

LAYOUT OF A CAMP FOR A  
CONSTRUCTIONAL COMPANY

AT JEDDAH WITH ARCHITECTURAL  
DESIGN OF CERTAIN UNITS

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FOR  
A CONSTRUCTION COMPANY AT JEDDAH  
WITH  
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BY  
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## INTRODUCTION

### Saudi Arabia

The importance of Saudi Arabia has always been appreciated not only by the Arabs but by all the Moslems of the world.

To the Arabs, it has been regarded as the mother land from which they spread out over all the Arab countries.

From the Islamic viewpoint that country is the "Holy Land" to which every capable Moslem should come, at a definite time of the year, for pilgrimage; at least once in a life time.

Up to a few years ago, pilgrimage was the only economical revenue of the country. That small income was hardly sufficient to meet the very preliminary necessities of the people. The country was thus referred to as "The Empty Deserets".

Scientists, however, have always thought of possible resources of large economical advantages in that country. These resources are found partly in the eastern part of Arabia which is normally known to geologists as sedimentary formations which under certain conditions become an ideal home for oil and coal deposits; and partly in the western area which consists of igneous and metamorphic formations favorable to metallic ores.

In 1932, contracts were signed and missions were sent to the deserts for these purposes. Few amounts of gold were found in "Mahd-El-Dahab"; but huge fields of petroleum were discovered in "Al-Hassa" region.

Petroleum discovery was a turning point in Arabia. Its results could be seen everywhere and in any respect. From the engineering stand point, two of them will be mentioned.

1 - Oil is a fruitful economical resource by which the government can execute all the projects already thought of as imaginary.

2 - For the first time, foreigners, especially Americans, got an access to Arabia and established some of the biggest companies in the world. Some were in charge of the oil itself such as Aramco and Tapline, others were in charge of something else such as Bechtel and Bethenki.

### Jeddah

Jeddah is a small city on the eastern shore of the Red Sea. It is only 73 kilometers from Mecca and that is what makes it the natural harbor of all Arabia.

Moreover, so many factors combine to make of it an important part of the country which has always received a considerable amount of care by the government.

The population of Jeddah is only 30,000, but this number is increasing quickly and irregularly due to imigrants who find, at the present time, good opportunities to get jobs in the being <sup>x</sup> <sup>a</sup> ~~executed~~ Jeddah projects.

### The Foreign Companies

Having no engineers and men of technical knowledge in the country, suggests the idea of allowing foreign companies to take care of the numerous projects of which the country is in need.

International Bechtel Incorporation has entered into a contract with the government to take a large part of these projects. Such an incorporation may be taken as the one for which the camp is to be provided.

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## CHOICE AND OUTLINE OF THE PROBLEM

Anyone who has had the chance of visiting Jeddah realizes, without hard thinking, that Bechtel, as well as any foreign company in that city, is in a great need of a large camp to replace the scattered houses and offices it is occupying now.

The present situation is totally inadequate not only for the companies but also for the city and the inhabitants.

Jeddah, as it has been said, is a small city and is not able to provide all the necessary buildings for the companies. Besides, it is really unfair, to say the least, that a company which comes for the prosperity of the city should create a housing shortage in the same city.

Furthermore, the few modern existing buildings are occupied by the government offices. All the other buildings are old, earthy and very often unsanitary. Such buildings, even if available, will by no means meet the requirements of the companies.

The construction of a camp is, therefore, a vital necessity and it is quite logical that a company should construct something for itself before it comes to be able to construct something for the others.

Such a camp will contain all the requirements of providing a good living to the employees and adequate offices and workshops for the company.

Moreover, the camp will increase the number of modern buildings in Jeddah and contribute in its future development.



When the company is gone, the camp may be turned into government use for many purposes.

It may seem reasonable to ask "How long will the company have to stay in Jeddah so that the construction of such a camp will be justified?". The contracts of the existing companies show no indications to the length of the periods of their presence in Jeddah. At any rate, should a company stay less than 25 years, the construction of such a camp for it would not be economical.

