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PREPARATORY TECHNICAL ASSISTANCE TO THE MINISTRY OF RECONSTRUCTION AND RESETTLEMENT OF TURKEY[1/]

DP/TUR/76/001

Mission report

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1.0. SUMMARY

The preparatory technical assistance was implemented by three international experts and national counterparts. The experts, in the different fields of competence, are presenting this joint report, and are for practical purposes referred to in this report as the "Team"

The results of the mission were subject to changes in the terms of reference described in the Project Data Sheet, UNIDO, DP/TUR/76/001, as well as in the form which the project was documented.

1.1 Terms of Reference

After arrival on the duty station and in consultation with the Resident Representative Office, SIDFA and representatives of the Ministry of Reconstruction and Resettlement. The terms of reference were updated and provided the scope for the mission activities. During the mission. other points of view were considered from the side of the Government, which were discussed in a meeting of the Team and the different Head of Divisions of the Ministry, and partly have been reflected on by the members of the Team in this report.

In view of the administrative procedures of the Project Documentation, a new Project Document was drafted for preparatory assistance. In this document total UNDP contribution was increased through the addition of an expert from the UN Centre fo. Housing, Building and Planning Headquarters for housing financed under project INT/74/R41 Int. Advisory Services, Acct. No. RP/INT/4/R41 - 117 in the form of a Special Service Agreement (13.8.1976).

1.2 Government Housing Plan 1973 - 77.

The target for housing units to be built during the TFYP (Third Five Year Plan) is abt. 1.220.000 urban and abt. 440.000 rural housing units, which amounts to an annual average of abt. 330.000 units. It is not likely that goals of this magnitude can be reached with the present available resources in respect of contruction materials, skilled and unskilled labour and construction management. Hence, it is obvious that new ways and mean of housing supply must be developed and implemented .

1.3 Principle of Housing in Eastern Region of Turkey

(i) The type of housing which should be built in reconstruction and resettlement projects must be in conformity with the social, economic and physical condition of the region;

(ii) However, there does not exist such thing as typical housing settlement or way of life in the various villages in the region;

(iii) Some settlements are scattered and others concentrated, some houses are made of sun dried bricks and others of natural stones or concrete blocks. Some have elevated main floors, others have semi-underground living space and so on;

(iv) However, some certain common features should be taken into consideration for development of a prefabrication system for the housing in this particular region, namely:

a) walls are masonry
b) flat roofs of mud supported by logs etc. are prevailing
c) most structural materials used are non-manufactured natural ones
d) very little manufacture materials such as asbestos cement sheets, gypsum boards, plywood, galvanized iron sheets are used
e) most construction works are done by the villagers themselves and very little skill of specialized craftmen is required
f) addition of partitions, finishing, expansion and substructures to original living space are common practice.

1.4 Guidelines for Prefabrication

The prefabrication system which should be established in these regions must have following basic concepts:

(i) in order to fulfill such requirements as quick erection, high structural integrity, easy transportation, less use of heavy contruction equipments, as well as the desirable variety and flexibility of housing types, the prefabrication should be of structural components of appropriate size and shape and not of complete houses;

(ii) the materials for the major prefabricated components should be locally available and familiar to the local workers to the greatest extent;

(iii) supplementary systems for partitions, interior and exterior finishing, thermal insulation, expansion and substructure should be developed along with the main structural system.

1.5 Description of the Basic Housing Unit

Improvement of the standard of living in the rural areas of Turkey is one of the main aims of the Government, and betterment of the houses of the population in the villages has a high priority in this respect. The Team has come to the conclusion that specific priority should be given to prefabrication of linear "one-dimensional" concrete panels, which when used effectively together with other available forms of materials and methods of contruction, will form a basic housing unit which can be extended and improved (with installations etc.) according to the owner's personal needs, desires and financial means.

The concrete panels, which should be produced in a very limited number of variants, can then be put together in various combinations which allows for the desirable free, or almost free, choice of the location of doors, windows etc, in the proposed basic housing unit.

1.6 Future Involvement and Follow-up Assistance by UNIDO

The Team is of the opinion that further assistance to the Government will be advisable . The funding for the assistance would be incorporated in the 2nd cycle of the Country Programme to Turkey. A proposal to this effect was submitted to the office of SIDFA, Ankara, and is elaborated on in the report in the Section "Findings and Recommendations". The proposal provides for experts assistance, and/ short-term consultants over a duration of 3 years with a UNDP input of US$ 290.000.

The Government's input will have to be defined in kind and provision of counterparts and an organization established by the Government, which will be able to handle a housing supply system.

The assistance to the Turkish Government can be

either: a) assistance to the Ministry of Reconstruction and Resettlement in the implementation and establishment of a prefabricated housing component factory in the Eastern Region of Turkey with the necessary auxiliary supply and erection services. The prefabrication industry in the Eastern part of Turkey will be the demonstration plant

to be used as model for other regions in Turkey.

Or: b) evaluation and identification of a suitable pre-fabrication component systems for different types of houses, which are available in the different countries and would be in the interest of the Turkey's Government.

c) assistance during the implementation and establishment of an acquired prefabrication system as " watchdog" for the Government in fullfilment of the conditions and specification of the contract made with foreign companies.

d) assistance during the first time of its operation in the required training of Turkey's locals in a so-called "management contract".

or: an assistance of any combination of a) and b), c) and d).

2.0. INTRODUCTION

2.1. Background Information

Upon the request of the Government of Turkey, based on the correspondence from Mr. Kulessa, Resident Representative a.i., Turkey, dated 17 October 1975 and from Mr. Shallon, Resident Representative, Turkey, dated 13 February 1976, a mission to provide the preparatory technical assistance to the Ministry of Reconstruction of Turkey was implemented in August 1976. The purpose of the mission was to determine UNIDO's technical assistance requested for the reconstruction of the Lice area and for development of prefabricated elements production for Eastern Turkey in accordance with the prevailing local conditions.

The Lice region in the Eastern part of Turkey is one of the regions which has recently suffered from an earthquake. It is known that Turkey, throughout its geological history has been subjected to many severe earthquakes. On the basis of the earthquake zoning map of Turkey and the results of the 1965 census, 91.4% of the total surface area and 95% of the population of Turkey are included in these earthquake zones. The following table shows the distribution of industrial centres and hydro-electric dams within the earthquake zones.

earthquake zones	big industrial centres	hydro-elecdams
1st degree	24.7 %	10.4 %
2nd degree	48.8 %	20.8 %
3rd degree	12.0 %	33.3 %
4th degree	12.8 %	27.1 %
danger free	1.7 %	8.4 %

1st degree earthquake zone with intensity = VII MM-
2nd degree earthquake zone with intensity = VII "
3rd degree earthquake zone with intensity = VI "
4th degree earthquake zone with intensity = V "

In zones with intensity higher than VII about 1200 people were killed and about 7 400 buildings were destroyed during the last 10 years.

The Lice region is in the boundry lines for second and third degree intensity is subject to mountain-slides whereby the geological formation of the mountains, due to corrosion, accelerates the side-effect, that villages built on the mountains' slopes are partly or totally destroyed. The Turkish Government undertook energetic steps in order to overcome the consequences of the natural catastrophe. The reconstruction of the destroyed houses in the disaster area was made to a large extend with prefabricated houses from prefabricated building components provided by the Government's Prefabrication Industry in Ankara. Several other countries such as Yugoslavia, Libia, Germany, Switzerland, France, Norway provided complete fabricated units and Saudi Arabia with the provision of funds. The local prefabricated components were transported from Ankara to the Lice area over a distance of 980 Km and the foreign units were erected with foreign expertise assistance. UNDO/UNIDO and the United Nations Centre for Housing, Building and Planning were requested to assist the Ministry of Recontruction and Resettlement in reviewing, in a joint mission, the possibilities for establishing factories for building components in the Eastern region of Turkey with location near the earthquake belt.

The fabrication in the to be established plants for prefabricated building components will be aimed at providing technically adequate housing for this disaster area and in reducing underemployment in this region. One successfully implemented the project might be forming a model for the Turkey's authorities in other disaster areas suffering from earthquakes.

2.2. Scope of Assistance (Terms of Reference)

The development objectives are:

(i) To assist the Turkish Government through the Ministry of Reconstruction and Resettlement on preparing the plans for establishing a prefabricated housing industry in the earthquake prone area of Diyarbakir which is among the development objectives in the Country Programme.

(ii) To assist the Government in the establishment of industry in the underemployed Eastern area of Turkey through the establishment of a prefabricating housing industry, producing prefabricated houses, with a capacity of 5 000 dwellings per year of different types in accordance of prevailing local conditions in the region.

(iii) The purpose of the project is two fold:

- to produce prefabricated elements for social housing in rural areas of the region
- and for emergency reconstruction programmes in case of disasters.

The immediate objectives were subject to discussions during a meeting on the 10th August 1976 in the Ministry of Reconstruction and Resettlement and the Ministry, the UNDP Representative and the leader of the Team agreed upon the following terms of reference:

1. The assistance to be rendered will cover suggestions on the following aspects for the prefabrication housing units with a capacity of 5 000 dwellings per year of different types, low or high rise, in accordance of prevailing local conditions.

1.1. Optimum system of prefabrication in accordance with extreme climatic difference, earthquake resistance, with minimum of construction equipment, such as cranes, etc, which due to the location cannot be used and possible self-help method's.

1.2. Selection of raw-materials, available locally in the region, with a minimum of transport and in accordance with prevailing infrastructure.

1.3. Selection of the prefabrication unit and/or units on location and scale of the unit or units using labour intensive methods.

1.4. The assessment of Economic, Investment and Unit Cost and overall financing.

1.5. Suggestions on public utilities and human waste treatment.

1.6. Proposed further assistance to be rendered in the planning, implementation and establishment of the prefabrication industry, with built-in on the spot training of unskilled labour and technicians.

NOTE: The above terms of reference to be subject to the findings and consultations of the Team during the mission period, and therefore the report may not necessarily reflect on the particulars of the terms of reference.

for example: item 1.4. appeared to be premature and the report contains only guidelines for further investigation.
item 1.5. was later considered by the Government as irrelevant.

2.3. General Information

Turkey is divided in 67 districts headed by a Governor, 572 Directorates and approx. 36 000 municipolities and villages. The population of Turkey is approx. 40 million inhabitants and about 60 % live in the villages and the countryside. Five districts are inhabited by more than 1 million inhabitants each.

Istanbul	approx.	3 500 000	inhabitants
Ankara	"	2 225 000	"
Izmir	"	1 575 000	"
Konya	"	1 420 000	"
Adana	"	1 140 000	"

In the rural zones, the population is partly concentrated in small towns and villages and partly spread out over a large area. Their housing is in general based on ancient principles and adopted to the climate, the necessities and the financial possibilities of their occupants. The type of housing varies from region to region. In the Central and Western regions the housing is constructed out of wood, masonry and natural stone with different roofing predominantly roofing tile. The houses vary from 1 to 3 stories. In the Eastern regions the houses are built on natural stone foundations, and mud-brick or cement block-walls with mostly flat roofs covered with mud and/or straw. Their roofs withstand 1 to 2 M snow in winter time. The heating in wintertime is produced out of the firing of dried animal-manour.

Until 1930 the Turkish economy was mostly based on rural and artisan industry.For the last 45 years the country has experienced and extraordinary development in the modern civilation of scientific industrial development. However, the growing urbanization imposes heavy infrastructural and social burdens on the Government and the Districts. Especially in the rural zones the sector of public utilities and infrastructure is inadequate.

2.4. Government housing plan

(Quotation from the summary at the third five years plan (TFYP)

The housing problem will be approched[a/] from the point of view of the city environment in accordance with the general settlement policy.

Under a long-range programme, housing units will be built in the quality and quantity in conformity with the future standards of living in Turkey.

To assure the construction of as many housing units as possible, efforts will be directed towards building social housing which suits the conditions in Turkey. Taking into account the considerable savings arising from mass construction instead of separate housing units, efforts will be made to promote large-scale housing schemes.

The construction of housing units which can meet the requirements of various income groups will be undertaken especially through cooperatives and large-scale construction programmes. In this respect, priority will be given to the low income groups and the credit policy will be adjusted accordingly.

Financial resources will be increased by utilizing small savings that are not directed towards productive investments. To that end, measures will be taken to organize small savings in such a way as to make their most productive use possible.

To reduce the cost increasing effect of land acquisition and to prevent speculation, public control will be exercised over the expansion areas of cities. Public holdings of land will be increased to build industrial districts and to organize the systematic expansion of cities to meet the requirements of public organizations. Public land will be sold through a single organization in such a way as to support inexpensive housing construction.

Targets for the housing units to be built and the amount to be invested during the TFYP are given in the Tables IV.40 - 41.

(Thousands)

Types	1973 - 1977
Urban Housing	1,221.7
- New Urban Housing	1,015.0
- Renewals Due to Changes in Function, Expropriations, Natural Disasters, etc.	76.0
- Prevention and Liquidation of Squatter Housing	130.7
Rural Housing	443.0
- New Rural Housing	31.0
- Renewals Due to Natural Disasters, etc.	392.0
- Pilot Rural Housing Project Implementation	20.0
TOTAL	1,664.7

Table IV.41: Housing Investments

(1971 Prices, TL. Million)

	FFYP (Actual)	SFYP (Estimate)	TFYP (Forecast)
Private Investments			41,806
Public Investments			2,202
- Public Contribution to the Amelioration, Prevention and Liquidation of Squatter Housing			1,132
- Public Contribution to Rural Housing			230
- Other			840
Total	21,457	31.942 a/	44,008

2.4.1. Problems of Rural Development (Villages and Peasants)

The Five Year Plan has two main objectives for the rural area and peasants. Firstly, the unequal distribution of the farm lands which is one of the reasons for the economic and social imbalance, will be improved through the land and Agricultural Reform. This Reform aims not only at distributing farm lands to the families who are landless or whose lands are insufficient, but also at stepping up of agricultural productivity so as to raise the standard of living in the rural areas and to achieve the betterment of the income distribution.

Secondly, the rural settlements will be improved during the Five Year Plan period with the establishment of "Central Villages". The main objective of this policy is to increase the efficiency of public services for the rural areas and to provide benefits to greater number of villages from these services.

2.4.2. Planning of Urbanization and Rural Development

The Planning of housing, public utilities, state institutions from the Ministry of Reconstruction and Settlement is entrusted to the City Bank in Ankara. The City Bank acts as a mini-world bank for Turkey with branch offices in the larger municipalities of Turkey. On request of the municipalities, the organization will act as consultants for the Ministry and prepare through the implementation of feasibility of the requests the necessary planning programme for approval by the Ministry or the Ministries involved in the projects. The organization acts when approved with funds in trust from the Government as implementor in all the phases of the approved projects. It also will enter into industrial projects when it concerns the establishment of small-scale industry and industrial estates. The organization chart is demonstrated in Annex.

2.4.3. Financing

(Quotation from the summary of the Third Five Year Plan).

Housing Credit

1) The Turkish Real Estate Credit Bank (T.Emlak Kredi Bankasi) is the only banking institution specialized in extending housing credit. The most important problem of this bank is resource allocation. The Bank is under obligation to participate in various ventures. This condition affects the own-resources of the Bank and increases in housing credit have to be limited to increases in deposits.

2) The facts that sales price of housing units indirectly built by the Bank fund (i.e., through a construction firm owned by the Bank) are lower than market value and that low interest rates are fixed on some credits adversely affect the development of the Bank's services.

3) A consistent housing policy cannot be pursued due to scattered social housing funds and differences in credit conditions. Standars and costs differ in various construction projects for which credit has been extended.

4) Therefore, all funds for housing construction will be pooled in the Real Estate Credit Bank and will be extended preferably for for social housing projects under a standard set of conditions. Credit, interest and maturity dates will be different according to size and standards of housing units.

5) Construction built indirectly by the Bank (i.e. through a contruction firm owned by the Bank) will be valued at market prices.

3.0. FINDINGS AND RECOMMENDATIONS

3.1. FINDINGS

3.1.1. General conditions

Disasterous Conditions. The eastern and south eastern region of Turkey belongs mostly to the I and II earthquake zones. In addition to this most villages in mountain areas of the region are in potential danger of landslides and falling rocks because of the corrosion of the earth.

Climate Conditions. This regtion has a very severe climatic conditions which brings the temparature up to 40°C in summer and down to 30°C below zero in several parts of the region. Besides that, in several areas the snow fall is so heavy as to accumulate over 3 m sometimes.

Conditions of Natural Resources. The region has no forest which can supply wood for housing construction except very little amount of logs for rafters, however, on the other hand has plenty supply of inorganic raw materials such as stones, soil for brick production, lime, bim etc.

