and Chapter V should help to ensure that at the United Nations such changes are kept to a minimum.

66. Errors in initial estimates. Such errors raised the estimated cost in several projects, particularly in Phases 2 and 3 of the UN New York project. The proposals made in para. 21 should help to reduce the likelihood of these errors.

67. Fluctuations in exchange rates. When cost estimates and budgets are expressed in one currency and contracts in another, any fluctuation in exchange rates between these currencies will increase or decrease the charge on the budget. Organizations have little protection against this problem except insofar as they can reduce the construction time span which might also reduce the risk.

68. The United Nations has in recent years financed construction costs from budget appropriations made during the construction period. Other organizations, such as UNESCO, have had recourse to loans reimbursable over a number of budgetary periods. This has proved to be advantageous in periods of high inflation. In future, the United Nations should consider financing construction through loans, particularly when favourable interest rates can be obtained especially with the help of the host government.

VII. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

69. Although this report compares the building construction procedures of several organizations of the United Nations system, its conclusions and recommendations are addressed primarily to the United Nations.

A. Building Requirements

70. The determination of the needs that a building should meet and the expression of those needs in requirements is difficult but critically important. Most buildings have been insufficiently flexible for later economical adaptation to meet evolving requirements.

Recommendation 1: Greater attention should be paid to the process of determining building requirements and the architectural design should allow for as much economical expansion and alteration as possible during the life of the building (paras. 10 to 16).

71. The true cost of a building consists of its initial construction cost and the cost of its operation, maintenance and adaptation over its entire life.

Recommendation 2: The overriding consideration in designing a building should be its cost-effectiveness over its entire life (para. 9).

B. Role of Participants in Construction

72. Organizations have abandoned too much of their responsibility for the control and supervision of building design and construction.

Role of Organizations

73. The owner of a construction project must be able to specify his requirements and then be in a position to ensure that they are fulfilled. The main problem affecting the quality and cost of constructions was the lack of sufficient technical expertise within organizations to permit them to deal effectively with architects and building contractors and to ensure that their requirements were well defined and economically met.

Recommendation 3: Before and during construction technical expertise should be available to the organization by either forming an in-house technical team or engaging a specialized consulting firm independent of architects and building contractors, or by a combination of these solutions. The second or third of these solutions appears preferable for the United Nations (para. 21).

Role of Architects

74. To compensate for the lack of technical expertise within organizations architects, as a rule, exercised functions which went beyond those normally expected. No architect for any of the projects studied was chosen through a formal competition. The extent of the financial liabilities of architects in case of error or omission was not adequately covered in contracts of the United Nations. Since architects' honoraria are a function of actual construction costs the organization should play a greater role in controlling these costs.

Recommendation 4: For large projects architects should be selected through international competition. The organization should retain responsibility for construction management. Architects' contracts should contain when consistent with national practices a clear clause on their financial responsibility in case of errors or omissions (paras. 22 to 29).

Role of Cost Estimators and Quantity Surveyors

75. As a rule, organizations delegated these functions to the architects.

Recommendation 5: Cost estimating and quantity surveying should be carried out independently of the architects or contractors and be a direct responsibility of the organization, carried out under one of the methods suggested in recommendation 3 (paras. 30 to 32).

Building Contractors and Construction Contracts

76. Construction supervision was entrusted at times to a general contractor and at times to the architect. The number of contractors used and their functions varied. Building materials were generally supplied by the contractors. Three main types of contracts were used - non-revisable fixed price; cost plus fee; revisable price.

Recommendation 6: Non-revisable fixed price contracts should be eliminated except for jobs of approximately one year or less. Revisable fixed price contracts are usually preferable to cost plus fee contracts (paras. 37 and 38).

77. The clauses that a contract contains have to be decided in the light of circumstances and the criteria suggested in this report. For clarity and to ensure that the organizations' interests are protected, it would be preferable to use internationally accepted standard clauses or national standards where these are sufficiently developed.