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## FACTORS AFFECTING THE PROBLEM

The general requirements of the camp cannot be determined before taking into consideration some important factors which have great effects on the problem, namely,

- 1 - Classification and number of employees
- 2 - Climate
- 3 - Site
- 4 - Soil
- 5 - Building stones

Classification and Number of Employees.

Among the essential requirements of every townplanning or architectural problem, is a thorough study of the number of people involved, their standards of living, habits and traditions. In this problem, where many kinds of people, different in almost every respect of living, are involved, this study becomes more important and cannot be overstressed.

## (a) Classification of Employees,

For the mere sake of simplicity and to put the solution into a systematic order, the following classification is made. It has never been the purpose of which, and should never be misunderstood as, dividing the people into different social classes, as these terms imply in sociology books

Class 1, includes the executives.

Class 2, includes the professional and administrative staff.

Class 3, includes the Junior administrative staff and technicians

Class 4, includes the artisans.

Class 5, includes the laborers, locally known as "Coolies".

To these classes, the nurses and teachers may be added as a special class.

In general, the employees included in the first three classes are Europeans and Americans. Those included in the fourth one come from the different Arab countries. They have<sup>a</sup> social life similar, to some extent, to that of the fifth class employees who are excludingly Saudi Arabians.

The different social habits as affecting the design will be mentioned at the points where their effects are being considered

(b) Number of Employees

	<u>Married</u>	<u>Single</u>
Class 1	15	-
Class 2	50	30
Class 3	150	120
Class 4	150	400
Class 5	-	1700
Nurses and Teachers		10
	<hr/>	<hr/>
	365	2260

Considering each family as composed of four persons, the total number of the people living in the camp will amount to 3270 persons.

The above figures are approximate maxima. Consequently, the camp will not have to be given the chance of great future development.

The fact that all the fifth class employees are listed as bachelors needs a little explanation. The wage of an employee in this class does not usually exceed 4 Rials (L.L. 3.5) The company

is thus obliged not to provide a complete family house for him, even if he is married. Therefore, only bachelors, or married employees who can afford to live away from their families, are given the chance to have lodging in the camp. Such an arrangement has successfully been practiced in Dhahran Camp of the Arab American Oil Co.

### Climate,

As it is expected in localities of  $21^{\circ}$  latitude and  $0^{\circ}$  altitude, the climate of Jeddah must be ~~hot~~ and humid. Jeddah, however, is the coolest place of the same altitude and latitude in Arabia.

"In 1946 a maximum temperature of  $41^{\circ}\text{C}$  and a minimum of  $9^{\circ}\text{C}$  were registered (4)". This is due to the northern and western winds, locally known as "Bahri and Shami", which blow continuously, day and night, and mostly as cooling breezes. These are the prevailing winds which make the summer bearable and the winter delightful. When the wind turns southerly, heat, humidity and sandstorms are likely.

Relative humidity is usually over 80, which accompanying such degrees of temperature, creates a mist which may sometimes be similar to a Turkish bath.

"From October to May is the "Rainy Season". Rains occasionally appear as showers and do not exceed few inches in one year (1)".

### Site

"As the site may be a very real factor in determining the important phases of the design, it should receive the most careful analysis. The peculiarities of a site are matters of location, physical conditions and size of grounds (2)"

The location of the camp is chosen in an immense area, two kilometers to the north of the city.

As the new city plan of Jeddah does not interfere with this spot, the relation of the site to places of business in Jeddah will have to be accomplished afterwards. In other words, in this case, this relation does not govern the location but it is govern<sup>ed</sup> by it.

The topography of the land is so flat as to be far from being a governing factor in the design.

"The amount of land available for a given project will very materially determine its character. If the land be plentiful and cheap there will be no necessity and no justification for intensity of development (2)"

The land in Jeddah is quite cheap. The square meter in residential quarter is sold for 3 Rials (L.L. 2.75). Most probably, the land for the camp, will not be paid for by the company. Consequently, from the viewpoint of land value or the land area, the designer is not restricted.