3.1.2. Social Conditions

Regarding the location of rural settlements, it can be said that there are two categories of them:

i) location which has comparatively easy access,

ii) location which is rather remote and isolated.

Villages or settlements on the plains have in most cases comparatively easy access and are not so vunerable to disasters as such settlements in the other category of location. Villages or settlements in mountains or valleys are, in most cases, rather difficult to approach and, moreover, usually more vunerable to disasters such as earthquakes, landslide, etc.

As regards the pattern of settlements, it is observed that there are two different types:

i) concentrated and

ii) spread-out.

These two types of settlements patterns are both found in villages in plains and also in mountains or valleys. However, the central settlement of a village is normally of the concentrated pattern.

3.1.3. Housing

There are two types of dwellings in the rural villages of the region i) the continuous buildings and ii) independent buildings. The former is found, of course, in the concentrated pattern settlements, but the latter is found in both concentrated and spread-out settlements.

The continuous buildings in concentrated settlements have such advantages, for instance, as easy provision of water and electricity supply, but some disadvantages too, for instance, more serious damage or loss of life in case of disaster because of their high population density On the other hand the independent buildings in the spread-out settlements cause much trouble for administration and public services and have, in most cases, serious disadvantages in case of disaster because of their comparatively difficult access. (Technical observations regarding housing will be dealt in later sections)

3.1.4. Economic Conditions

Most settlements are agricultural farming settlements, except the temporary settlements of nomads. They are mostly living on the self-supporting economy, except very little earning from selling of their surplace products.

3.1.5. Factors which made disasters so serious and reconstruction so difficult

The location of the settlements are, of course, the very factor which caused disasters, but, since almost the whole region is in the

earthquake zone of high intensity. There had been no help to find safe location in most cases. Thus, the most important factor which made the disaster so serious and severe is to be considered the inadequate building technology. Most dwellings, except very few multistory buildings which have reinforced concrete column and beam structure in rural settlements in the region are built basing on masonry structure, which has very little earthquake resistance by its nature.

In addition to this most construction works are done by the villagers themselves, who are not trained to know about some principles which make the masonry structure earthquake resistant to some extent. Moreover, the villagers in most cases try to maintain the waterproofing of the roofs by putting mud layers on them every 2 - 3 years and the weight of such mud layers are quite dangerous in case of earthquake.

Introductory portion of some of the basic factors in the present housing situation of the eastern areas of Turkey. The basic factors which have accelerated the destruction of natural disasters are:

i) the use of substandard and cheap construction material and unproper construction techniques,

ii) of which main causes are the poverty of the people and high cost of proper construction,

iii) the lack of adequate financial provisions which make the villagers able to afford minimum shelter,

iv) the fact that most villagers do not enjoy the ownership rights of the pieces of land which they occupy because of which they do not try to improve their dwellings.

Besides, the less priority given so far to the improvement of rural settlements and the inadequate infrastructure thus resulted in accelerated the deterioration of fillage settlements.

Economic Conditions of Villagers.

- Poverty. The main cause of inadequate construction of the rural housing is the poverty of the dwellers. They are mostly in a primitive self-supporting economic stage and can hardly afford any improved construction syste.

Land ownership

In addition to their poverty most villagers are not enjoying the right of ownership of the lot on which they have their dwellings. Therefore, they do not pay much effort in improving their dwelllings.

Less priority in Policy

Moreover, the rural housing had received very little attention from political or administrative sector, thus no special provisions for improvement of the rural housing had been vigorously implemented.

3.1.6. Basic requirements for housing reconstruction

Design of dwellings

The principles on which the design of rural housing units in eastern and southeastern region have to be based as follows:

i) The household activities of rural families are a part of /or interwoven with their agricultural activities;

ii) Therefore, their dwellings are dependent upon their agricultural activities;

iii) For instance, their dwelling have to have large storage spaces for tools, products, etc. and expansions and changes of agricultural activities reflect on the dwellings.

In addition to the above, rural families are usually larger and more complicated in their composition and require larger space than urban do. The types of dwellings vary very widely according to their locality and it is hardly possible to find typical dwellings even for small areas in the region, but nevertheless one can observe certain common features among them: i) masonry wall, ii) flat roof, iii) self-help, iv) few manufactured material etc.

Above mentioned common features should be kept in mind when the design of houses is to be developed for the prefabrication of housing.

Type of Rural Housing in Turkey (Eastern Region)

The type of rural housing are of the masonry type using: field-stone, hewn-stone, bricks, cement blocks, concrete, adobe type.

Field-stone masonry

Field or pebble stones are used in large pieces without shaping and mud, mortar or nothing is used in joints. Earthquake resistance for this type is negligible or sometimes negative. A wall produced out of these conditions can withstand static loads, but by ground movements the materials is spread around. Normally it supports a heavy roof formed of cross beams on the wall. The roof is covered with straw and mud of 50 cm thick which provides good heat insulation. However, its large mass is a real danger for natrual disasters.

Hewn-stone, concrete block and brick type

Here the coarse material is shaped and the wall surface is smooth with improved resistance against ground movements, but the resistance is not sufficient. It will loose the strength when it is cracked. The strength is a factor of the masonry as a whole and the quality of the mortar and is affected by the thickness of joints. Intersections and corners are subject to the quality of work by the workers.

Masonry walls will resist lateral forces, cross-wise there is a limited strength. Forces applied to the walls built of masonry resulting from earthquakes and tremors occur normally in any direction and it is therefore self-explanantory that even strength and uniformity of strength on the walls must be provided for. However, as the length of the individual wall or panel increases the strength will be likewise.

If one considers an elementary wall or wall panel be subjected to horizontal shear, the main stresses are on the diagonal with tension in one direction and compression in the other, which results a release of tension by cracking with extension along on diagonal. When the direction of the shear is an reverse as a consequence of a quake, another crack will occur diagonal to the first which we see normally in dwellings with miltiple storeys and amount of windows,doors as a "X" pattern. This is the beginning that the overall strength is decreased and depending on the tie beams and pillars, the building contruction will prevend accelaration of cracking and spreading of the cracks.

Adobe dwellings

Adobe or mud bricks are sun-dried formed brick made of mud and straw easy to be made by the self-help method which is practised in the eastern regions and used in a wide variety of housing. The strength is not to be compared with brick but it is light weight, cheap to make with good thermal insulation. It is used in load bearing walls up to one storey buildings and as fill for frame houses. It requires maintenance against corrosion from heavy rains and by natural disasters. The earthquake resistance of adobe itself is small since ages it has been a common practice to use this material for housing construction and no doubt it will continue to be used.

Timber erected houses

In timber framed houses the load bearing is small and the fill material will further reduce the total resistance. Normally wood-framed houses with diagonal framed structures have good earthquake resistance. However, the use of timber in eastern Turkey due to its scarsety can only be utilized in auxiliary building components such as window frames, doors, etc.

3.1.7. Basic structural concept

The objectives are as follows:

1. To implement and establisn a demonstration factory to produce prefabricated components for the assembly of village houses in the eastern and south-eastern region of Turkey.

2. To produce a large enough stock of ready for erection building components for the reconstruction of houses after a disaster.

3. There are categorical conditions, such as type of house, adapted to the living conditions of the villages, the raw material resources and availability in the above regions, the climat conditions, the conventional construction methods. There are various types of houses within these regions with common features as follows:

a) Masonry wall structure(the used materials vary from sun-dried mud brick, field-stone, cement blocks.

b) Flat roofs composed out of logs, branches grass or straw and mud, in several different types are used also. But the flat roof is the prevailing type.

c) Various expansions and sub-buildings (auxiliary buildings).

d) Elevated main floor of semi-basement type.

e) Small windows.

4. The region's most important characteristic from the house construction point of view, earthquakes and extreme climatic conditions. Consequently the houses to be provided must have the following specifications:

a) Sufficient built in earthquake resistance against fairly severe quakes (earthquake intensity zone 2 and 3).

b) Sufficient thermal insulation.

c) Sufficient strength to withstand heavy snow.

5. The raw material resources for these regions are limited:

a) Supply or sawn timber is insufficient to construct wooden-frame houses for the general public.

b) Steel supply for housing construction does not seem feasible other than reinforcing bars small size constructural steel, galivanized steel and galvanized sheet to some extend.

c) The region supply for cement, bims, lime and aggregates is sufficient.

d) All other necessary materials must be transported over long distance up to 1650 Km.

6. In most of the village settlements, the inhabitants build their own home with very little help of skilled or specialized craftsmen.

3.1.8. Planning of settlement

A solution could be found through the disaster sheltering as a first assistance to the disaster stricken area. These shelterings could be to permanent dwellings and later on expanded with additional living space in accordance with needs. Thus must go coincide with a rural planning whereby the scope is absed on:

a) Resettlement of villages to less vunerable sites fo disasters which in most cases can be provided for through phusical planning and accomodated with contemporary agricultural techniques and infrastructure.

b) Settlements should be gathered and centralized to avoid scattered and very small villages, who otherwise become a problematic social economic environment for the inhabitants. This results into a naturally and socio-economic conveneinet system whereby the newly formed settlement have less problems of inaccessibility and communications.

c) These "so called" centralized villages could be planned with the following guide-lines to plan these villages as a neighbouring unit, whereby efficient agriculture necessitates a short distance from field to residence and/ the distance must provide a balance between field and social activities and to become a focal rurual unit, decreasing the gap between urban and rural life and will provide the following benefits:

i) the needs of a large rural population will create less cost for social care, institutions and administration;

ii) infrastructure will be ensured in a hierarchical manner;

iii) it will ease the improvement of agricultural techniques and so doing a better socio economic development;

iv) it will facilitate the development of industries based on agricultural products and other industries on a small scale basis, building materials, agro-tool maintenance and repair, domestic articles etc.;

v) agricultural production could increase the co-operation in villages;

vi) it will increase social services, education and provisions for organization among the villagers and increase the cultural aspect of the population.

Rural Housing in Disaster and /or Non-disaster Area

When rural housing is considered it is necessary to develop a general policy such as:

1) Local plans to be determined as a result of regional surveys family habits and provisions for climatic conditions and availability of local building materials.

2) The living habits which identified should not necessary be accepted but may be reshaped to accelerate social changes.

3) Determination of a project methodology should be extracted from these survey's.

4) Type of houses to be established for the different sub-regions of Turkey.

5) The villages should be informed with:

a) Aids to construction: the villages must be provided with basic building materials for construction of housing. Assistance is to be given to ensure the efficient use of these materials.

b) Self help schemes by the villages to be supported by providing practical aid for the use of standarized building materials and education in simple construction techniques [c/] with assistance and cooperation of available government services.

Settlement pattern of rural villages

The physical settlement locations which are found in the eastern part of Turkey are divided in two types:

i) villages in the plains (18,7 %)

ii) villages in inconvenient sites such as valleys and on mountain slopes, hill sides (31,4%)

The above creates the following problems:

iii) the villages settled in inconvenient sites are in most cases also vunrable [e/] to such natural disasters as earthquakes, landslides, falling rock etc. and cause many troubles to the authorities in rescue and recontruction in cases of disasters.

iv) since the villages are partly isolated it reduces their marketing possibilities and creates a subsistence economy system resulting in a decrease of agricultural production, social relations and leads to migration to other developed areas.

The rural pattern of settlement in Turkey show an ecological disturbance and with the physical pattern it results in serious socio-economic problems and planning or resettlement becomes necessary for the following types of villages:

a) those, effected by natural disasters

b) those, who have no means of income development

c) those, who lost their land resulting from necessary contruction of hydro-dams, etc.

3.1.9. Job opportunities

It means more job opportunities for villagers, but also means less wage per person and more expenditure of commuting by villagers or accomodating them nearby.

In addition to this, more worker's in the factory means more difficulties in management, quality control, training, etc. Therefore, it must be given special caution in implementation to materialize labour-intensiveness in the factory in order to avoid the above mentioned disadvantages.

"labour intensive" on the site.

i) This can be easily realized in normal cases of house construction but not always easy and/or desirable in cases of reconstruction after disasters.

ii) In recontruction projects, it is quite important to minimize the time for erection which requires higher skill in erection and, if possible, better, heavier equipments for speeding up the erection.

iii) Therefore, it is necessary to train some of villagers for these skills in order to have groups of villagers who can work in cases of disaster recontruction and or resettlement projects.

3.2. RECOMMENDATIONS

3.2.1. Guidelines on prefabrication

To evaluate and engage into prefabrication for the construction of houses, the following scope of considerations must be evaluated even to the extent that some prefabrication is already in existence.

i) What are the objectives of establishing such industry?

ii) Which advantages of a prefabircation system should be incorporated?

iii) Which disadvantages in a prefabrication system should be avoided?

iv) Which system should be slected with what justification on the selected syste,?

What advantages are there in prefabrication of building compenents and factory produced:

i) ready to live-in houses or ready to errect compcnents for houses can be provided by prefabrication.

ii) prefabrication can avoid exessive waste of labour, material and time.

iii) prefabrication facilitates quality control on raw materials and production compared with the convential construction system.

iv) prefabrication makes expansion of production capacity easier compared with the conventional system.

v) factory produced houses or prefabrication components,in most cases superior, have quality products than the conventional production of houses. New product lines which cannot be produced by manual methods.

vi) factory production facilitates improvement of working environment and can provide job opportunities for unskilled village labour.

What are the disadvantages of prefabrication and factory production:

i) prefabrication requires more experienced management.

ii) prefabrication creates more transportation because of its centralized production.

iii) prefabrication requires normally heavier construction equipment.

iv) factory production of components is normally not labour intensive.

v) prefabrication requires large initial costs compared with the conventional method.

vi) higher overhead expenditures.

vii) factory production requires a steady demand over a number of years.

viii) sometimes it limits the use of local available materials and make the use of it more difficult.

ix) factory production might increase unsafe working conditions, unless necessary precaution is taken into consideration.

x) factory production requires standarization which tends to go too far sometimes.

Above we have mentioned the "pros" and "cons" which advantages will have to be inforporated and which disadvantages must be avoid to fulfil our objectives. Since the most important factor is earthquake resistance we have to rely upon those advantages that will facilitate quality control and produce high grade standard products.

Besides these points, we have to carry a large stock of components, ready for use in case of disasters. The choice falls on factory with a possibility to expand the production capactity.[a/]

To provide job opportunities, the prefabrication system is to be chosen, that it provides jobs for unskilled labour.
The following disadvantages should be avoided:

a) The disadvantage of prefabrication by excess of standarization since there will be a range of types of houses, standarization on one type of house in the prefabrication does not lend itself for the proposed system, other than standarization on the prefabricated components.

b) The use of manufactured materials. In prefabrication large expenditures are required for initial capital and operational costs, therefore, the expenses and cost of raw materials used to produce the prefabricated components should be kept at the lowest possible level by using local available materials. Reliance upon manufactured materials and raw materials by hauling over long distance will cause difficulties for continuous raw material supply.

c) Too much reliance on heavy equipments. To avoid the use of heavy construction equipment as fas as possible because of the availability of such equipment as heavy cranes, etc. But also of the road conditions and site-conditions as well as obtaining and training of operators and the necessity of using available unskilled and semi-skilled labour.

d) Too high requirement for management. The required level of management in qualification and amount is inevitable, but the programming for production needs careful industrial operation planning in order to produce at the lowest possible cost. It is self explanatory that for this purpose raw materials, multipurpose equipment and skill should be kept on a narrow scale.

3.2.2. Considerations in selecting a prefabrication system for Eastern Turkey

General (basic) concept of the system. The major products of the factory should be medium, flat shape, unfinished structural components. The reasons for this concept are as follows:

a) In order to make the easy management in factory and quick erection on site possible, larger components are desirable. Besides, larger components can result in more structural integrity. However, such disadvantages of larger components as requirements for heavier transportation and construction equipments, higher skill and better care in handling are fatal in this case. On the other hand such small components as bricks or blocks do not make sense of prefabrication at all, since they are already prevailing, then the selection comes to medium size.

b) Flat shape is a must for the sake of easy and economical storage and transportation.

c) Since the system has to work for various demands from different areas, the components must have quite high adaptability to wide varieties of climatic, social and economic requirements. From that point of view "unfinished components" are recommendable. Besides, there must be such consideration in designing the components to give them the possibility of accepting various internal partitions interior and exterior finish and future expansion. In order to have wide variety and flexibility, large components cannot be recommendable again.

d) ONe of the most important objectives of adopting prefabrication system is to secure enough structural safety against earthquake. Therefore, the aim of quality control in the factory should be concentrated on the structural performance without diversifing the responsible persons attention somewhereelse. From that point as well as from the above mentioned point of view the components should be structural only.