Recommendation 7: To minimize divergent interpretations and conflicts and to protect the interests of the organization, contracts should use clauses taken from the accepted "Conditions of Contract (International) for Works of Civil Engineering Construction" (paras. 39 and 40).

78. Organizations have not always used bonds to protect themselves against a contractor not fulfilling his contractual obligations. Bid bonds, advance payment bonds, performance bonds, retention bonds, etc., can provide valuable protection.

Recommendation 8: Whenever possible, appropriate bonds should be used to protect the organization against a contractor not fulfilling his obligations (paras. 41 and 42).

C. Bidding Procedures

79. Two main types of bidding procedures were used - with pre-qualification and without pre-qualification. Criteria for the determination of winning bids varied and cost was often not the only factor. Less tangible factors will affect the quality and timely completion of the work. In the UN New York, Phase I, project there was no truly competitive bidding. More attention, particularly in New York, is required to ensure that a sufficient number of contractors participate in the bidding and to ensure that the organization has available the technical expertise to evaluate bids and bidders.

Recommendation 9: There should be rigorous application of competitive bidding, where possible on an international basis, and the organization should obtain the technical expertise to evaluate bids and bidders as proposed in recommendation 3 (paras. 43 to 52).

D. Role of Inter-governmental Bodies

80. Legislative bodies and executive heads both have responsibilities for construction projects.

Recommendation 10: The General Assembly of the United Nations might specifically charge the Advisory Committee on Administrative and Budgetary Questions, within its terms of reference, to pay special attention to all building projects, whether for new constructions or for large scale alterations and to report on them promptly to the Fifth Committee (paras 53 to 57).

E. Building Costs

81. Cost overruns have been frequent and large. This is not normal for building construction. When estimates are grossly below actual costs, legislative bodies may be led to approve projects that they would not have approved had they known the real cost.

82. The causes of cost overruns include longer than anticipated time spans for various phases of projects, incorrect estimates of the effect of inflation, changes in building specifications, errors in initial cost estimates and fluctuations in currency exchange rates.

Recommendation 11: More attention should be given to the preparation of accurate cost estimates and to this end the methods proposed in recommendation 3 should be introduced (paras 58 to 67).

ANNEX I DETERMINATION OF BUILDING REQUIREMENTS
(practices followed in 7 projects)

PROJECT	ESCAP	N.Y. Phase I	UN Geneva	ILO	ITU	UNESCO	WHO
a) Criteria for drawing up specifications	estimated needs of ESCAP and other UN occupants for the 10 years following building completion (i.e. through 1983)	General criteria were established by General Assembly, then expanded through correspondence between OGS and the Architect	Specifications were based on probable evolution of conference programs and needs of office space to accommodate the foreseeable increase in personnel	Criteria were determined by the team of architects and Advisory Committee of Architects on the basis of: . inventory of needs . integration in environment as exposed by ILO services	Criteria were determined by Architects and Engineering Consultants, based on inventory of needs by ITU Secretary General	A general inventory of needs was given to the Architect. Detailed specifications were drafted by the Architect	Requirements based on needs were determined by WHO Assembly and Secretariat (standard design, low cost, prefabricated building)
b) Who was consulted? Who approved?	The Office of General Services (OGS/NY) was consulted. Final approval by OGS/NY and General Assembly	Final approval by General Assembly. OGS and architect, plus all UN departments involved were consulted.	Administration of UN Office (Geneva) OGS/NY, ILO, WHO, Committee of Architects. Final approval by General Assembly.	A team of 3 architects + the Advisory Committee of Architects + 3 Engineer-Consultants were consulted. The ILO Governing Body approved.	Approved by ITU Administrative Council	Final approval by UNESCO Secretariat	Approval by WHO Assembly
c) Changes after signature of contracts	No	Yes. Modifications were necessary because of structural problems which appeared after the demolition of existing premises	- facade of building was changed - underground garage was enlarged - number of offices was increased from 200 to 1000	Yes, concerning facade elements and increase of office and reception space on 11th floor	Yes, increases in storage space	Yes, due to local regulations, supply difficulties, or aesthetic reasons	Addenda for additional storage space + parking space