### Soil

"The western area, extending from the Red Sea eastward to the points of contact with sedimentaries, is composed largely of igneous and volcanic rocks many of which have undergone a great transformation - that is, have been metamorphosed. (1)"

That is what the geologists say about that area. In fact there has been a careful study of Arabia geology but no scientific and adequate investigation of the nature of soil for construction purposes has ever been made in Jeddah. The designers usually rely on their personal

experiences.

As a result of a very primitive study made by the writer, the following may be said about Jeddah soil.

Hard soil of reliable bearing power is not to be expected shallower than two or three meters deep into the ground. At such a depth the strata may be considered satisfactory for building purposes, (2 to 3 tons per sq. ft.)

In the writer's opinion, in order to be on the safe side, more than 2 - storey buildings should not be built in Jeddah. If foundations on dry earth are designed, it is not advisable to get them built very deep into the soil because the ground water table is not usually far enough and the underlying strata may not be thick enough to support the structure.

These reasons, beside the cheapness of land, suggest the idea of making all the buildings of the camp of one storey.

#### Building Stones.

Two kinds of building stones are used in Jeddah.

The first one, called "Bahri Stone" is a kind of limestone. It is dirty white of earthy appearance; it is soft and workable but its bearing power is not great. The appearance of a wall built of Bahri stones is satisfactory to have it shown without being plastered.

The second kind is, most probably, a kind of igneous rocks. It is bluish brown, very hard, strong and unworkable.

Beside these two kinds, ordinary brick is also used. It has the advantage# of being a bad conductor of heat, beside its good

appearance and ease of construction.

For these reasons, the writer considers bricks as the most desirable material for the camp buildings.

If the company establishes a kiln for brick production, this kind of construction will prove to be the most economical one. Moreover, the bricks produced will be used in the other constructions made by the company.

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REQUIREMENTS OF THE CAMP

1 - HOUSING

A) Family Quarters

- a - 1st class housing.
- b - 2nd class housing.
- c - 3rd class housing.
- d - 4th class housing.
- e - Nurses and teachers house.

B) Bachelors Quarters

1 - Lodging

- a - 2nd and 3rd class lodging.
- b - 4th class lodging.
- c - 5th class lodging.

2 - Restaurants

- a - 2nd class restaurant.
- b - 3rd class restaurant.
- c - 3th class restaurant.
- d - 5th class restaurant.

2 - WORKSHOPS

A) Motor Transport And Workshops

- a - Car parking.
- b - Garage shop.
- c - Carpenter shop.
- d - Painting and upholstery shop.
- e - Service station.



B) Engineering Workshop,

- a - Electrical shop.
- b - Blacksmith shop.
- c - Carpenter shop.

3 - OFFICES

A) Administration Office

B) Engineering Office

4 - CENTRAL STORES

5 - POWER HOUSE & ANNEXES

A) Power House

B) Pumping Station

C) Boiler House

D) Elevated Tank

E) Ground Storage Tank

F) Laundry House

6 - HOSPITAL

7 - SERVICE BUILDING (CANTEEN)

8 - SCHOOL

9 - ENTERTAINMENTS

A) Clubs

- a - 1st, 2nd & 3rd Class Club.
- b - 4th & 5th Class Club.

B) Cinema

C) Athletic Fields .

a - Tennis fields.

b - Baseball field.

c - Football fields.

d - Basketball fields.

e - Volleyball fields.

D) Small Parks

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## LAYOUT OF THE CAMP

"One of the first things that arrests the attention of the designer is to see that things that go to make up the scheme of the subdivision in general are located to the best advantage in relation to one another (2)"

Here, the general arrangement of the layout is planned to be made of two sectors of a hexagon with two strips parallel to the external sides.

The hexagonal arrangement of subdivisions, which is recommended by Mr. Naulan Couchan of Ottawa, "among other things, provides good orientation (2)". Such a factor is considered of prime importance in a problem like that of a camp and in a climate like that of Jeddah. As will be explained in the following paragraphs, it has been regarded as the governing factor in the design.