Selection of materials. Reinforced light weight aggregate, cement concrete seems to be most advisable from various points of view.

a) Light weight materials have the advantage to give resistance against earthquake. Because of this reason, timber and steel or aluminium are considered to be most desirable materials for an earthquake resistant structure, however, they are not readily available in this region. In these circumstances a second choice is a reinforced cement concrete structure which has been proved to be reasonably earthquake resistant when it is properly designed.

b) Fortunately, this region has good supply of light weight aggregates. Our Choice will be light-weight aggregate concrete with small size steel bar reinforcement. The supply of the latter material is not sufficient enough at present, but the production of such basic building materials as reinforcing bars should any way be strengthened.

c) Furthermore considering the prevailance of flat roof in this region the choice of reinforced concrete is most appropriate because neither steel nor timber are advantageous in contructing strong enough flat roof structure at low cost.

d) Besides when timber or steel is selected as a structural material it becomes necessary to introduce several other materials to make components such as panels. There are only a few suitable materials for this in this region. In addition to the limited availiability of materials, the introduction of such materials makes the production of panel components more complicated. More secondary materials such as adhesives, nails, paints etc. sophisticated machinery, jigs, tools and higher skills will become necessary and require more specialized management.

Some consideretions about internal partitions, interior, exterior finish, equipment and expansion. Since the major components are designed only for structural performance, there must be supplementally systems for internal partition, interior and exterior finish and expansion. In developing such supplementally systems, efforts should be made to incorporate as wide as a variety of conventional ways of such parts for house construction.

In these regions of Turkey because of the severe climate condition the system of exterior finish which can provide with the major components sufficient thermal insulation has the first priority. Conventional way of providing thermal insulation, in these regions, is to have thick enough layer within / or in addition to wall and roof structures. This method adds considerable additional load on the major structure especially in case of earthquake, therefore, precautions based on appropriate research and experiments should be taken into developmnet of such supplementally systems. It is of course, desirable to use light weight thermal insulation materials such as fibre glass, foak plastics, etc. However, these insulation materials are not easily available and very expensive for the use in these regions. Besides the villagers and craftsmen in these rural areas are not yet used to these kind of brittle of fragile materials which require very careful handling to avoid damages during transportation and contruction, it is therefore that only very well developed systems for prefabrication and errection.

In these regions, it seems that expansion enlargement and/or construction of sub-buildings are prevailing. In most cases, these constructions are done in conventional ways, that is masonry of stones, bricks or blocks. The way of construction adds in most cases considerable loads to the structural parts of the main building in case of earthquake. The destruction of main building caused by these additional load from expansion and/or sub-buildings should be prevented completely. Therefore, it will be necessary to develop, when possible, two kinds of systems for additional construction to the main building as follows:

- the provision of impact absorbing zones between the main and additional structures,
- self standing structure for additional buildings.

3.2.3. Brief description of the "Basic Unit" (BU)

Preamble:

With reference to the Terms of Reference an attempt has been made to sketch "an optimum system of prefabrication in accordance with extreme climatic conditions, earthquake resistance, with minimum of construction equipment, such as cranes, etc. which due to the location cannot be used and possible self-help methods".

Backed up by former experiences and by a number of previous publications on this present subject, the Team has come to the conclusion that preference should be given to prefabrication of linear "one dimensional" components, which can be used effectively with other forms of industrial or traditional building components, materials and methods of contruction.

Standarization of "modular"components is of essence. Based on the presuppositions outlined above the Team ,suggests that a "Basic Unit" as described below, should be subject to further development, and eventually adopted as the first step towards better houses for the population in the region of South East Turkey.

3.2.4. Description of the BU

Fig.1 shows the plan of the BU with a width of 24 M (M being the modular unit of 10 cm) and a length of 60 M. This means a "modular floor area" of 1440 M^2. The material chosen is reinforced concrete.

It is envisaged that the exterior walls are constructed by means of three basic components:

12 Ms - a 120 cm wide "standard" panel

18 MD - a 180 wide panel with a door openning

6 MC - a 60 cm wide panel incorporating a vertical flute for chimney or ventilation shaft.

It is intentional that no interior partition walls or other installations are shown. Firstly because the location of such extras may vary according to the local requirements and possibilities at the side of contruction. Secondly, because such extras should not be manufactured and installed in the factory, but at the site and after the erection of the BU. Fig. 1 is only an example, showing one way to arrange the panels for the exterior walls. Other combinations may be advisable under various circumstances.

Fig. 2 shows elevation and cross section of the BU. The dotted line over the flat roof indicates that the final roof contruction can be any normal type of roof (flat, sloped or pitched and with a free ohoice of roofing material(s). The dotted lines outside the gable of the BU indicates that the final exterior of the walls can be chosen with a free regard to climatic conditions, availability of local materials (and skills) and also to the required exterior appearance.

The cross section shows a floor to ceiling height of 24 M = 240 cm which will accomodate a wall contruction of either standard clay bricks or standard (cement) building blocks. The next common dimension for these two important materials is 270 cm. The exterior extension of the foundation and the overhang of the roof of 30 cm is suggested as enough to accomodate any relevant type of exterior wall. Shown also in Fig. 2 in the envisaged foundation wall and the on-site application of a concrete floor over layer of gravel or other suitable loose material.

Fig. 3, Fig. 4, and Fig. 5 show other types of foundations likely to be contructed taking various site conditions into consideration. For example: the low basement in Fig. 5 could be the choice for a farmer's house in areas where it is common to have such a basement for storage or for shelter for the animals.

Fig. 6 shows the suggested floor slab arrangement where elevated top of foundation is used (as shown in Fig.s. 3,4, and 5.)

The dotted lines in the SL 3 slab indicates that openings for toilet, water, sewage pipes and maybe other installations have to be provided.

Fig.7 shows the suggested roof slab arrangement, with openings for chimney and/or ventilation shafts.

Fig.8 and Fig. 9 show a "summary" of the basic horizontal and vertical components.

Fig. 10 and Fig. 11. It is not within the scope of work for the team to elaborate on structural (or other) details of the proposed system, but it is obvious that a cross beam along the center line of the BU is required as support for the roof slab and our way of providing such support is shown in Fig. 10.

If the cross beam is bolted to the sides of the chimneys a rigid frame at the center of the long exterior walls is established. (Important for earthquake resistance).

Fig. 12, Fig. 13 and Fig. 14 show examples of extensions to the BU (Ex 1, Ex 2 etc.) It should be kept in mind that the BU must be designed "strong enough" to absorb the impact from the extensions during an earthquake.

Fig. 14, Fig. 15 and Fig. 16 shows a possible solution for construction of the BU on temporary foundations in case of a disaster, where time or other limitations (e.g. frost) prevents the preparation of the final foundations, which in this case then must be excavated for and completed at a later time.

3.2.5. The earthquake resistance of the BU

It is envisaged that the BU shall be designed for earthquake resistance in the 1st degree earthquake zone, and that components of this design shall be kept in stock for disasters.

For preplanned erection of the BU in other zones (with a lower degree of earthquake) it may be justified to save on some of the specific earthquake resisting features of the design, but the outside dimensions of the components (wall thickness etc.) should not be subject to variations.

Whether or not it is possible to design, in an economical way, the BU for two or three storey buildings under 1st degree earthquake conditions cannot be estimated at the present stage of development, but it is safe to assume that a BU for a 1st degree zone can be used for more than one storey buildings in a zone without earthquakes.

3.2.6. Details of the basic components

Details have not been worked out and if the designer starts from scratch then an enourmous amount of calculations, detailing etc. is required before the "system" is ready for production.

However, a Japanese system, which with some alterations may be suitable for the PU-system outlined in this chapter has been successfully used for more than 10 years.in Japan.

The name of the system is:

"Ryosan-Koei-Jutaku" (mass production system for public housing)

Source of information:

"Jutaku-seisan-ka (Housing Production Division),

Jutaku-kyoku (Housing Bureau)

Kensetsu-syo (Ministry of Construction)

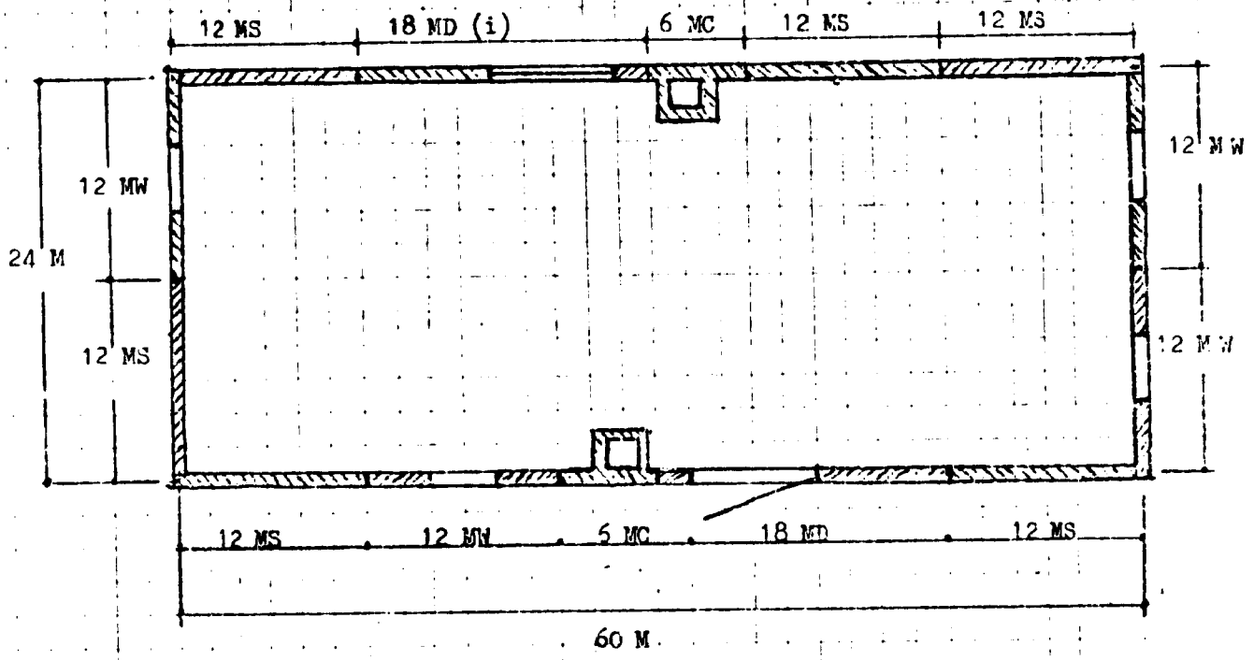
or

International Housing Research Institute

17 Mori Bldg. 2 - Shiba - Nishikubo - Sakuragawa - cho Minatoku,

Tokyo, Japan.