ANNEX II ROLL OF ARCHITECTS

(for the six completed projects studied in detail by JIU)

Project	ESCAP	N.Y. Phase 1	UN Geneva	ILO	UNESCO	WHO
<p><u>Architect</u></p> <p>a) selection</p>	<p>Architect was provided by local Ministry of Works. No competition.</p>	<p>No competition: negotiation with single architectural firm (which had originally designed JN/HQ building) and had already worked several times for the UN.</p>	<p>. No competition . 1 of the Architects of the high level consultative Committee of Architects (5 members) was entrusted with the job.</p>	<p>No competition: the DC wanted to avoid costs of an international competition. The choice of the 3 architects was based on reputation and performance.</p>	<p>Architect selected because was a member of team which had worked on previous UNESCO buildings, in order to achieve continuity between various buildings.</p>	<p>Architect was a staff member of WHO.</p>
<p>b) nationality</p>	<p>Local</p>	<p>Local</p>	<p>Foreign (French) but Director of Geneva Fine Arts School.</p>	<p>1 local (Swiss) (for better knowledge of local regulations and practices...) and 2 foreign.</p>	<p>Local (French)</p>	<p>In house architect</p>
<p>c) fee</p>	<p>Architectural services were provided free of charge by the Government. Some engineering fees were paid by UN on basis of actual cost.</p>	<p>. lump sum based or estimated expenses for main Architect . design costs first estimated at 7,5%, then at 10% of construction cost; final cost was 13,7%.</p>	<p>. in Switzerland, fee depends on nature and complexity of job. Exact share of total actual costs is fixed by Société des Ingénieurs et Architectes . fee corresponded to 5,5% of actual costs.</p>	<p>7,2% of the global actual construction costs.</p>	<p>6% of the global construction costs (actual costs)</p>	<p>(Not applicable)</p>
<p>d) functions</p>	<p>. plans . specifications . building supervision . quality control . scheduling (during planning stage only)</p>	<p>. preparation of drawings and specifications . building supervision . quality and quantity control</p>	<p>Overall responsibility for effective execution of project (specifications, plans, cost estimates, construction management, scheduling, supervision, final acceptance, etc.)</p>	<p>. preproject, cost estimate . detailed project drawings . tendering documents . negotiation of contracts . coordination, supervision and control of works</p>	<p>. coordination, permanent supervision and control of works . preproject and project cost estimates.</p>	<p>Specifications, plans, quantity survey, cost estimates, bid analysis, construction supervision, quality and quantity control, payment authorizations.</p>
<p>e) control of his work</p>	<p>. monitored by Chief of Conference and General Services Section (ESCAP) . approved by OGS/NY</p>	<p>HQ Construction Unit (OGS) with subsequent approval by Chief of Buildings Management Service (and ASG for OGS in case of financial implication).</p>	<p>By Committee of Architects and UNOG Administration</p>	<p>Monitoring performed by ILO buildings Unit. For important decisions, approval necessary from higher levels.</p>	<p>By UNESCO staff (1 architect advisor, 1 technical manager and a team of specialized technicians, accountants and quantity surveyors).</p>	<p>(Not applicable)</p>
<p>f) liability</p>	<p>No financial liability as services were free.</p>	<p>In case of errors and omissions, would be covered by local laws.</p>	<p>In Switzerland, errors would have been covered by SIA imposed insurance.</p>	<p>Provisions concerning liability of Architects were included in contract but never applied.</p>	<p>Architects' errors would be covered by insurance with "Mutuelle des Architectes Français".</p>	<p>(Not applicable)</p>



Annex III SUMMARY OF FUNCTIONAL RELATIONSHIPS OF PARTICIPANTS IN CONSTRUCTION
(for the six completed projects studied in detail by JIU)