Residential Quarters

The upper half of the northern part, the western and the north western parts of the area are devoted to the residential buildings.

Such locations will give these buildings the opportunities of receiving the greatest share of the delightful western and northern Jeddah breezes. Without such breezes life in Jeddah would be suffocating and "in warm weather the provision of cool air to the rooms is especially important (3)"

On the other hand, "remoteness of the residential quarters from the business section has its advantages in affording a change of

environment for workers of all kinds and freedom of the houses from the smoke of the factories as well as from other nuisance from incidents to any of the factories (2)". By this orientation the smoke of the workshops will be carried away from the camp by the winds.

The disposition of the different classes of housing is carried in accordance with these two conditions, namely, reception of wind and remoteness from workshops. The first class houses, for instance, are located in the extreme end of the north western side of the camp. Consequently, they are subjected to both breezes and located to the far end from the workshops.

The idea of dividing the area among the different classes of houses is evident from the principles of Zoning in modern townplanning. Beside the beauty of the quarters, the psychological inferiority feelings, which are created by locating luxurious villas in the same neighborhood of that of humble houses, are totally eliminated.

Privacy is favorable to every normal person but it should not be much stressed in such camps. It is given some weight in the design by the proper separation of classes.

The separation between families and bachelors quarters, although not well identified in some places, has been endeavored for as much as possible.

The greatest weight is given to the complete separation between the first, second and third classes on one side, and the fourth and fifth classes on the other side. This is due to the totally different ways of living between these two groups, as has already been explained.

Beside the wide north western radial street, this separation is performed by placing small gardens, hospital, school etc., in between the two divisions.

In most of the residential quarters, the buildings are located to the edges of the lots, making room to athletic fields or vegetation in the middle. In the map, only athletic fields are shown, leaving the arrangement of small gardens, if possible, or other things to the inhabitants who may find in it an interest to spend some of their spare time.

The last point to be explained is that the fourth class families quarter may look, at the first glance, to be overcrowded. However, a further study of the architectural design of these units will take care of eliminating this illusion. The compound of each of these houses is around 5 m. long which, together with the 10 m between each two buildings, will make a distance of 15 m between two consecutive rows of rooms. To the buildings which are 4.25 m high, such a distance <sup>is</sup> more than adequate.

#### Public Buildings,

"Because of their significance, public buildings demand that adequate provision be made for them in the city plan. Such adequate provision is determined by the city planner taking cognizance of the usefulness and beauty of the buildings themselves and their relation to the plan of the city at large. (2)"

Here, the public buildings are generally located in the lower half of the northern part of the camp, midway between the workshops and the houses.

The office is the only building fronting the main square at the entrance of the camp for "every site of a public building gains an advantage when it offers opportunity for fronting or surrounding forecourts or open areas. (2)" The adjacent buildings at both sides of the square are screened from view by the planted trees.

Besides, this arrangement makes the office the only building which is easily accessible to people coming in and out of the camp, emphasizes the unique significance and position of the office and provides some privacy and little disturbance to the adjacent buildings.

The service building lies just to the north of the office, in a place near to the residential quarters with which it has most of its relations.

The clubs are located in a beautiful surrounding, overlooking a park-like place surrounded by trees and full of green lawns. They are thus affording a noticeable change of environment for the employees, which is among the main purposes for which clubs are found.

The hospital, which is considered as the most important service-giving institution, is offered the best site in the whole camp, for "such an institution must be located where conditions contribute to its maximum serviceableness (2)". It is given the opportunity of receiving plenty of the refreshing breezes and offers no interference with the residential quarters. "Since they require much sun, quiet and as little congestion as possible for their highest usefulness, hospitals as a rule should be placed in a residence district of high class. (2)"

The location of the school amidst the residential quarters satisfies the necessity of preventing the kids from having a long walk to reach it, and minimizes the chances of accidents.

Workshops.

"City planning efforts are useless as long as rays of the sun may be obscured by smoke..... There are in various ways tremendous losses that result from the smoke (2)".