FIG. 1 PLAN



M = 10 cm

FIG. 2 ELEVATION AND CROSS SECTION

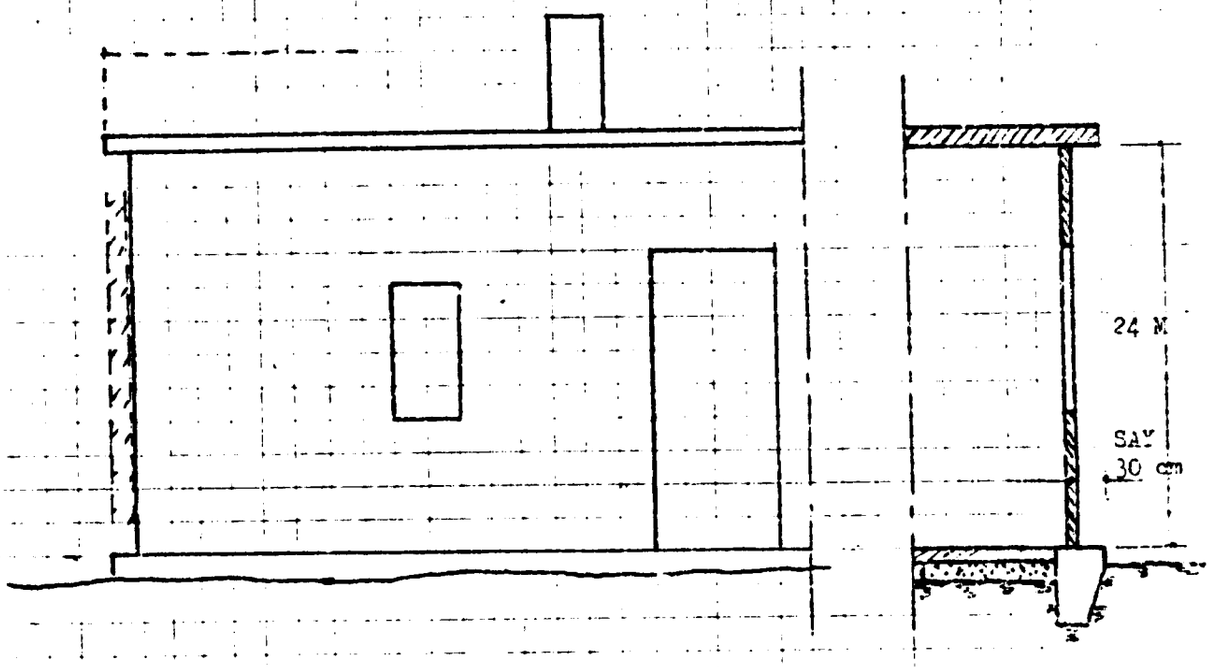


FIG. 3 FOUNDATION - PLAN

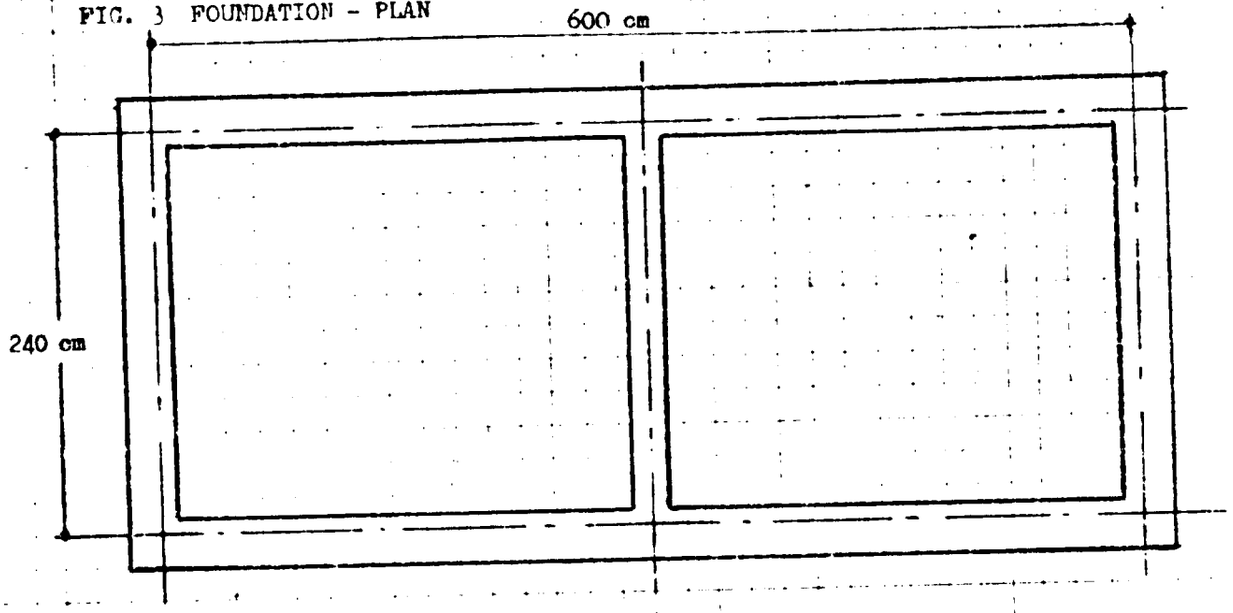


FIG. 4 FOUNDATION ON A SLOPED SITE

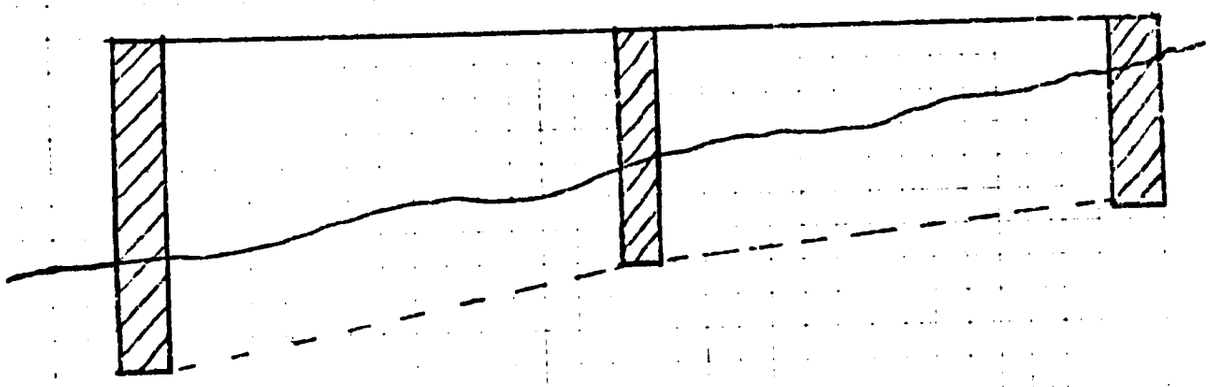


FIG. 5 FOUNDATION AS LOW-CEILING GROUND FLOOR

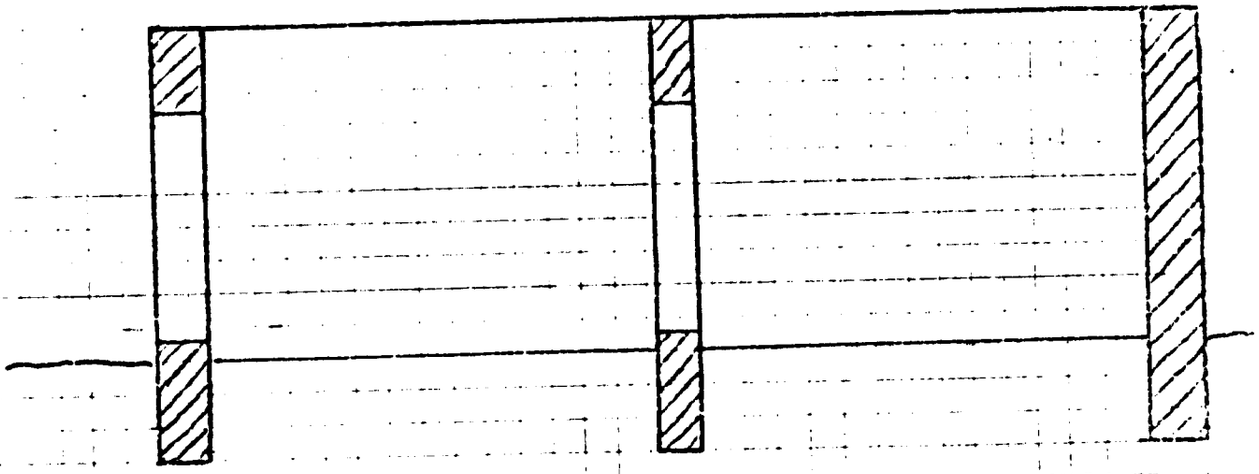


FIG. 6 GROUND FLOOR COMPONENTS

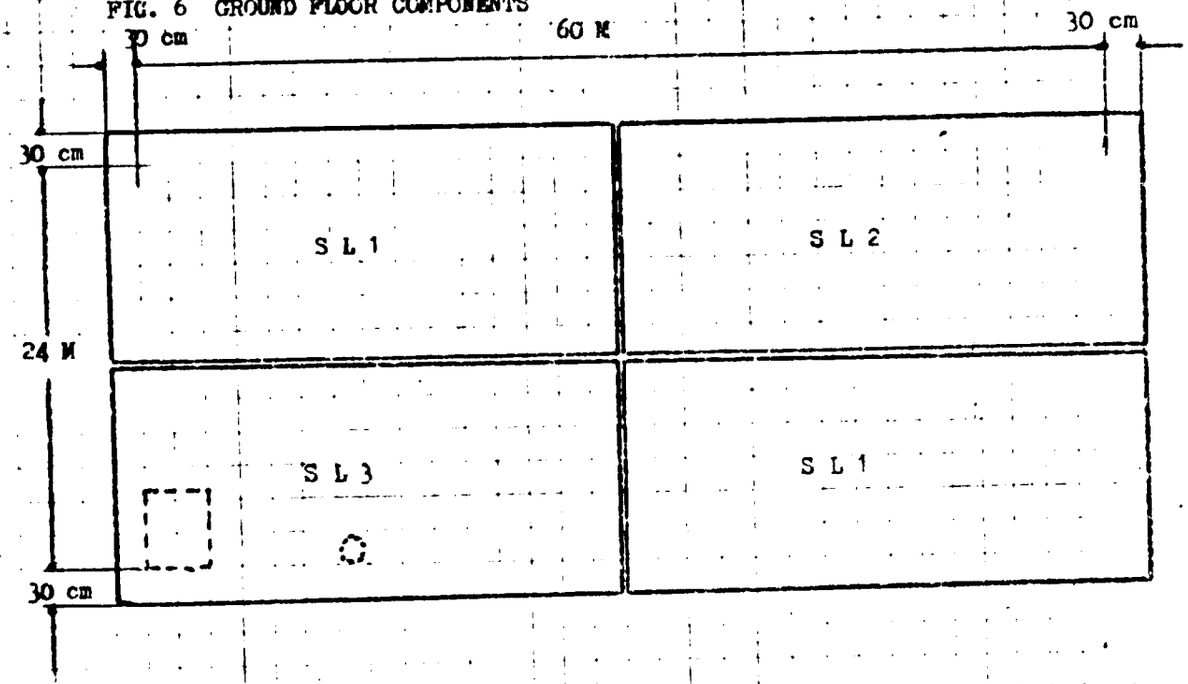


FIG. 7 ROOF COMPONENTS

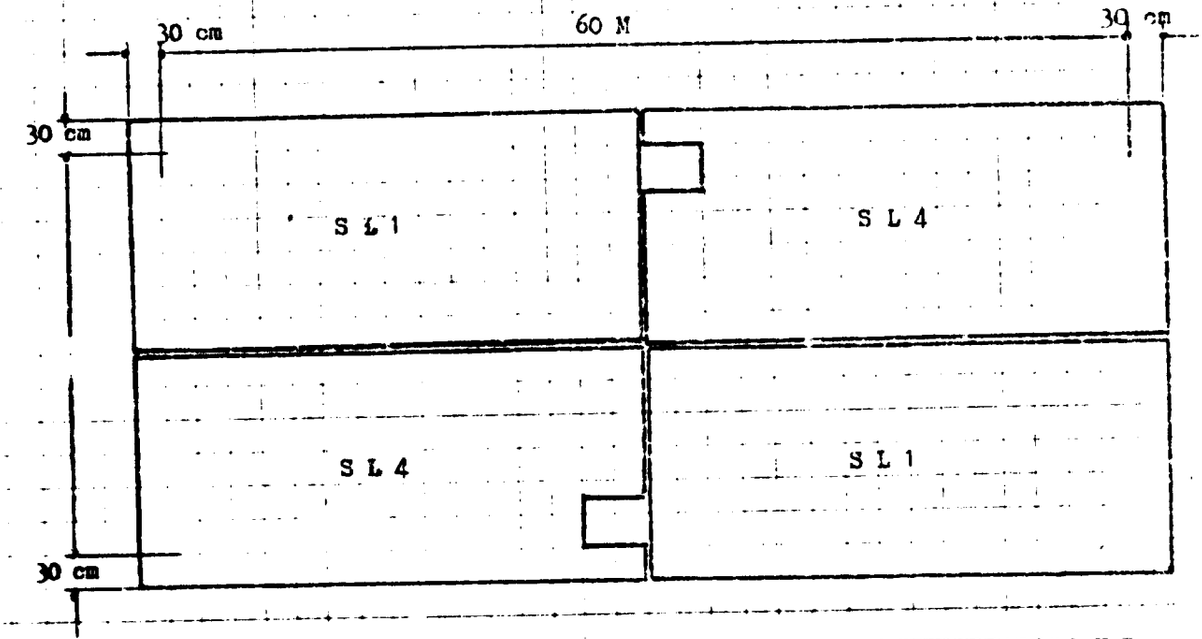


FIG. 8 BASIC HORIZONTAL COMPONENTS

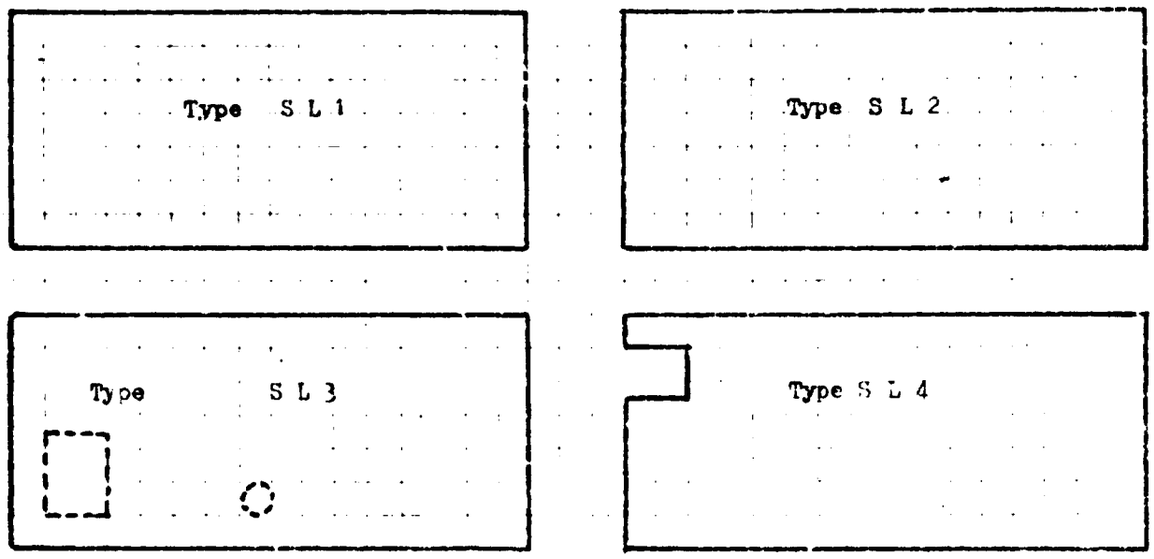
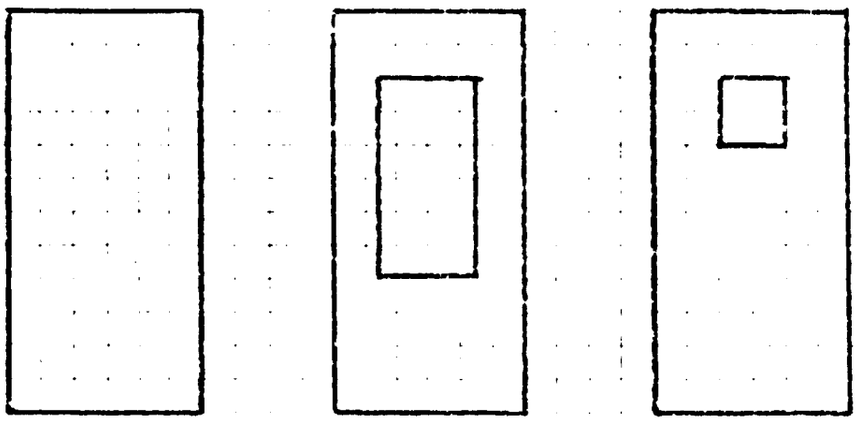


FIG. 9 BASIC VERTICAL COMPONENTS



Types: 12 MS 12 MW (1) 12 MW (2)

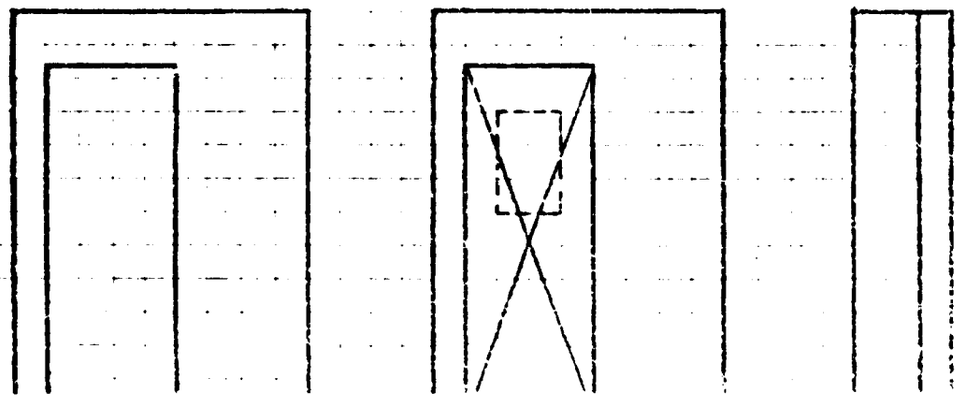
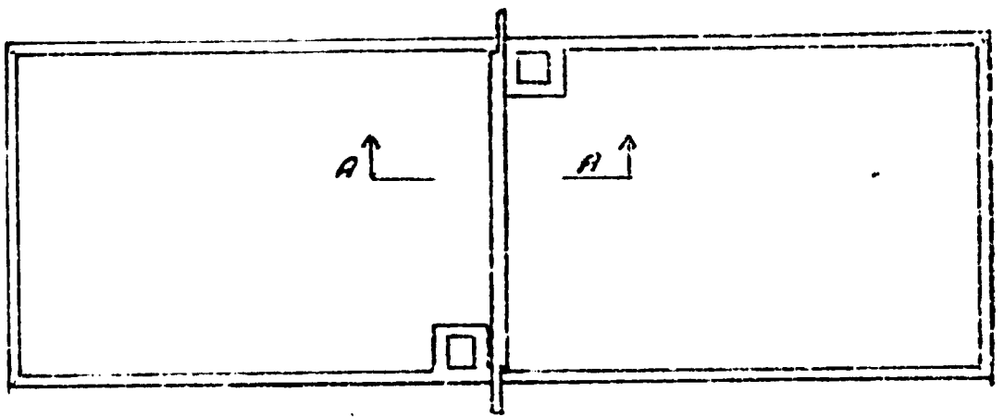
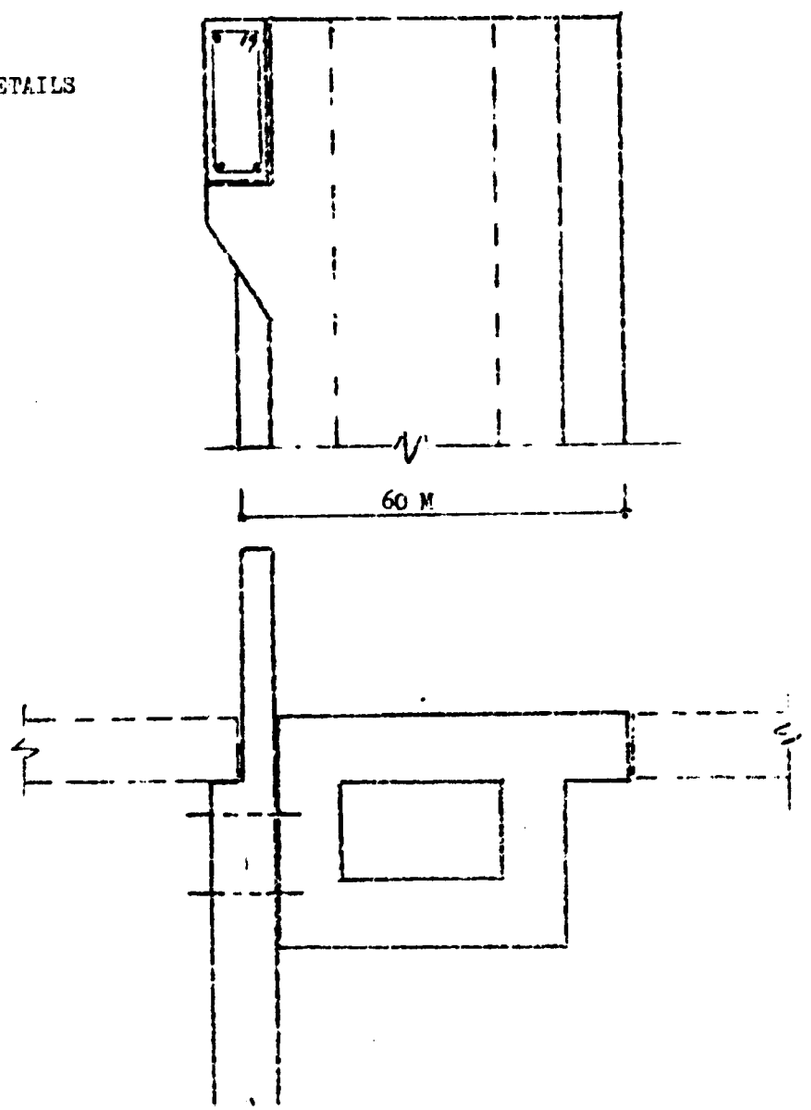