ACTIVITY	ARCHITECT						COST ESTIMATOR/QUANTITY SURVEYOR					BUILDER(S)				MEMBERS OF SECRETARIAT								
	Main Responsibility	Assists	Advises	Reviews	Approves	No. Responsibility	Main Responsibility	Assists	Advises	Reviews	Approves	No. Responsibility	Main Responsibility	Assists	Advises	Approves	No. Responsibility	Main Responsibility	Assist	Advise	Review	Approve	No. Responsibility	
Building Specifications	ESCAP UN NY UNCG ILO	UNESCO	UNESCO	UNESCO		WHO (1)						All					All	UNESCO WFC	ESCAP	ESCAP	ESCAP UN NY ILO	All	1	
Building Plans	ESCAP UN NY UNCG ILO UNESCO					WHO (1)						All		ILO			All except ILO	WHO	JNCG	ESCAP UNCG	ESCAP UN NY ILO	ESCAP UN NY UNCG ILO	UNESCO	
Quantity Survey	ILO UNESCO	UNESCO		JNCG		WHO (1)	UNESCO UNCG (2)					WHO (3)		ILO				WHO	JNCG		ILO	ILO		
Cost Estimates	ESCAP UN NY UNCG ILO UNESCO	UNESCO					UN NY UNESCO UNCG (2)					WHO (3)	All (4)					WHO	ILO	ILO	ESCAP UN NY UNCG ILO UNESCO	ESCAP UN NY UNCG ILO	UNESCO	
Bid Analysis and Decision	ILO	ESCAP UNESCO UN NY	ESCAP UNESCO UNCG	ESCAP UNESCO		WHO (1)		UNCG	UNCG	UN NY							All	ESCAP UN NY UNCG ILO UNESCO WHO			UNESCO	ESCAP UN NY UNCG ILO UNESCO		
Construction Management	JNCG ILO	UN NY		UNESCO	UNESCO	ESCAP WHO (1)								ESCAP UN NY UNESCO WHO				ILO UNCG	UNCG		UN NY	WHO UNESCO	ESCAP ILO	
Construction Scheduling	JNCG ILO			ESCAP UNESCO	ESCAP UN NY UNESCO	WHO (1)								ESCAP UN NY UNESCO WHO	ILO UNCG						UN NY ILO ESCAP	UN NY UNESCO ILO WHO		
Purchase of Materials				ESCAP (5)	ESCAP (5) UN NY	JNCG UNESCO ILO WHO(1)								ESCAP UN NY UNCG ILO UNESCO WHO					ESCAP (6)		UN NY	UN NY UNESCO ILO	WHO UNCG ILO	
Construction Supervision	ESCAP JNCG ILO UNESCO				UN NY	WHO (1)								ESCAP (7) UN NY				ILO WHO UNCG	WHO	ESCAP		ESCAP	UNESCO UNCG ILO	
Quality and Quantity Control	ILO UNESCO			ESCAP (8) UNCG	ESCAP (8) UN NY UNCG	WHO (1)	UNESCO UNCG (2)				UNCG			UNESCO ESCAP UN NY UNESCO				ILO UNCG	WHO	ESCAP		ESCAP UN NY	UN NY UNCG UNESCO	ILO
Payment Authorizations	ESCAP UNESCO		UN NY UNCG	UN NY UNCG ILO	ESCAP UN NY ILO	WHO (1)	UNESCO (2)							ESCAP UN NY (9)				ILO UNESCO UNCG WHO	ILO UNESCO UNCG WHO				ESCAP UN NY UNCG ILO UNESCO	



ANNEX III: Notes

- (1) WHO: architectural services were performed by a staff member
- (2) UNESCO and UNOG: the "mètres-vérificateurs" were hired by the architect
- (3) ESCAP and WHO: it appears that no cost estimators or quantity surveyors were used
- (4) Cost estimates appear in bids made by potential contractors
- (5) ESCAP: selections only
- (6) ESCAP: for imports only
- (7) ESCAP and UN NY: for sub-contractors only
- (8) ESCAP: quality control only
- (9) UN NY: prepares payment authorizations

NB: - UN NY means Extension of Headquarters facilities, New York, Phase 1
- ITU was for the reasons stated in para. 6 of the report unable to reply to the questionnaire and therefore does not appear in the table.