By placing the workshops in the extreme eastern strip of the area, the nuisance of smoke is eliminated by the western wind.

A consideration is taken to get the workshops located as far as possible from the residential quarters so that, excluding the central stores, no other direct communication must exist between the workshops and the other units of the camp. The workshops are thus located in complete isolation.

The immense area given to car-parking is put on the extreme north east corner of the camp near to a special door, so that the company vehicles will introduce the least amount of disturbance to the other parts of the camp.

Near to it, is located the service station which is an undetached part of parking places.

Following in order of their serviceability to vehicles, come the garage and the engineering workshops.

The power house with its annexes are then located between the two previous shops and the pumping station, where they serve both of them.

The water purification and distribution work is performed in a locality of better surrounding.

### Parks and Play Fields

Although the designer is convinced that nothing deserves more earnest consideration than parks and recreational places, one discovers, at the first glance to the layout, that the areas devoted to parks are inadequate. So many factors combine to make of this inadequacy an evil necessity. The most important one being the water supply shortage in Jeddah. Up to a very few years ago, a cup of water used to be sold, in time of pilgrimage, for P.L. 35. The new water supply system has lowered the cost of water very much but not to the extent of allowing large parks to come into existence.

Small parks are introduced only where the inevitable necessity suggests their presence.

The ring of trees around the whole camp serves to screen it from view and offers to it some kind of privacy. In a sandy region like that in which the camp lies, this ring of trees gives to the camp the appearance of an oasis.

At the entrance of the camp, a small park is found. It serves the same purpose as that of a small garden in front of a house.

At the clubs, the cinema and the playfields the presence of parks is a vital necessity.

The other traces of green are found around the hospital, at the school and in a small park in the first class residential quarter.



Another kind of recreation which offers the opportunity of physical and mental regeneration is the sport. As a compensation to the inadequacy of parks, play fields are generously scattered throughout the camp.

### Streets and Street System,

The theoretical traditional representation of street system by a spider's web may be applied precisely to the arrangement of streets in the camp. Consequently the streets may be classified in 3 groups.

In the first group the radial streets are included. They represent the important major streets that serve the whole camp and are subjected to all kinds of possible traffic. The 10 m width of roadway of these streets are provided for 4 lanes of traffic. With 2.5 m set back of buildings from each side, the width of these streets between building lines becomes 15 m.

The second group includes the minor, and mostly transverse, streets. They are 10 m wide providing a roadway 5 m wide for two lanes traffic. Although, they may seem narrow, these 10 m streets are enough wide to provide the required space between one-storey buildings.

The third group contains the perimeter streets around the camp. This group differs from the first one by the presence of vegetation at one side and by the increased width due to the 2.5 m between the trees and the boundary fence of the camp.

Continuity in the sense of absence of cul-de-sacs, and directness in the form of shortest possible route and absence of meanders, are noticeable in the design.

At the intersection of streets, the radius of curvature ranges between 12.5 and 20 m, which the designer considers satisfactory for a camp.

The idea of having a long tangent before the introduction of a reversed curve is neglected where these curves are found, for the designer believes that shortness of tangents produces no harm in such places as where they exist in the layout.

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## ARCHITECTURAL DESIGN OF CERTAIN UNITS

Every architectural design must be based on three principles: beauty, function and economy.

In a project like the camp concerned, beauty may be sacrificed, if necessary, for the sake of the other two principles. This is especially true where so many units of the same type are to be built and where the arrangement of these units contributes materially to the beauty of the buildings themselves.

Also, sanitary conditions are given an important consideration in the design. Ventilation, which is particularly important in hot weather is performed through large windows which will adequately satisfy this important need if the building is properly oriented.

"To prevent dampness all buildings without cellar or basements must be raised not less than 2 ft. above the ground (3)". In the designs all the buildings are raised around 50 cm.

The Walls are divided into three groups,

1 - Exterior walls, they are 40 cm thick and composed of two parts with 12 cm of space in between so that they serve as insulators. In most cases, beside their usual function as exterior walls, they serve a structural function as bearing walls.