FIG. 10 CROSS BEAM FOR ROOF SUPPORT



A - A

FIG. 11 DETAILS



EXAMPLES OF EXTENSIONS TO THE BASIC UNIT (BU)

FIG. 12

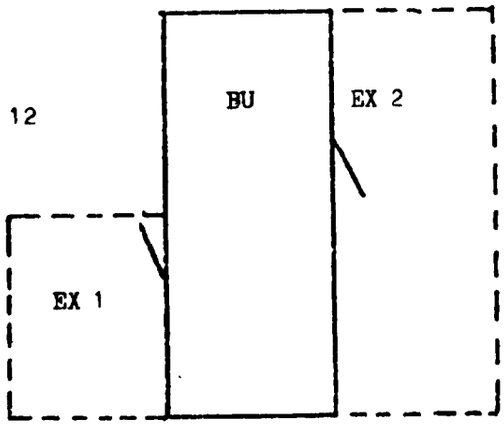
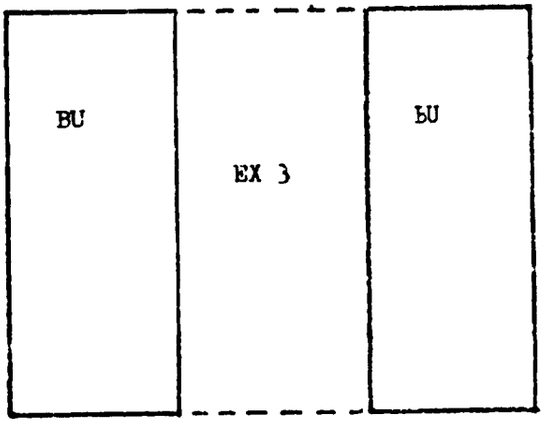


FIG. 13



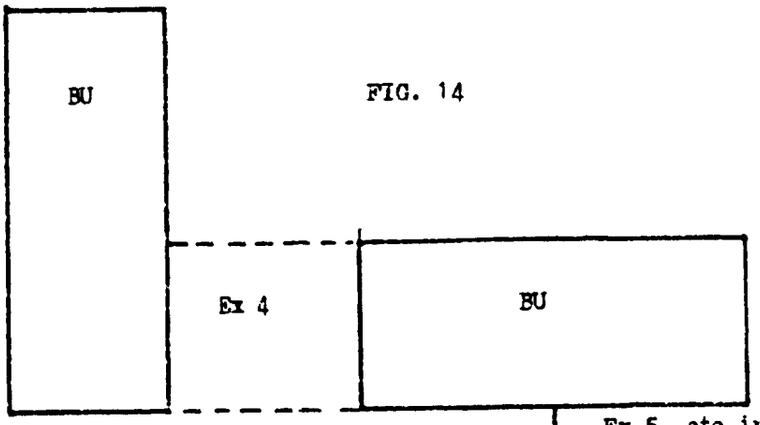


FIG. 14

Ex 5, etc in a number of variations and combinations

TEMPORARY FOUNDATIONS

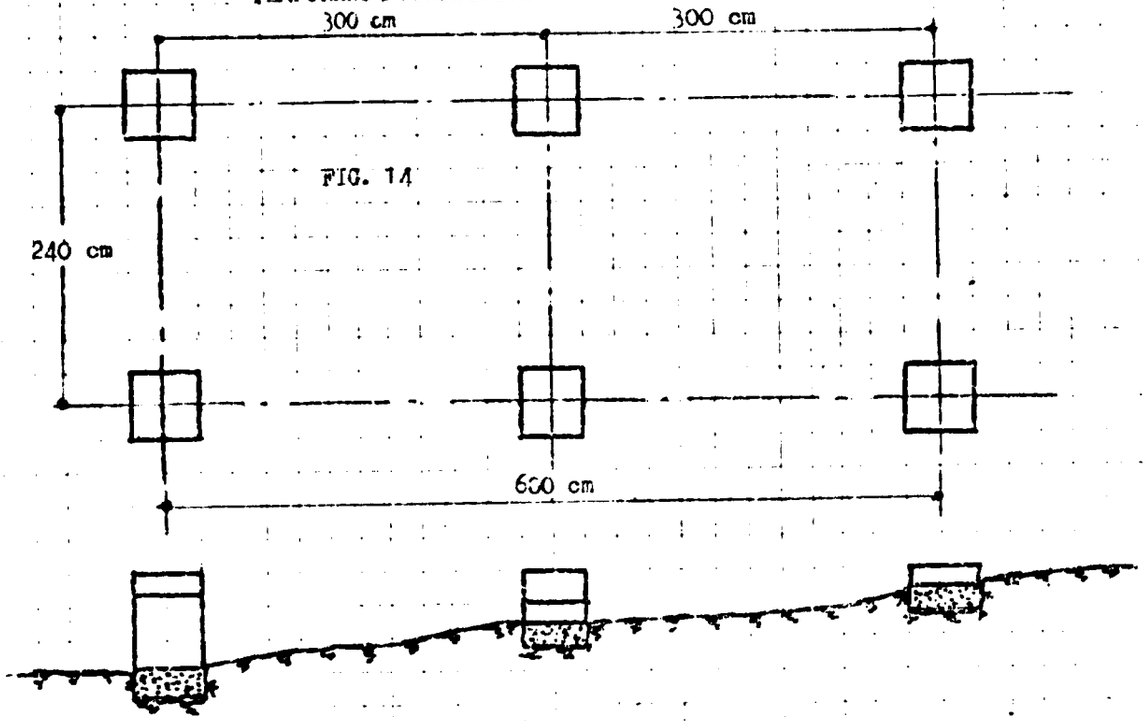


FIG. 14

FIG 15

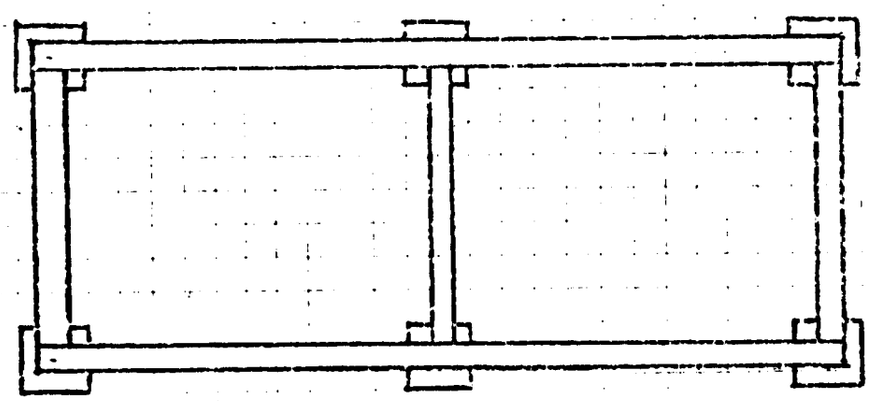
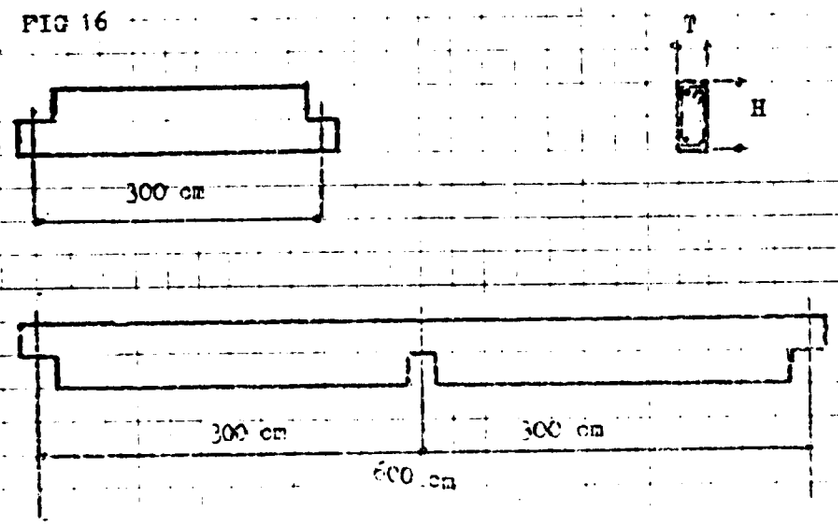


FIG 16



3.2.7. The concrete component factory, transport and erection

A factory for concrete components comprises:

I. Receiving and storage facilities for all materials required for the production, including materials for maintenance (spare parts, etc.)

II. The main production line.

III. Feederlines to the main production line.

IV. Storage of finished products.

V. Loading facilities.

VI. Auxiliary facilities (mechanical and electrical repair shops, storage of moulds for various components, etc.)

VII. Office facilities for technical, commercial and administration management and staff.

VIII. Facilities for labour.

ad-I. Receiving and storage facilities

Open stockpiles of aggregate

Open or covered area for reinforcing steel bars

Shed for cement

Warehouse(s) for other materials

ad-II. The main production line

Transport of aggregate to batching plant

Transport of cement to batching plant

Feeding of batching plant

Mixing of concrete

Transport of concrete to mould

Filling of mould

Compaction of the concrete in the mould

Trowelling of the open concrete surface

Removal of the mould

Curing - 1st stage

Separating the concrete component from the mould

Stocking of the concrete component

Cleaning and reassembly of the mould
Application of mould oil
Placing of frames fixtures, etc. in the mould
Bringing the maould into position for the next filling with concrete

ad-III. Feederlines to the main production line

(i) Reinforcing steel
Cutting of steel bars
Binding of steel bars
Bonding of steel bars
Tying of steel bars
Teacing of the reinforcing in the mould

(ii) Frames, fixtures etc. to be placed in the mould

(iii) Moulds, to be changed from time to time according to the production programme

ad-IV. Storage of finished products

(i) normal intermmediate storage for preplanned housing projects

(ii) special permanent storage of components for say 2000 housing units to be readily available in case of disaster

ad-V. Loading facilities (for loading of trucks)
presumably one or more mobile cranes

ad-VI, VII, VIII. no comments at the present stage.

Optimum system of fabrication

General remarks

Whilst the trend in the fully industrialized countries is to minimize the labour required for, and to apply sofisticated automation, governed by punch cards etc, etc, quite another approach should be applied in the present case and for a number of good reasons.

Economical reasons

(i) The initial cost of a highly mechanised factory is much more than for a more simple one.

(ii) The cost of labour in the rural areas in Turkey is relatively low compared with labour cost in the highly industrialized countries.

(iii) There is not shortage of labour in the rural areas in Turkey. To the contrary there is too high degree of underemployment.

Technical reasons

(i) Sophisticated machinery, no matter how carefully it is designed and manufactured generally it is not fool-proof. To the contrary it will normally require a very high degree of skill and understanding in the operators of the plant.

(ii) Also a highly developed maintenance routine is normally re quired.

(iii) When break-downs occur it is not unlikely that only "experts" from the supplier (presumably from a foreign country) can locate amd repair the damage.

(iv) Training of the initial operators of the various pieces of machinery will normally be the duty of the suppliers and can be carried on until the operator is fully competent to operate the machine, but training of replacement of operators will undoubtedly be the responsibility of the technical staff in the factory and there is a limit to how much technical know how one can expect even from well educated engineers.

Conclusions

(i) The concept of "approbiate technology" should be kept in mind from the early stages of the design of the factory, taking both economical and technical aspects into consideration.

(ii) Machinery and equipment with direct influence on the quality of the final product should be given a special attention before procurement and there may be cases where more sophisticated machinery than otherwise (by economical and technical evaluation only) should be chosen. This pertains for example to the composition of the concrete mix, which should be by weight and not by volume, and to the compaction of the concrete (in the mould) which should be by means of schock or vibration and not by hand-tampering.

Transportation to the site

There are two alternatives:

(i) by railway

(ii) by road.

ad-(i) transportation by railway

The railway station in Diyabakir has plenty of sidings, but no cranes. Except under special conditions railway trasportation should be disregarded, especially because it will involve two extra transfer operations.

ad-(ii) transportation by road

The components should be designed for trasportation on standard flatbottom trucks, and the loading programme should satisfy a maximum utilization of the capacity of such trucks both regarding volume and load.

Erection on the site - contruction equipment

Since the bulk of the components will arrive to the site on standard flatbottom trucks (and not on trailers), the ideal of tramfiring the components from the trucks directly to their final position in the building can disregarded because this would keep the trucks waiting for a not justified length of time.

Thus intermediate short term storage of the concrete components at site locations should be provided for .

The overall programme including equipment for the actual execution of the works to take place at site location will vary from site to site, and, between other matters, depend very much on the number of housing units and other buildings to be contructed at each particular site location.

Larger development schemes will justify the application of a more specialized fleet of equipment than smaller schemes, where the line of programming should be more "multi-purpose" oriented, e.g. the same crane for unloading of bricks and placing of the components in the building.

Very small sites, comprising may be only a dozen dwellings or so, cannot bear the cost of much equipment to be brought in, and threfore, special attention should be given to "what to do" under such circumstances.

Such small scale sites are likely to be in rural areas, and farm tractors are more and more common in farming, and therefore it is suggested that prototypes of contruction and erection equipment, using the farm tractor as basic power unit should ;be designed, build and tested in relation to the building system which is finally adopted.

A farm tractor can be fitted with : a backline excavator (for foundations etc.), a concrete mixer, a pump, a compressor, a small crane and a number of other auxilliaries.

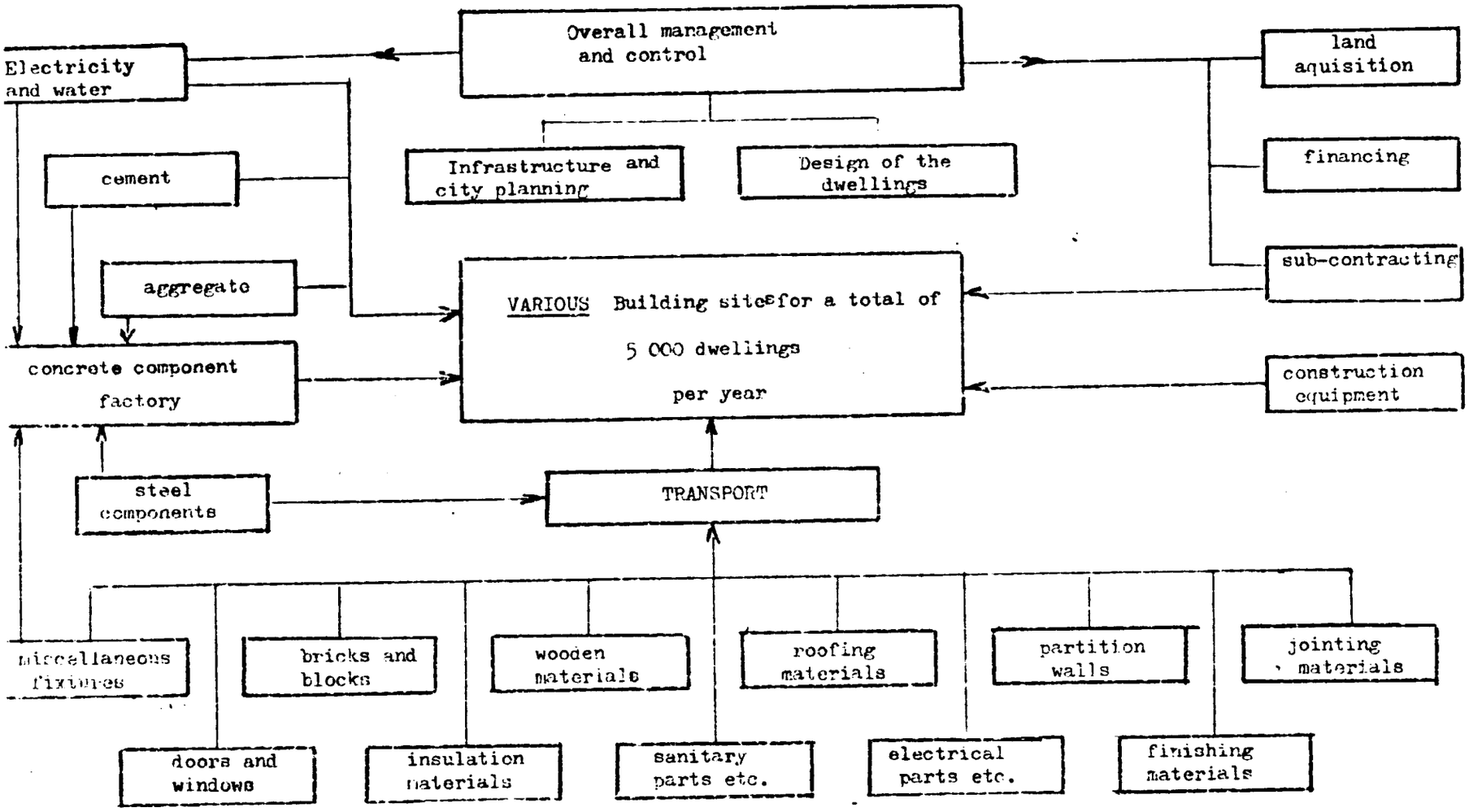
3.2.8. The housing supply system

In the preceeding sections of this present report some preliminary investigation and some preliminary suggestions has been recorded, concerning the subjects of design, raw materials, the "prefabrication system", transport and construction, but these items, important as they may be, represents only a part of the total requirements to be fulfilled before complete delivery of 5000 dwellings per year becomes more than wishfull thinking.