ANNEX IV: TECHNICAL STAFF OF ORGANIZATIONS FOR CONSTRUCTION PROJECTS

This annex summarizes the replies of organizations regarding the number and qualifications of their staff members who were working on specific construction projects.

A. Engineers, Architects and supporting technical staff working full time on building projects as staff members of the organization

1. United Nations, New York: Extension of Headquarters facilities (phases I to III) :

Phase I: The Chief, Headquarters Construction Unit (SPA/P-5), degree in Architecture, was involved in design and construction of HQ building since 1949.

Phase II and III: same as above with the addition of a Construction Engineer (P-3), appointed in 1980, ten years experience with various contracting firms.

2. United Nations: Extension of Palais des Nations (Geneva): None.

3. United Nations: Building for ESCAP (Bangkok): A Resident Engineer P-3 experienced in supervising and inspecting construction projects in Thailand was engaged at commencement of work on pilings. Assisted in administration and supervision of project and monitored architectural and engineering drawings and maintained liaison with consultants and contractors.

4. ILO: Headquarters building (Geneva):

No engineers, architects or technicians were available full-time.

5. ITU: Extension of Headquarters (Geneva): No staff member worked full-time on the project, however a Consulting Architect was hired on an annual basis to advise ITU on all matters relating to construction and to supervise progress of work.

6. UNESCO: Extension of Headquarters - Bonvin building (Paris): A Technical Administrator (P-5), degree in engineering, with extensive experience in construction operations and an architect-consultant, also with extensive experience.

7. WHO: Extension of Headquarters - building "L" (Geneva): None.

B. Engineers and Architects who were staff members but who worked only part time on building project

1. United Nations, New York:

- Chief, Buildings Management Service (D-1), degree in architecture, involved in HQ construction since 1951;

- Deputy to the Chief, Building Management Service (P-5), certified architect, experienced in construction management and supervision;

- Chief, Architectural and Engineering Unit (P-2), degree in architecture;

- Chief, Technical Services Section (P-5), degree in electrical engineering.

2. United Nations, Geneva: Various engineers, architects, technicians and supporting staff of the Geneva office assisted in supervision and monitoring part-time:

- Chief, Buildings and Engineering Branch (P-5), degree in mechanical engineering;

- Deputy Chief, Buildings and Engineering Branch (P-4), certified architect;
- Chief, Technical Services Section (P-3), degree in marine engineering;
- Chief, Buildings, Parks and Gardens Section (P-2), certified architect.

3. ESCAP: None, although some ESCAP personnel participated as members of the contracts committee. Support was provided by periodic visits from Headquarters.

4. ILO: The only staff member with experience in construction projects was the official in charge of the maintenance of the old ILO Buildings. He was consulted on occasion. It was unnecessary to recruit specialized staff because of the extent of the tasks and responsibilities of the architects and in order not to dilute lines of responsibility.

5. ITU: (No information received).

6. UNESCO: None.

7. WHO:

- Chief, Building Management (P-4), Architect with experience in building construction and maintenance;

- Assistant Chief, Building Management (P-3), Civil Engineer;

- Technical Assistant (G-6) and various Technicians (G-7 and G-6). All staff had experience in building construction and maintenance.

C. Non-technical staff working full-time on building project

1. United Nations, New York: A Finance Officer (P-3), certified accountant

2. United Nations, Geneva: None

3. ESCAP: None

4. ILO: - A special assistant to the Director General (ADG)
- A D-1, Chief of the Building Project
- A P-4 in charge of general and budgetary questions
- Two secretaries (G-5 and G-4)

5. ITU: The legal Counsel of the Organization (P-5) spent most of his time on the project. He was assisted by a G-7 staff member and a G-5 secretary.