2 - Interior Walls, these are 20 cm thick and may be used as bearing walls also.

3 - Curtain Walls, they are 10 cm thick and serve as partition walls only.

Family Housing,

"It is well known to architects that the design of a small house is much more difficult than that of a large one. The design of a house composed of 2 or 3 rooms with a kitchen and a bath is considered as one of the most difficult architectural problems which require a proper economical solution. Such a house should be so designed that each of its parts will just satisfy the function for which it is desired (5)".

An efficient plan is looked for in the design of the three types of family houses. An efficient plan means easy house keeping and above all must be economical.

These three plans vary according to the standards of living of the people who are to use them. It is quite logical that the rents of such houses would be more than could be paid by the employees but the company, as well as any institution, should try to raise the standard of living of the people who work for it.

A common feature in the three plans is the presence of a compound. A compound may be used for,

- 1 - Children playground
- 2 - Laundry
- 3 - Small garden

A servants' quarter is presented in the second and third class houses because of the extensive use of men-servants in almost every house in Jeddah.

Each four family houses of the fourth class are combined in

one building. In every house there are two bedrooms, a living room, a bath, a kitchen and a compound.

The living room is used as a dining and a reception room. No attempt is made to have either of the bedrooms open out to it, so as to give a privacy recommended by the Moslems whose women do not appear in front of men.

The baths and kitchens of each two houses are put adjacent to one another so as to reduce the cost of plumbing.

Each building of the third class contains two houses, in each there are two bedrooms, a living room, a bath, a compound and a servants' quarter - composed of one room and a bath. Here also, the living room is used as a dining and a reception room.

The second class family house contains three bedrooms, a living room, a dining room, a pantry, a kitchen, a bath, a compound and a servants' quarter - composed of one room and a bath.

#### Bachelors Lodging,

The same type of lodging is provided for both the second and third classes of bachelor employees. In the plan of lodges, six of them are put in one building. Each lodge contains a living room, a bedroom and a bath. It is quite true that there are many doors in the bedrooms, yet enough space is provided for a bed, a table and other necessary things. The position of the exterior door eliminates the necessity of a special door to the living room.

To each 24 employees of the fourth class one building is provided. It contains 24 bedrooms, a salon, two washrooms, six showers

and eight W.C.'s

Restaurant For Second Class Bachelors,

This restaurant is made for the use of 50 persons. It contains a dining hall, an office, a kitchen, a storageroom and two W.C.'s.

In warm weather, crowded places should be well ventilated. Large windows from the three sides of the dining hall are provided to facilitate ventilation. For the same reason the net height is made 5.50 m by 10 m. Besides, the dining hall is made 12.5 x 10 m providing a space of 2.5 sq. m. per capita, which is larger than the usual practice.

No direct communication between the kitchen and the dining hall is made possible.

The location of the office facilitates the control of the kitchen and the dining hall.

Club For the First, Second And Third Class Employees,

As it has already been said, the first, second and third class employees have many things in common between them. These relations justify the provision of one club for the three classes.

This club is one of the important and relatively luxurious buildings in the camp. It contains a sitting room, a lobby, a library, a games room, a bar with a kitchinette and a storage room, an office, a director's room, a ladies' room with two W.C.'s, and two gentlemen W.C.'s.

Here also, the net height of rooms is made 5.5 m and many windows are introduced to assure good ventilation.

Verandas are given a special attention here, because they may be used more frequently than the rooms themselves.

For entrance, five doors are provided. The first is the main entrance door. To the bar another door is provided to permit coming in and out of the bar without interference with the other parts of the club. The third door is a side one used as an ordinary secondary door. The fourth and the fifth ones are intended for the use of the kitchinette and the storage room.

On special occasions, the doors between the sitting room, the games room and the bar may be open to combine them into one large place with easy access to the bar.

In the elevation, a contrast of height is performed by having the part between the ladies' room and the kitchinette lower than the other parts of the club.

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