To go into details of the above statement is outside the scope of this present report, but the team has attempted to illustrate the interrelationship of the many activities which has to be coordinated and completed in a "FLOW DIAGRAM" shown in Appendix.
This diagram could serve as a preliminary check list for the government authority (ies) responsible for the implementation of a housing supply system for 5 000 dwellings per year.

A HOUSING SUPPLY SYSTEM FOR 5 000 DWELLINGS PER YEAR

"FLOW DIAGRAM"



3.2.9. Possible expansion of the production capacity

1. In order to fulfil the objectives of resettlement of villagers, provision of schools, clinics, nurseries, post office, shops, public offices etc. is inevitable.
2. These buildings are useally larger and more complicated than villagers houses, and require more advanced technology of construction.
3. Prefabrication can provide such technology for the less advanced rural contracters producing easy-to-erect structural components.
4. There are three major structural materials for above mentioned buildings timber, steel or concrete.
5. Timber is not advisable no only necause of the short supply in these region but also its poor fire resistance.
6. Steel in this case, must be of heavy section, therefore, absolutely not available in these region.
7. Thus, concrete is the only choice. Besides once a factory for concrete panel components for houses is established it will not be very difficult to expand its production to include such structural (oomponents as pillars, beams, floor, facad, etc.) for above mentioned buildings in its products.
8. The technology of producing such components may differ from that of simple panel components but to certain extent is similarity which enables the management and workers in the factory enter the new production without difficulties.
9. Besides, in resettlement or reconstruction projects, the construction of infrastructure such as road, water supply, drainage, sewerage disposal, electricity supply, communication etc.
10. These construction works might provide another demand for the production of the factory, although the required products are not same as the products for buildings.
11. From that point of view, the selection of concrete as the major material is considered most appropriate .
12. The domestic production and supply at low cost of various building materials such as cement asbestos sheets, gypsum, boards, galvanized iron sheets, insulation materials, etc., which will be needed especially in construction of abovementioned buildings as well as elaborate house buildings , are to be gradually expanded.

3.2.10. Selection of raw materials for the envisaged pre-fabrication plant

This section refers to 1,3, of the revised terms of reference of the project. The selection of raw materials used for the prefabrication plant in the estarn region of Turkey should be based in principle on the available raw materials locally in the region with a minimum of transport and in accordance with the prevailing infrastructure.

Turkey covers 776.000 Km^2 of which 3 % is in Europe and 97 % in small Asia. The distance from West to East is 1600 Km and from North to South 600 Km. The country is formed of vulcanic mountain with a center plateau of Anatolie.

A report produced by the Building Materials Institute in Ankara demonstrates the places where building materials are produced with the increase of production in graphical form during the recent years. The report is added to this report as annex.

The different building materials, as they are produced in Trueky are with the exception of

a) tile and brick
b) artilan lime industry
c) plastic pipe
d) small scale wood saw mills
e) cement
f) sand and gravel, within a rage of o - 200 Km from the anticipated prefabrication plant in eastern, south eastern Turkey.

The other materials over 200 Km up to 1650 Km as follows:

g) asbestos sheets
h) cement tiles
j) wood and timber
k) pywood and chipboard
l) sheetglass
m) small scale production of paints, verni
n) sanitary and heating equipment
o) water heaters and boilers
p) bims as raw material for light weight building components within a range of 580 Km from diyarbakir produced

q) asbestos pipes

r) glass fibers

s) glass mosaik

t) paints, verniz

u) steel and castiron pipes

z) porcelain emanelled sanitary

were within a minimum of 1300 and maximal 1650 Km range from the eastern part of Turkey.

Material Supply

Location prefabrication plant diyarbakir

Asbestos cement	Factory location	Distance to diyarbakir
Asbestos pipes	Ankara	approx. ~~1200~~ 960 Km
Asbestos sheets	Adana	" 515 Km
Cement poles, travers for elect Inst.		
Cement tiles	Içel	" 560 Km
Tile and brick	Diyarbakir	" -
	Elazig	" 138 Km
Brick	Diyarbakir	" -
Wood and timber		
Saw milles	Içel	" 570 Km
	Rize art VI	" 690 Km
Small scale factories	Diyarbakir	" -
Triple andboard	Sivas	" 560 Km
Chip Board	Adana	" 515 Km
Lime industry		
Artizan industry	Siirt	" 189 Km
	Elazig	" 138 Km
	Tunkeli	" 234 Km
Proper industry	-	"
Sheetglass	Içel	" 570 Km
Glass fibre	Istanbul	" 1650 Km
Glass Mosaik	Istanbul	" " "
Paint, verniz, etc.	Ankara	" ~~1200~~ 960 Km
	Rize (challscale)	

Steel pipes	Istanbul	approx	1650 Km
Cast iron pipes	Zonguldak	"	1750 Km
Plastic pipe	Elazig	"	138 Km
Electrical equipment	Ankara	"	200 Km
Sanitary and heating equipment	Sivas	"	580 Km
Enamelled sanitary ware	Istanbul	"	1650 Km
Waterheaters and boilers	Gaziantep		327 Km
Radiators	Ankara		~~1700~~ 386 Km
Cement	Gaziantep		327 Km
	Erzurum		538 Km
	Mardum		95 Km
Bim	Erzingan		
	Bitlis		316 Km
	Mus		405 Km
Sand and Gravel	Diyarbakir		-

3.2.11 Assessment of investment costs

As the present stage of preparatory technical assistance, without anything but a sketch of the basic housing unit and the components, with only "notes" regarding the layout of the factory and with limited and unconfirmed information regarding costs of materials and labour it is not possible to submit a relevant estimate of neither the initial investment, nor of the cost of fabrication, transport and construction.

However, some information has been collected during the mission and is listed in below, together with some general comments: (1 Turkish Lire (T.L.)= approx. 0.06 US$).

Aggregate for prefabrication of concrete components.

This should be properly washed and graded materials, preferably from river beds in the neighbourhood of the factory.

The cost will depend very much on the availability and the composition of riverbed materials and could range from 150 to 250 T.L. per M^3.

Aggregate for concrete foundation

This could (in some locations) be obtained from the excavated materials by means of "site-sieving", which is often carried out manually. The cost in this case in not known.

Cement. The ex. factory prices in the Ankara area is: bulk 390 T.L. per ton and bag 475 T.L. per ton. The delivery cost will of course depend on the distance between the cement factory and the prefab-factory but will probably be in the range from 50 to 75 T.L. per ton for transport.

Reinforcing steel bars. The ex. factory prices in the Ankara area is: for bars less 12 mm ϕ 5 000 T.L. per ton and for bars over 12 mm ϕ 4 500 T.L. per ton. (these prices seem to be very low and should be checked.) The cost of transport to the prefab-factory has a comparatively heavy influence on the delivered price and an allowance should also be made for straightening of the bars before cutting and bending.

An overall cost of say 7 000 T.L. per ton ready to use is likely to be a fair guess.

Other materials. Some information was obtained, but the prices are varying to such an extend that it is deemed better not to indicate any (misleading) information at this present stage.

Cost of labour. The official rates per hour ranges from unskilled labour 8 T.L. semiskilled 12 T.L. and skilled from 15 to 20 T.L.

However, on top of the official rates the labourers benefit from bonus systems etc., and for example in a factory for doors and windows in Ankara the total dayly earning varied from 200 to 350 T.L. per day.

Auxiliary materials. Gasoline 2.50 T.L. per liter. Diesel oil 1.90 T.L. per liter, fuel oil 1.65 T.L. per liter. Electricity 0.15 T.L. per KWh.

Conclusion: All prices for materials and labour should be carefully checked before they are used for estimates.

3.2.12. Alternative proposal in case of acquiring an existing system from outside.

The immediate question arises whether

a) to obtain an existing system available in different concepts world wide,

b) to develop a complete new system,

Both can be answered in a negative way. There are many systems known today. Some applied successfuly others not.

A system successful in one area, fails in another due to:

a) differences in the physical location such as: climatic difference with extreme temperatures and weather conditions,

b) geographical differences, infrastructure (socio -economical),

c) economical material selection, local and imported

d) socio-economical conditions (financing, government substitutions in financing and land provision).

Therefore, in acquiring an existing system, it is of the unconditional importance to evaluate to be acquired system in the light of the objectives and the adoptation. Thereof, the prevailing conditions of the region where such system is to be established..

Besides the existing successful applied prefabrication system are developed for the demand of housing and external appearance in the industrialized developed countries with middle and higher income levels for urban development, such as France, Germany, Denmark, Sweden, Japan, United States, etc. who are subject to less differential conditions than that of Turkey.

With the above kept in mind. it would be not recommended to acquire a system unless the system is throughly evaluated by competent, neutral, international experts in cooperation with local engineers and modified to suit the prevailing conditions in Turkey. Should we therefor, develop a system from scratch the development of a prefabrication system is a time consuming process with high inputs of applied technology, train work, costs etc. There is no reason to prevent the utilization of already internationally known concepts and the experience obtained with it.

3.2.13. Follow-up assistance

The Specialized United Nations Agencies with their technical assistance programmes will, if requested through the official government channels assist the Government in :

- the evaluation of internationally available concepts of prefabricated houses and building component industry,

- the selection in cooperation with local technicians of a system, which can be used and directly applied or modified for application to suit the different aspects of local prevailing conditions,

- the selection of location and the size of operation for a prefabrication component system suitable for different housing in types in Turkey,

- the establishment of a demonstration plant in the eastern or South-eastern part of Turkey which once established and in operating condition can be used as model for other regions in Turkey,

- the application of neutral "watch-dog" assistance in case, a system is acquired from foreign countries,

- the formation of a core of local technicians for the purpose of field activities for erection on site of houses composed out of factory produced components,

- the training of local supervisory personnel and unskilled and semi-skilled labour necessary to produce prefabricated houses.

For this purpose, a team consisting of

a) expert in prefabricated components of and prefabricated houses. Definition of the expertise required should be considered carefully,

b) expert in architectural design and

c) short term consultants

will be necessary to advise and assist the Covermment in the implementation and establishment of[a/] prefabricated housing industry as well as the research and development of building material technology. Starting in 1977 with a duration of 3 years in short tem and long term assistance the project is estimated on a cost of

i) expert's assistance	US$	230 400	- 96 m/m
ii) short term consultants	US$	40 000	
iii) miscelleneous	US$	15 000	
	Total US$	290.000 (approx)	

Government's input to be defined funding could be based on available IPF funds of the upcoming 2nd Country Programming, cost sharing and foreign voluntary contributions.

The Governments inputs are two fold in kind and in organizational provision. The Government will have to establish an organization which will have to be able to handle a housing supply system. For this case of 5 000 dwellings per year the following flow-chart for such an organization as a housing supply system will be of utmost importance to support the prefabrication of houses.

4.0. SUGGESTIONS

4.3. General

The terms of reference for this porject as preparatory technical assistance to the Ministry of Reconstruction and Resettlement are linked to other aspects, which are of importance to the planning and implementation of prefabricated housing. For example the present population in Turkey is estimated on 42 million of which 57,5% lives in rural areas.

With the present net growth rate at 2.7% (applied to the previous five years),an approximation is taken as 2.5% for 1980 to 2000. The population will be in

1980	46,400	(million) of which 47,9 will be rural
1990	59,4	(million) of which 37,1 will be rural
2000	32,2	(million) of which 32.2 will be rural

Whereby, the current net emigration from rural to urban areas is assumed to decline progressively, due to saturation factors of the high populated areas decline in rural population growth will normally cause decrease of the number of settlements, rather than decrease in population per settlement. The infrastructure for rural area must be based on hypotheses concerning the future of each rural settlement, based on its ability to grow or disappear.

On the above, we must drain the consequence that the proposed prefabrication plant should have two fold purpose

1) to provide the necessary components for disaster units or housing,

2) on the bases of the disaster design provide housing for resettlement and demand of the normal construction.

Rural housing development is one important facet of the rural development. Available statistics the total amount of rural dwellings stands at 4 million, with an occupancy rate of 6 persons per dwelling the requirements during the Five Year Period 1973 - 1977 for rural dwellings taking into account:

a) demographic growth,

b) renewal and resettlement

c) natural disasters

d) nomad housing requirement

are estimated to increase 900 000 dwellings or nearly 25%.

Since rural housing replacement by natural disaster resettlement, improvement of housing condition, require high capital investment, the national budget will be limited to release the necessary funds for such a programme. It is eminent that participation by the people is a necessity.

The Team's recommendations are to finance the basic fundamental dwelling in case of disaster and resettlement by the Government. For the improvements of the fundamental dwelling according to personal need. Long term loans based on self help principles could be provided for. In a case of expansion the same guide lines could be adopted.

It is apparent that the economical position of the rural inhabitants is very limited for the support of housing replacement, resettlement and improvement . Landless agricultural labour and unemployed labour cannot offer support for financing. It is therefore necessary that the housing programmes must go coinside with the development of the agricultural industry and region industries supporting the agro-industry.

4.2. Supporting aims for reconstruction and resettlement

1. Since the almost whole territory of Turkey is in the earthquake zones it is impossible to relocate villagers to such location that no effect of earthquake will endanger them.

2. Therefore our efforts should aim at relocation of settlements which have potential danger of land-slides falling rocks and cracks of the earth and rebuilding or reinforcing the houses strong enough against the quakes.

3. If possible it is desirable from the administrative point of view to relocate villagers who are living in scattered settlements in dangerous areas into concentrated resettlemnt areas during the reconstruction periods after immediate rescue activities have been completed.

4. However, such relocation usually make the villagers loose their sources of living. Therefore, it is not possible unless they are very well persuaded to do so with really attractive job or income opportunities.

5. In this respect the intension of the Government to establish house-building industry in the region basing prefabrication system is considered to be quite appropriate, because the establishment of such an industry can provide of both their houses and jobs for the villagers.

6. Therefore, in establishing such industries in the region, it must be fully taken into consideration that the employees of the factories and on the sites must be recruited as far as possible from among those villagers who have been or are to be relocated from their original settlements.

4.3. The Self-help housing

A widely used term of "self-help" housing construction is a process, whereby families are making efforts to provide themselves with low-income housing. Normally this method is supported by the state through construction advise and housing credits.

In this process there are different elements to consider:

i) a participation of the people working in the construction of their own houses and of their immediate in laws and friends. It means that they actually build their own homestead, save on expenses building their own home applying features and dimensions to their taste;

ii) the"self-help"construction must go coinside with the provision of technical and financial assistance by the Government;

iii) the Goverrment's assistance should provide a programme for self-help housing and advise families to participate with the necessary incentives as:

- procuring skilled labout and technical advise on the erection and improvements and the possibilities to expand the homes in accordance with their personnal needs;
- the government has to engage themselves in the establishment of a separate unit as a department of the Ministry of Reconstruction and Resettlement which will have the responsibility to organize a housing supply organization which outline in the recommendations in this report;

- the Government will have to provide the financing through a inexistent or to be established state housing financial assistance bopy, who advises, approves loan applications for housing and will be the underwriter and guarantee for housing loans and will provide special financial incetives for the "self help" housing construction in long term loans.

Experience in a number countries has a shown that programmes of "self help" housing that a certain number of participants in such a programme and in particular out of the agricultural sector become semi-skilled and skilled workers and contractors in the construction field. It accelerates by the involvement of engagements in new aptitudes through becoming a trainee for even more skilled construction work.

There Government's assistance in training on the spot, if so motivated, could be an instrument for preliminary trainif of self help families in the construction of their j homes and for more advanced job training at a state construction of prefabrication industry showing construction attitudes and more advnaced construction erection and construction principles. It appears, in fact, that if such aptitudes were implemented in the different regions, a humerous amount of jobless would be finding employment and a dent could be made in the shortage of construction technicains and artisans by on the job training on self help housing projects in Turkey.