6. UNESCO: - A Financial Administrator (P-5)
- Three accountants (G-6, G-5 and G-4)

7. WHO: None.

D. Preparation of cost estimates by in-house team before intervention of Architect

1. United Nations, New York: No: all cost estimates prepared by architects and their consultants.

2. United Nations, Geneva: No: all cost estimates prepared by architects.

3. ESCAP: No: preliminary cost estimates were prepared by the consultants.

4. ILO: Not applicable.

5. ITU: No. Cost estimates were prepared by the architects and engineers; they were approved by the Consulting-Architect.

6. UNESCO: No preliminary estimates were prepared by the Organization prior to those prepared by the Architect.

7. WHO: Yes, by the Building Management Unit which acted as Architect/Engineers.

E. Instances in which in-house teams' views differed substantially from those of Architect and how differences were resolved

1. United Nations, New York: In general there were no substantial differences of opinion.

2. United Nations, Geneva: Examples of differences: length of glass panes in façade of conference building; air conditioning for interpretation booths; distribution of air flow in relation to exposures of the façades; lighting system of conference rooms XVII and XVIII. All differences were resolved in favour of the architects, except for partial satisfaction on air conditioning of the interpretation booths.

3. ESCAP: No significant differences, although initially there was some disagreement on aesthetic matters which was resolved in favour of the architect.

4. ILO: Not applicable.

5. ITU: (no information received).

6. UNESCO: Differences of opinion arose concerning the air-conditioning system and the materials to be used in the "piazza". In both cases the solutions proposed by the Architect were rejected by the Organization.

7. WHO: Not applicable.

F. Organizations' views on strengths and weaknesses of in-house technical team. What changes should be made in the event of a new construction project?

1. United Nations, New York: The main strengths of the technical team lay in background and experience with previous projects at Headquarters. As to weaknesses, the major difficulty experienced was during the planning stage. This was due to the fact that the Buildings Management Service Chief's Office and the Architectural and Engineering Section were able to work on these projects on a part-time basis only. If a new major construction was envisaged, it would be desirable to establish a Headquarters Planning Office with adequate technical administrative, financial and clerical personnel, prior to the planning stage in order to provide the proper management and administrative co-ordination to all stages of the work.

2. United Nations, Geneva: Strengths included full knowledge and practical experience of operational and functional requirements and concern for realistic and economical solutions. Main weakness was the fact that none of the part-time in-house team had ever participated in a project of such magnitude. Also the fact that outside architects and engineers had been entrusted with complete responsibility for the project made it difficult for the part-time in-house team to contest their views. In a major new construction project, ensure constant control by an in-house team over the evolution of the work and reinforce financial control through use of additional qualified personnel.

3. ESCAP: Administrative and technical team worked well with consultants and contractors. For a major new project, would assign a finance officer full-time and hire the resident engineer somewhat earlier.
4. ILO: Not applicable.
5. ITU: (No information received).
6. UNESCO: It is extremely important to free the Organization from any subordination to the architects. The architect's role should be strictly confined to that of "maître d'oeuvre", while the Organization should retain responsibility for all stages of construction. Steps in this direction have already been taken: the in-house technical team has been substantially reinforced.
7. WHO: Not applicable.

ANNEX 1: CONSTRUCTION CONTRACTS

The main relevant provisions of the building contracts examined by JIU are summarized below (see also paras 37 to 40 of report).

