as been designed to footpaths. The total of crossing is 63°.

variants of the bridge

was designed, using 44 m long and reinforced concrete deck and has 15 spans and a total length of 760 m. The construction was designed to include a tower with side canyons. The manufacturer of the Tigris, across the auxiliary span length of 56 m is.

Fig. 2 Tower of cable-stayed bridge

about 64 m height is of solid reinforced concrete built with a steel form. It has been located on the right bank of the river to form an architectural counterpart to the nearby hill, Nabi Yunis, on the opposite bank. The cable-stayed structure was designed to be constructed by the incremental method and shifted gradually across the channel from the right embankment. Auxiliary supports are to be installed before activating the cables. The shifting of the superstructure is accomplished by three separate box parts which are finally to be interconnected by cast in situ up and down deckslabs.

Fig. 3 Cross section of cable-stayed bridge

Substructure and foundation

For the precast prestressed beams variant, either prestressed concrete web piers or column piers, columns of which are to be interconnected with a countersunk cross beam, were considered. For the variant using the incremental construction method, V-shaped piers of solid reinforced concrete were designed. In all three variants, the foundation of piers and tower rest on bored piles of 1,800 mm diameter and 2,000 mm diameter respectively. Ultimate bearing capacity for one pile up to 20 m deep was calculated as 7,000 kN. Piles are to be transported by means of a steel jetty.

Fig. 4 Column pier for 1st variant

Conclusion

Bridges in Iraq across the main Tigris and Euphrates Rivers are characterized by great length, a very flat river channel and by the great difference between high and low water levels.

Also, scouring of the river bottom sometimes up to 5 m deep has to be taken into account. As there is almost no bedrock, only friction piles can be used for the foundation. Insulation is not required for the structures due to scarcity of rainfall in Iraq.

(V. Vesely)

Fig. 5 Web pier for the 1st variant

V-Shape pier for the 2nd variant

Fig. 6 V-Shape pier for the 2nd variant
Foundation of Bridges:

Knowledge about: Soil Mechanics
Hydraulics
Structural analysis

Soil profile
Waterway characteristics

Types of foundation:

1) Shallow foundation
2) Deep foundation (depth > width)

Pile foundation
Caisson foundation

Open caisson (well form)
Pneumatic caisson

1) Shallow foundation
above the water = 5m depth

For depth > 5m or working under water → using sheet piles + pumping for water

Sheep pile
Cofferdam
Piled foundation

friction pile
bearing pile

material
Timber
steel
reinforced concrete
Prestressed concrete

precast pile
underwater

cast-in-situ (place)

steel pipe
concrete
shell-pile

side view

bridge pier

plan

Typical pile cap
Well foundation (open caisson):
6 - 9m diameter size well

Concrete pipe Well

Concrete pier

final concrete foundation

Soil profile

Typical foundation well
Pneumatic Caissons

1. Floating of steel caisson
2. Concreting and setting on river bed
3. Attachment of airlocks
4. Sinking of caisson and concreting of pier
5. Final concrete foundation