If needed training advisers from UNIDO and ILO could work on inter-agency project could be envisaged. In addition health, mother-care, welfare home economics and adult education and vocational training could be by WHO, FAO and UNICEF, UNESCO. The drastic needs for such assistance for the Eastern Part of Turkey would enable the Government to replace "depency" from the Government onto "self reliance" which would result into a firm industrialization of Eastern Turkey.

5.0. ACKNOWLEDGEMENT

During the preparatory assistance and the subsequent discussions, we were grateful for the excellent level of co-operation we received. In particular, we are most indebted to Mr. M. Gündüz and Mr. M. Denirr of the Ministry of Reconstruction and Resettlement who provided a great deal of assistance and understanding during our mission.

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Z.O. MISSION PROGRAMME

PROJECT TURKEY DP/TUR/76/001. PREPARATORY ASSISTANCE TO THE MINISTRY OF RECONSTRUCTION AND RESETTLEMENT

Description of activities	August 1976 (S=Sunday)																													September 1976												
	12	11	12	13	14	S 15	16	17	18	19	20	S 21	22	23	24	25	26	S 27	28	29	30	31	1	2	3	4	S 5	6	7	8	9	10	11	12
1. Starting and finishing of project.																																			
2. Consultations with the different Ministries.																																			
3. Field studies and activities																																			
4. General at UNDP Offices.																																			
5. Draft Report.																																			
6. Briefing of incoming Team members																																			

Mission Team

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3. Yujiro Kaneko, UN Centre for Housing, Expert, ARchitect, Tokyo, Japan

8.1. ANNEX

United Nations Development Programme

Project of the Government of Turkey

Preparatory Assistance Document

Title : Preparatory Assistance to the Ministry of Reconstruction and Resettlement

Proposed starting date of Preparatory assistance : 10/8/76

Number : DP/Turkey/76/001

Duration of the preparatory Assistance : 1 (one) month

Sectors : (Govern. class)

UNDP classification and code : Industry 35

Subsectors : (Govern. classification)

(UNDP Class and Code) Establishment of Industries (3520)

Government Implementing Agency : The Ministry of Reconstruction and Resettlement

Executing Agency : United Nations Industrial Development Organisation

Estimated starting date : July 1976

Government input : TL (in kind) UNDP inputs : US$ 10.900

Signed :

Approved : ..... Date : .....

On behalf of the United Nations Development Programme

Resident Representative

PART II. The Project

PART II. A. Development objectives

1. To assist the Turkish Government through the Ministry of Reconstruction and Resettlement on preparing the plans for establishing a pre fabricated housing industry in the earthquake prone area of Diyarbakir which is among the development objectives in the Country Programme.

2. To assist the Government in the establishment of industry in the underemployed Eastern area of Turkey through the establishment of a prefabricating housing industry, producing prefabricated houses, with a capacity of 5000 dwellings per year of different types in accordance of prevailing local conditions in the region.

3. The purpose of the project is two fold :

- to produce prefabricated elements for social housing in rural areas of the region
- and for emergency reconstruction programmes in case of disasters in Turkey or neighbouring countries

PART II. Immediate Objectives

The prime objective of this project is to suggest on the aspects for the prefabrications housing plants with a capacity of 5000 dwellings per year, low or high size in accordance of prevailing localconditions and the and the existing social structure in Eastern Turkey.

The objectives are :

1. To advise on the optimum systems of prefabrications in accordance with extreme climatic differences, and built in earthquake resistance

2. To advise on the production and erection of emergency units with a successions of construcjtions equipment which due to the location will have to selected in accordance with the prevailing infrastructure

3. To advise on the production of a skeleton basic emergency unit to give immediate shelter in emergencies, which through self help methods can be improved, enlarged and serve the local needs of the inhabitants in the Eastern Region of Turkey.

4. To advise on the raw materials, available locally and in the region, to produce prefabricated components with a minimum of transport to the prefabrication plants.

5. To suggest the location for the establishment of prefabrication plants in accordance with the economic viability and economic feasibility.

6. To advise on the size of the prefabrication plants as well as the equipment selection using optimum labor intensivity.

7. To access of economic investment and unit cost and suggest on the overall financing

8. To suggest and propose further assistance to be rendered in the planning, implementation and establishment of the prefabrication industry with providing the necessary on the spot training of unskilled labor and technicians.

PART II C. Special considerations

Considerations are given to achieve the :

1.

a) decentralization of the metropolitan area population and centralisation of industry in rural areas

b) improvement and upgrading of the rural social structure.

c) upgrade the environmental and health conditions in rural areas

d) minimize the loss of human life by natural desasters and conservation of human settlement which by natural disasters is destroyed

e) promote through the obtained experience technical cooperation among developing countries where equal conditions exist, to minimize the world wide hazzard of natural catastrophes

f) exchange of technical know how and appropriate technology to protect and prevent the global earthquake areas from destruction of human life and property

2. The results of the project will indentify the Government goals to establish prefabrication plants in other areas of the country, whereby the objectives of this project can be used as basic terms of reference.

PART II D. Background and Justification

The Lice region in the Eastern part of Turkey has recently suffered from a severe earthquake and was declared disaster area. The Turkish Government took energetic steps in order to overcome the consequence of the natural catastrophe.

The reconstruction of the destroyed houses in the disaster area was made to a large extend with prefabricated houses provided by several countries.

UNDP / UNIDO has now been requested to assist the Ministry of Reconstruction and Resettlement in reviewing the possibilities for establishing components in Diyarbakir , eastern Turkey. The possible factory(ies) to be established near the earthquake belt will be aimed at providing technically adequate housing for this disaster area with severe climatic conditions and will constribute in reducing under employment in this region.

PART XI E. Outputs

The establishment of a prefabrication component industry capable of producing a minimum of 5000 core disaster units per year, with built in self help improvement methods, once used, to provide immediate shelters in case of earthquakes or other natural catastrophes.

The provision of the system for storage over long period of time without deteriorating effects of the components by longer storage in extreme climatic conditions. The provision of erection procedures and methods of transfert to disasters areas.

The provision of erection equipment in accordance with the prevailing infrastructure.

To provide through the use of labor intensive production systems the outlines for training of unskilled labor and technicians.

PART II F. The project staff composed out of

a team leader with experience in the production of building materials, an expert with experience in the production of prefabrication components, an expert with experience in architecture will through the evaluation of the local conditions, availability of raw materials and prevailing local housing structures suggest and outline the system for prefabrication and erection of adisasters core units, which can provide :

(i) Immediate skeltos after the occurrence of a natural catastrophe

(ii) By the use of self help improvements will serve as adequate housing in accordance with the prevailing social structure of the desaster area

(iii) Provision for expension with the addition of the help of desaster unit in accordance with the needs of the inhabitants

(iv) Result in permanent living quarters to satisfy the social environment in the area

PART II C. Inputs

1. Assignment of International Staff	Location	Starting Date	Durantion
a) Team Leador as a UNIDO Staff Member will assist and supervise the project activities and have experience in the production of building materials and raw material selection	Ankara	Aug. 76	4 months
b) An expert with experience in the production of prefabrication components and prefabrication systems	Ankara	Aug. 76	1 month
c) An expert with experience in the planning and erection of prefabricated houses and architectural design of housing schemes and planning of resettlement	Ankara	Aug. 76	1 month

PART II H. Preparation of Work Plan

A detailed workplan for the implementation of the project will be prepared by the Team leader assigned to the project, in aconsultation with the international staff and the Government's assigned counterpart.

This will be done in location at the start of project in consultation with the Government's authorities and the Res. Repr. of UNDP, reviewed and brought forward periodically, in order to implement adequately the objectives of the project.

The Work Plan consist of :

- Consultation with the local Governmental authorities
- Visits to the in existence prefabrication industry
- Field visit to review the in existing prefabricated housing schemes
- Orientation field visits to the area where the prefabrication industry should be established and assessment of local conditions for the selection of housing types.
- Consultations with local institutions for collection of desired data for the selection of prefabrication schemes in accordance with the prevailing local and social conditions.

PART II I Preparation of the framework for effective participation of national and International Staff in the project

The activities necessary to produce the indicated outputs and achieve the project's immediate objectives will be carried out jointly by national and international staff assigned to it.

The respective roles of the national and international staff will be determined by their leaders, by mutual discussions and agreement, at the beginning of the project, and set out in a Framework for effective participation of National and International staff of the Project.

The framework will be determined on the spot and reversed from time to time. The respective roles of the national and international staff shall be in accordance with the established concept and specific purposes of technical cooperation.

PART II K. Institutional Framework

The Government cooperating agency will be the Ministry for Reconstruction and Resettlement and their different sub-directorates established in Ankara and Diyarbakir.

The Ministry of Reconstruction and Resettlement is keen on implementing the Government policy of bridging the gaps among the different regions of Turkey affected by natural desasters, through the provision of desaster housing by the use of prefabrication components produced in underemployed regions in Turkey.

For this purpose the Ministry established the policy to provide 5000 desaster core units per year, to be produced in the herefore to be established prefabrication components industry, which are as designed to provide the possibility to replace the losses of houses by permanent housing by the use of "self help" improvement.

It will also aim to provide employment and industrialization to aid in becomming self sufficient on the different rural regions of Turkey.

PART II L. Prior Obligations and Prerequisites

(a)	The Government will provide the necessary counterpart and if necessary a foreign language translator to its key professional staff	Ankara and within the country	Aug. 76
(b)	The Government will p rovide the necessary transportation to the International staff and the necessary assistance to fullfil the immediate objectives of the project	Ankara and within the country	Aug. 76
(c)	The Government will provide all necessary data, documents, as well as reports on former duties relevant to the implementation of the project and will arrange the necessary contacts for consultations on the different aspects of the immediate objectives with the different ministers of if so required	Ankara and within the country	Aug. 76

PART II M. Future UNDP assistance

The need for further UN assistance after the termination of the proposed project will defined whether additional inputs and follow-up assistance will be requested to augment the resources than available for performing specific tasks.

PART III C. Progress and Terminal reports

Before the finalization of the project activities a terminal report will be drafted by the team of experts at UNIDO Headquarters in Vienna. The final report after formal editing will be issued within the reasonable time to the office of UNDP AnkarA and after found in order submitted to the Government.

The final Report should be submitted not later than November 1976.

PART IV. Budgets

Projects Budget Covering UNDP Contribution

Country : TURKEY

Project No : DP/TUR/76/001

Project Title : Preparatory assistance to the Ministry of Reconstruction and Resettlement

10. Project Personnel Component	Total		1976	
	m/m	$	m/m	$
11. Experts				
11.01 Team-leadder UNIDO Staff	1	1.300	1	1.300
11.02 Prefabrication expect	1	4.800	1	4.800
11.03 Architect and Construction Expert	1	4.800	1.	4.800
Compcnent Total	3	10.900	3	10.900
Total UNDP Contribution		10.900		10.900

Project Budget Covering Government

Country : TURKEY

Project No : DP/TUR/76/001

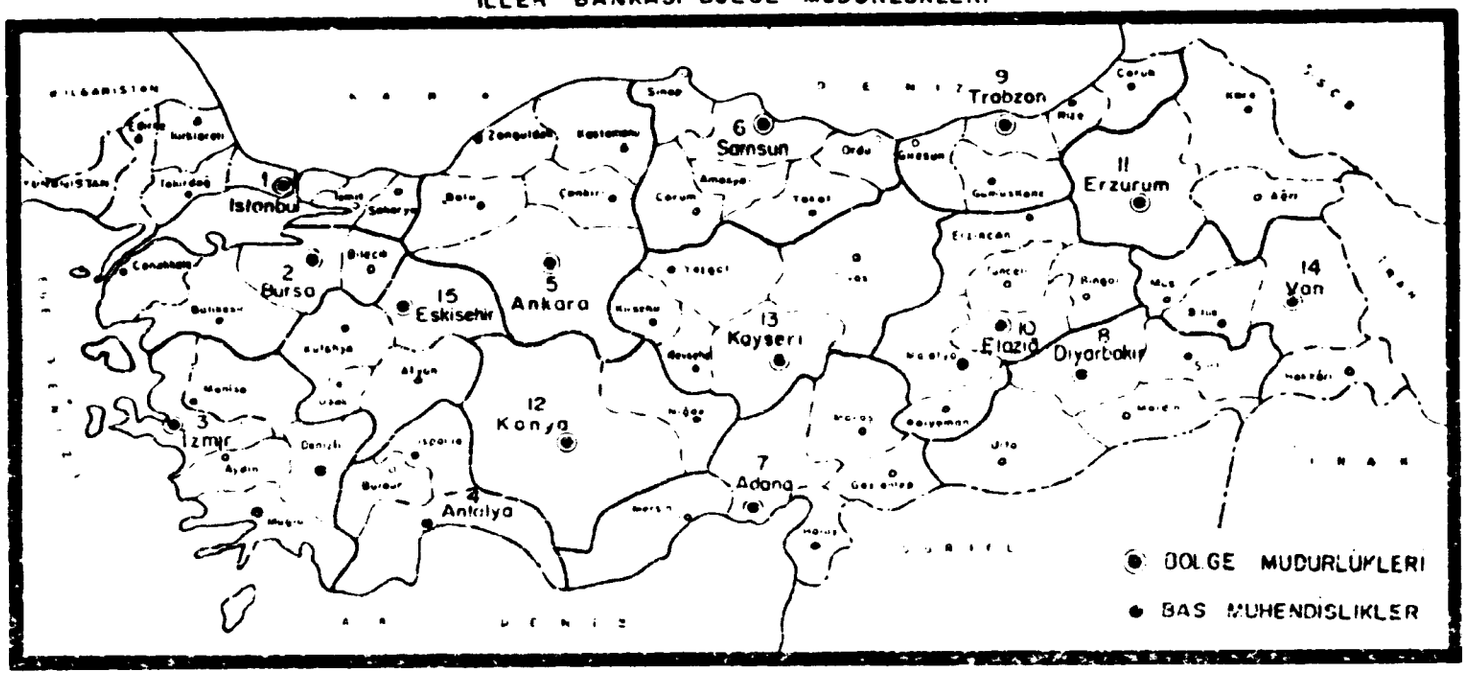
Title : Industrial Development Programme

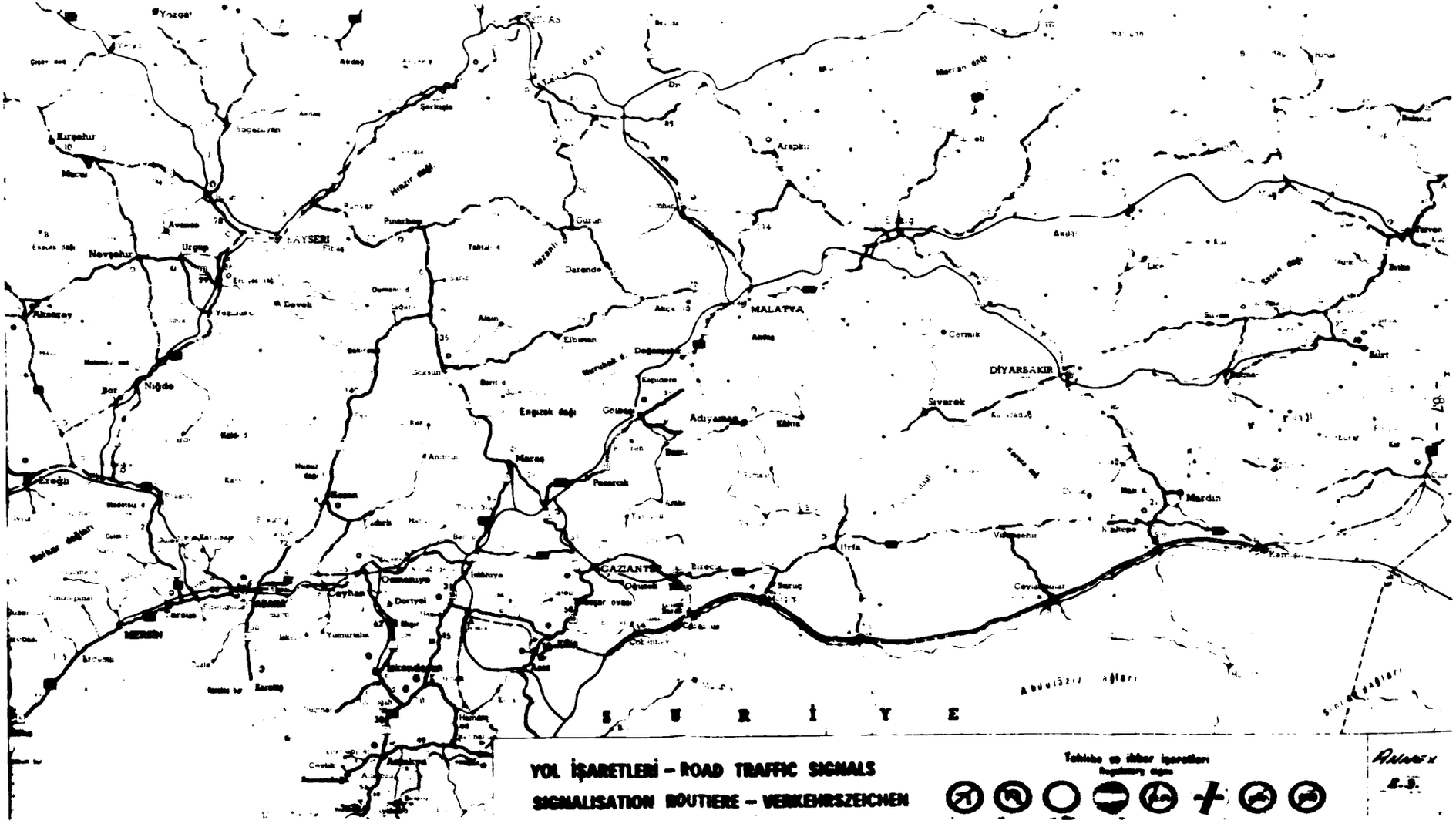
		Total	Counterpart contribution in kind (in local currency) 1000		1976	
		m/m	TL	m/m	TL
10	Project Personnel				
11	Construction Engineer	1		1	
	Component Total	1		1	
50	Miscellaneous				
	Travel and Transportation				
51	Transportation by car and driver				
52	Air travel expenses				
	Component total				
	GRAND TOTAL				

Ek : 3

ANNEX 8.2.