1. In all cases, contractors are responsible for quality and quantity controls under the supervision of the architect (ESCAP, ECLA, UNESCO, UNEP and the 3 New York projects), the consulting engineers (ECA, ILO) and/or the staff of the organization (UNESCO, ITU, WHO, UN Geneva).
2. In most cases, contractors are required to prepare and submit a construction schedule. All contracts also foresee a 2-tier acceptance procedure at the end of the work, with a provisional acceptance date (also called substantial completion date or practical completion date) and a final acceptance date, 6 months (UNEP, 1 year (ECA, ECLA, ESCAP, ITU, UN Geneva) or 2 years (ILO) later. Most include a clause by which the contracting organization is entitled to impose a financial penalty on the contractor if the latter is responsible for delays affecting the provisional acceptance date (ECA, ESCAP, ECLA, UNEP, UN Geneva, ILO, ITU). In the case of UNESCO, no penalty is applicable if the delay remains within 30 days. No penalty clause is included in any of the New York contracts and in some ILO contracts. The ESCAP project was the only one for which the contract foresaw a bonus for the contractor for early completion (\$ 500 a day).
3. According to the information received by JIU, no sophisticated planning method was used for any of the projects (and in any case neither PERT or CPM techniques). In general, contractors seem to have used bar chart planning.
4. Payment schedules are fairly comparable between the various contracts (see Table on following page).
 - (a) cost plus fee contracts: for the ECLA project, the cost part was payable on a monthly basis (according to monthly reports) and the payment of the fee was broken down as follows: 15 per cent as advance payment, 60 per cent on a monthly basis (with the corresponding cost part), 20 per cent on provisional acceptance and 5 per cent on final acceptance. For the 3 New York projects, cost and fee were paid on a monthly progress basis (following monthly reports) with a retention of 10 per cent on both cost and fee until the contract was financially half way to completion and no retention after that point. The balance was payable after final acceptance;
 - (b) other contracts: in general, no advance payment, progress payments according to monthly reports, retention and balance paid partly after provisional acceptance partly after final acceptance;
 - (c) the practice of advance payments upon signature of the contract was not taken into consideration very often. This practice alleviates the financial burdens to be borne by the contractor during the mobilization stage and since these costs are carried over to the bid price, it should result in slightly lower costs. Advance payments should only be made, however, against delivery by the contractor of an advance payment bond of equal amount which protects the organization against any default.
5. In the event of specification changes, the cost impact estimate was generally made by the contractor and submitted for approval to the architect and/or the organization (ECA, ECLA, UNESCO, ILO). In some instances, the cost estimate was made directly by the architect (ESCAP) or the quantity surveyor (UNEP). In all cases, the estimate was based upon the pricing elements attached to the contract (unit prices, etc.).

Projects	Advance Payment	Progress Payments	Provisional Acceptance	Final Acceptance
ECA	0	90%	5%	5%
ESCAP	up to 25% on imported supplies only	90%	10% against retention bond valid till Final Acceptance	
UNEP		90%	5%	5%
UN Geneva	some advance payments possible	80%	10%	10%
UNESCO		works 95% supplies 80%		5% 20%
ILO		90%	5%	5%
ITU	0 alternatively, 5%	90% 90%		10% 5%
WHO		90%		10%

6. All contracts feature an arbitration clause governing the handling of disputes which cannot be resolved through conciliation. These clauses refer to one of the following:

- the rules of the International Chamber of Commerce (ECA, ECLA, ESCAP, UN Geneva);
- arbitration by one single arbitrator selected by the East Africa Institute of Architects (UNEP);
- the rules of the American Arbitration Association (UN New York);
- arbitration by one single arbitrator selected in common by the contractor and the organization, or if this proves impossible, by the Chairman of the Swiss Federal Tribunal (WHO) or the President of the Swedish Arbitration Institute in Stockholm (UN Geneva);
- the rule of the international arbitration system (UNESCO, ILO, ITU).

7. Apparently no real provision is made to permit the organizations to audit the contractor accounts should this be necessary. Nevertheless, the contracts governing the 3 New York projects foresee that contractors must hold detailed accounts of their activities related to the projects; such clauses were included not so much for auditing purposes but to check the monthly reports and the payments due to the contractors under the cost plus fee system.

8. Taxes and duties were treated in one of two ways:

- either included in the contract, when the organization was not exempt from some or all of them (ESCAP, Nairobi, the 3 New York projects, UN Geneva, ILO, ITU, WHO);
- or excluded from the contract, except for taxes specifically mentioned (ECA, ECLA, UNESCO).

9. Penalties and incentives to limit construction costs were fairly rare. Only 3 cases were reported to JIU:

(a) for the ECLA project, the contractor was encouraged to reduce construction costs through a bonus-penalty system affecting his fee (the contract was of the cost plus fee type): bonus if actual construction cost is below guaranteed maximum cost and penalty if it is above. In itself, the guaranteed maximum cost gives a strong incentive for the contractor to avoid overruns;

(b) the UN New York projects also are governed by the cost plus fee type contract: contractors are paid the guaranteed maximum cost whether actual cost is in fact superior, equal or inferior. The same applies to those contractors with WHO: the lump sum of the contract was payable regardless of what the actual construction cost turned out to be. Such arrangements encourage contractors to reduce actual costs in order to increase their profits (or limit their losses), but benefits which may occur are not passed on to the organization;

(c) after its main contractor ran into time scheduling problems linked to labour shortage, difficulties in obtaining certain supplies, etc., ILO devised a system of penalties and bonuses. Unfortunately, its clauses were too vague and application proved impossible.

10. Provision for unforeseen problems was generally made in two ways:

(a) a contingency provision was included in the contract prices, except for the cost plus fee type contracts, where there is no need for it. As a general rule, this contingency provision amounted to 10 per cent of the construction cost;

(b) a contractual clause which set out the types of events which could warrant a temporary or final stop in the execution of the contract for which the contractor could not be held responsible. Strikes, slowdowns, lock-outs, civil or military disorders, and natural disasters were always included in the list of such events, either explicitly or as cases of "force majeure". The only exceptions concern the ILO and ITU contracts which define "force majeure" only as strikes or lock-outs over which the contractor has no control: natural disasters, wars, etc. are clearly excluded.

11. Serious claims or legal disputes. Most such claims were related to additional payment requests:

(a) for the ESCAP project, the general contractor filed an arbitration claim apparently linked to inflation-generated cost increases;

(b) for the UN Geneva project, 7 contractors filed 7 different claims for additional payments, arguing that they had incurred increased costs or suffered from late payments due to delays in the execution of their contracts for which they could not be held responsible;

(c) for the ILO project, some claims were filed concerning inflation-related cost increases.

Other claims and disputes concerned: the bankruptcies of one contractor in each of the UNESCO and UN Geneva projects; an electricians' strike in the New York, Phase 1 project leading to increased costs which were charged to the UN; opposition by local unions to the organization of an international tender for the New York, Phase 1 project.

ANNEX VI BUILDING COSTS*

(amounts are expressed in '000 of US dollars (\$) or Swiss Francs (SF))

Project	N.Y. Phase 1	N.Y. Phase 2	N.Y. Phase 3	UN Geneva	UNEP	ECA	ECLA	ESCAP	ILO	ITU	UNESCO	WHO
Size	M	L	M	L	S	M	S	M	L	M	L	S
First cost estimate approved	\$ 12.920	\$ 15.870	\$ 7.612	\$ 15.000 SF 64.800	\$ 1.990	\$ 6.200	\$ 1.070	\$ 7.600	\$ 22.266 SF 96.190	\$ 3.610 SF 15.592	\$ 19.784	\$ 2.208
Actual cost (or latest cost estimate)	\$ 14.750	\$ 31.470	\$ 10.773	\$ 28.751 SF124.205	\$ 1.895	\$ 7.524	\$ 996	\$ 8.533	\$ 59.840 SF 146.000	\$ 8.384 SF 26.830	\$ 24.693	\$ 1.800
Percentage overrun	14.2%	98.3%	41.5%	91.6% (\$) 91.6% (SF)	-	21.3%	-	12.2%	168.7% (\$) 51.8%(SF)	132.1% (\$) 72.1%(SF)	24.8%	-
Time between first cost estimate submission and latest estimate approval	13 months	30 months	29 months	37 months	26 months	72 months	36 months	60 months	60 months	60 months	48 months	4 months

(*) Data is based on information provided by the organizations in response to JIU questionnaire. It refers to all construction projects of the organizations of the UN system (with the exception of the WIPO building, see para 5) completed since 1970 and costing more than \$ 1 million or now underway and expected to cost more than \$ 2 million.