İLLER BANKASI BÖLGE MÜDÜRLÜKLERİ



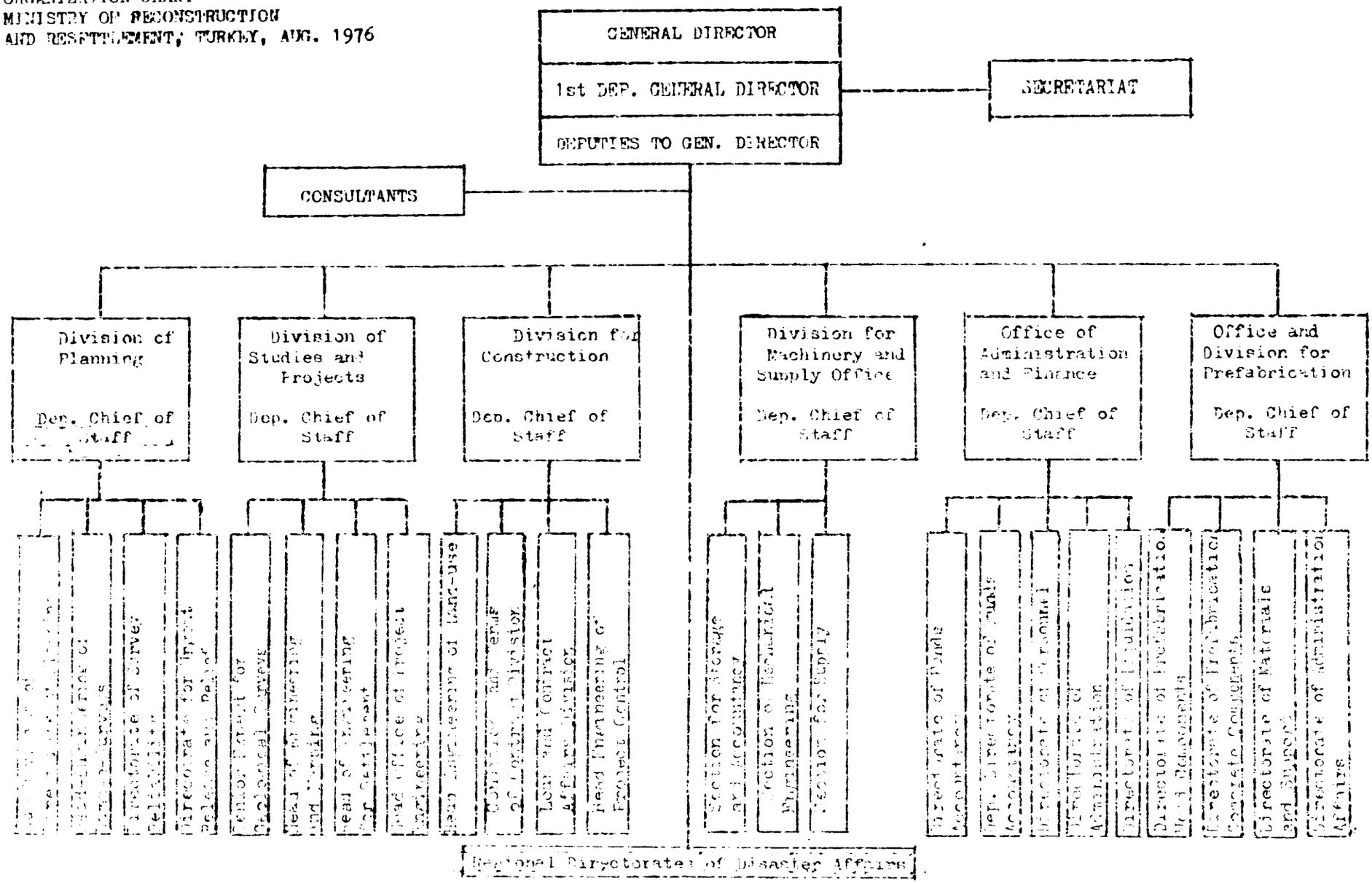


YOL İŞARETLERİ – ROAD TRAFFIC SIGNALS
SIGNALISATION ROUTIERE – VERKEHRSZEICHEN

Tehlike ve ihtar işaretleri
Regulatory signs

ANNEX 8. 4.

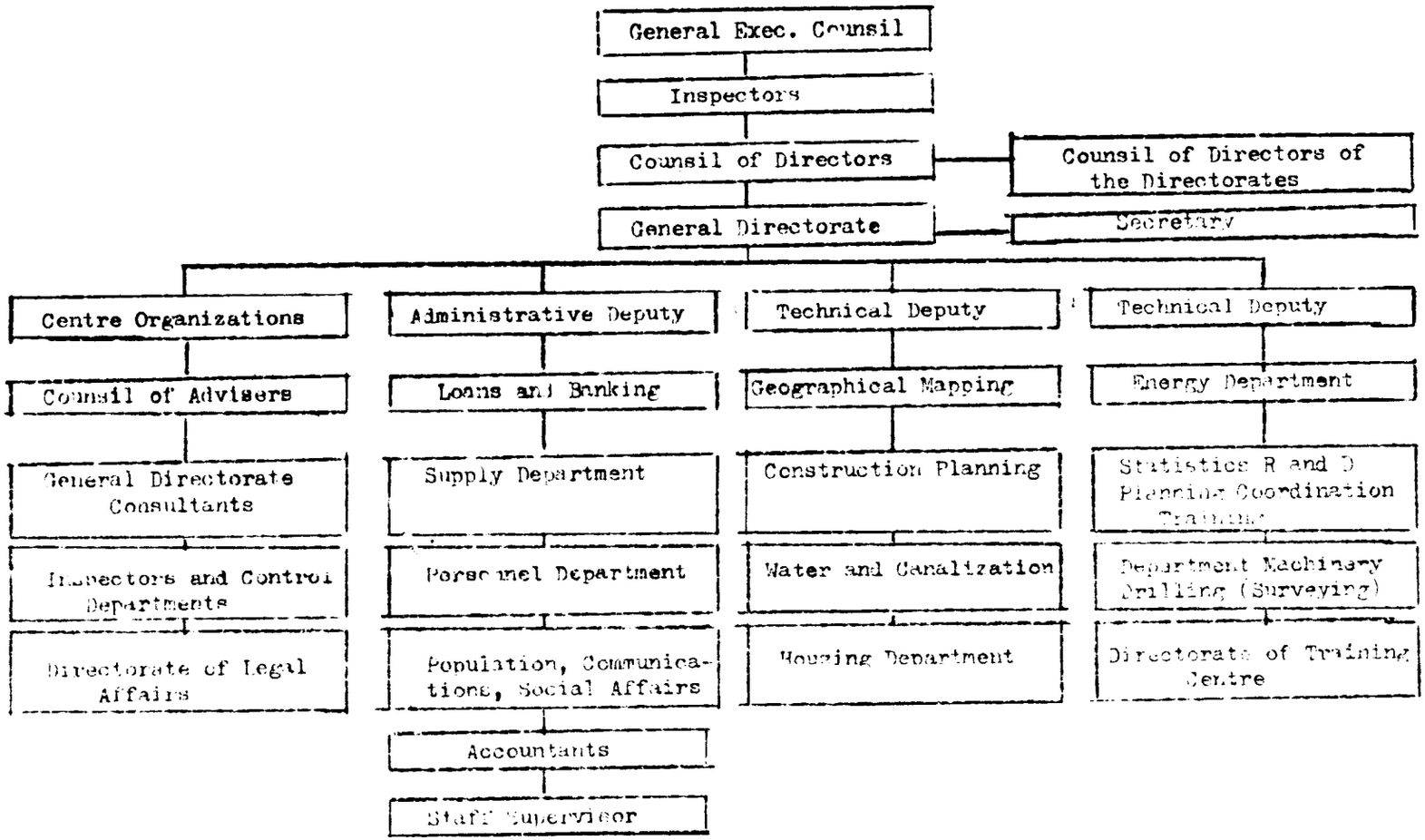
ORGANIZATION CHART
MINISTRY OF RECONSTRUCTION
AND RESETTLEMENT, TURKEY, AUG. 1976



ANNEX 8.5.

Annex 8.8.

ORGANIZATION CHART OF THE GENERAL DIRECTORATE OF THE CITY BANK



REGIONAL DIRECTORATES IN:

Istanbul
Bursa
Izmir
Anfacya
Ankara
Samsum
Diyabakir
Trabzon
Elazig
Erzurum
Konya
Kayseri
Van
Eskisehir

ANNEX 5. 6.

COSTS OF MATERIALS AND LABOUR

[redacted]

SOURCE OF INFORMATION _____

POS	material	unit	price	remarks
1	cement (silo) ex. factory	ton		
	cement (bag) — " —	ton		
2	steel less than 12 mm ø	ton		
	steel more than 12 mm ø	ton		
3	sand	m3		
4	gravel	m3		
5	timber	m3		
6	block work 1o cm	m2		
	" " 15 cm	m2		
	" " 2o cm	m2		
	" " 3o cm	m2		
7	transport sand and gravel	m3		
	" steel	ton		
	" cement	ton		
8	roofing and insulation	m2		
9	flooring tiles	m2		
1o	wall tiles	m2		
11	terazzo	m2		
12	painting oil paint	m2		
	" dispersion	m2		
	wall paper	m2		
13	aluminium window	m2		
	steel window	m2		
	wooden window	m2		
14	aluminium door	m2		
	steel door	m2		
	wooden door	m2		

COSTS OF MATERIALS AND LABOUR

POS	MATERIAL	unit	price	remarks
15	electricity point	1 pc.	_____	
16	electric cooker	1 pc.	_____	
17	rinsing washboard	1 pc.	_____	
18	shower bath	1 pc.	_____	
19	WC incl. flash tank	1 pc.	_____	
20	washing stand (single bowl)	1 pc.	_____	
21	wash-hand-stand	1 pc.	_____	
22	banister	run. m	_____	
23				
24				
25				
26				
27				
28				
29				
30	prefab. wire mesh for reinforcement:			

PAYMENT			AVAILABILITY *)
1	unskilled worker	1 hour	_____
2	concretor	"	_____
3	steel worker	"	_____
4	erector	"	_____
5	carpenter	"	_____
6	mason	"	_____
7	plasterer	"	_____
8	painter	"	_____
9	electrician	"	_____
10	plumber	"	_____
11	mechanic	"	_____
12	certified welder	"	_____
13	truck driver	"	_____
14	heavy equipment operator	"	_____
15	foreman	1 month	_____
16	draftsman	"	_____
17	junior engineer	"	_____
18	senior engineer	"	_____
20	typist	"	_____
21			_____

*)availability code: A= no problem. B= difficult. C= could be imported from neighbour countries. D= have to be imported from Europe

COSTS OF MATERIALS AND LABOUR

Payroll charges, and other contributions related to wages. (and salaries)

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

Overtime? _____

To other charges? (profit sharing?) _____

working hours per week _____

working days per year _____

holidays for labour _____

holidays for staff _____

Estimate of efficiency of local labour compared with European labour: %

To which extent is it possible to obtain working permits for:

1 skilled labour from neighbour countries:

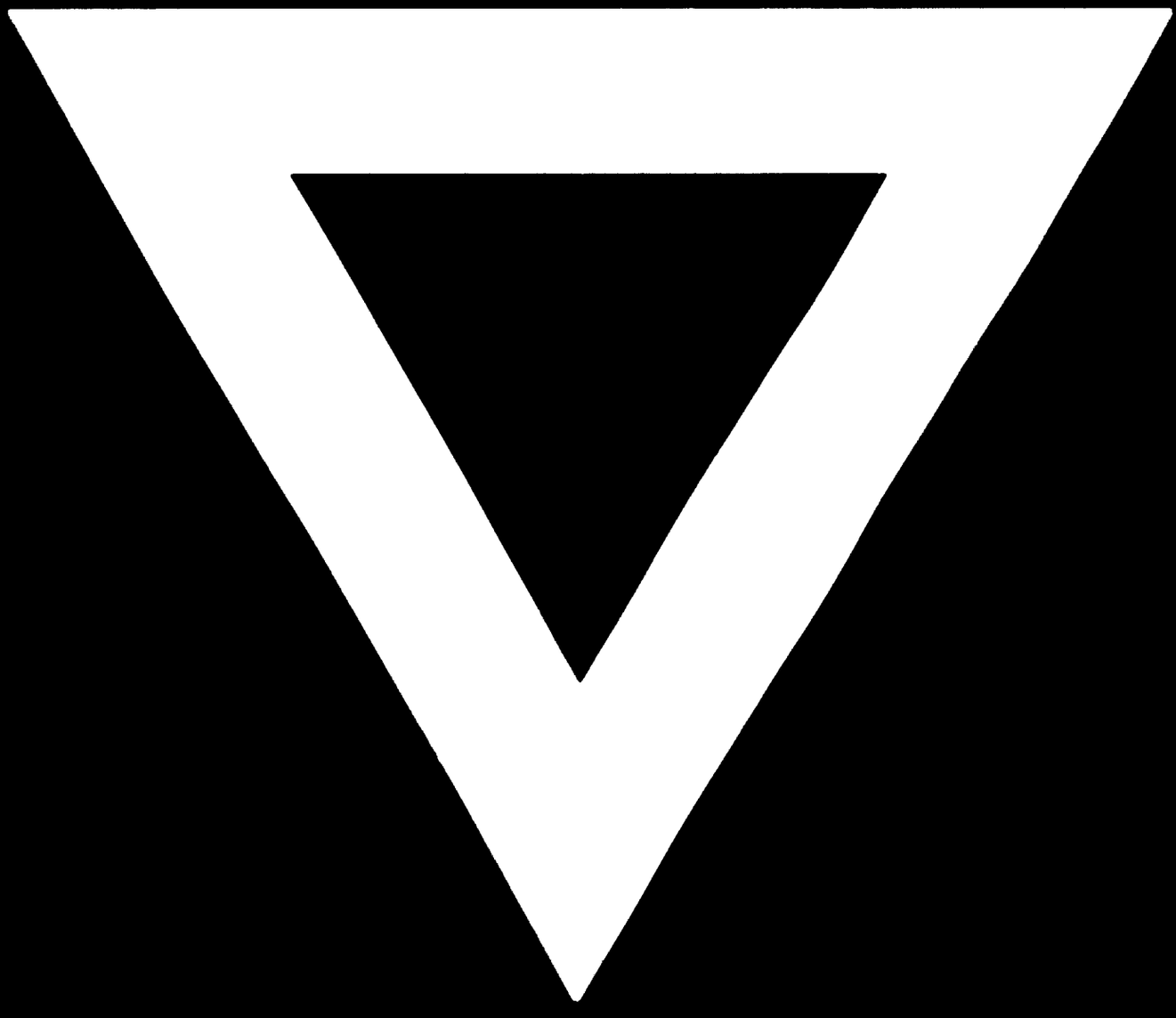
2 skilled labour from european countries :

To which extent is a contractor (building) obliged to provide transport for the workers?

To which extent is a factory obliged to provide transport for the workers?

Rules for import and re-export of special contractor's equipment?

C-370



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