CABORA BASSA

A REALITY SET IN THE HEART OF MOZAMBIQUE

The Cabora Bassa dam will be erected in a narrow gorge of the Zambezi at a site where, due to the construction of a small artificial abutment in the superior part of the right bank, it was possible to correct a slight natural asymmetry of the cross-section. However, the cross-section shape is rather unusual, with slopes almost vertical in the superior part and V-shaped in the inferior part of the Valley.

part of the Valley. The gorge is cut in grannitoid charnockite gneiss which appears sound on the surface and shows in a general way a reduced sound on the surface and shows in a general way a reduced fracture, this being the reason why, besides the singularities existing in limited zones requiring special treatment, the problems posed by the dam foundations will be the usual ones in this type of work and rock

The reduced relation between the cord and the height makes the place one of the most suitable ones for the installation of an arch-type dam, the solution chosen being constituted by an arch of double curvature, with a slightly accentuated vertical curvature. The crest will be situated at the elevation 331 and will have an extension of 303m.

Since it is foreseen that the foundation attains on the base of the central cantilever the elevation 160, the dam will be 171m high. The arches of the vaults, whose mean lines are paraboles of the

The arcnes of the values, whose mean lines are paraboles of the 4th degree, have a variable thickness, increasing from the top up to the sides. The minimum thickness of the dam is of 5m in the design arch of the crest and the maximum thickness is of 21,5m in the sides of the lower arches.

On the base of the central cantilever the thickness is of 21m. In the building of the dam about 500,000 cubic metres of concrete be used. will

will be used. The principal splilway equipment will consist of 8 orifices of rectangular section, whose axles are situated at elevation 238,5. The inlet shapes of these orifices are convergent and rounded in such a way as to reduce the vena contracta effect discharged and its dimensions are, at the outlet of 7,80m in height and 6,00 in width width

The sill increases downstream, having an inclination that gives

in width. The sill increases downstream, having an inclination that gives the jet discharged a sufficient reach in order to remove its erosive effects from the dam bottom. The orfifces are gathered in 2 groups of 4, symmetrically arranged in relation to the dam axis and forming with this an angle of 4°, so that the jets be convergent in the riverbed and do not fall over the banks. On the whole, the eight orfifces will discharge a flow of 13,600m³/s when the water level upstream is at the elevation 326. Every orfifce will be provided, downstream, with a sector gate fixed to a structure bound to the dam structure. Upstream, a stop log will be installed, operated by a travelling gantry on a platform at the dam crest level, which will enable the betterment of the gate and inspection of the orfifce. At the central zone of the dam structure there will be a crest spillway which will afford an additional discharge in an emergency. Inside the dam crest a viaduct will be left designed to achieve a monolithic structure, tuncels will be built 6m wide in the roadway and 1m in the side-walks. The many purposes which will also be made. Along the dam crest a viaduct will be built 6m wide in the roadway and 1m in the zambezi Valley. As a matter of fact, due to the construction of a dam 171m high, on a favourable place creating a lake with a considerable capacity, it is possible : — to regularise the Zambezi river flow, thus guaranteeing minimum flows sufficient to make navigation possible downstream of Cabora Bassa;

sufficient to make navigation possible downstream Cabora Bassa

to reduce the intensity and the frequency of the floods downstream of Cabora Bassa; to control the eventual irregularities proceeding from the abnormal

Kariba flow

Lariba now; - to retain the sediment flow corresponding to a basin of about 900,000km²; - to produce power an quantity and at a low cost; - to extend navigation 250km, upstream of Cabora Bassa, allow-

to extend navigation 200km, upstream of Cabora Bassa, allowing an easier flow of products from the hinterland, of special importance for coal and other ores;
to promote the establishment of fishing and tourism industries. For the execution of the Cabora Bassa undertaking, a tender was opened in 1968 which was implemented by a contract made on the 19th September, 1969, to an international consortium-

on the 19th September, 1969, to an international consortium— ZAMCO (Zambeze Consórcio Hidroeléctrico) composed of Portuguese, German, French, South African and Italian firms. The 1st stage of the Cabora Bassa undertaking includes the construction of a power house on the south bank, where 5 generator groups will be installed, each one with 400 nominal MW. The working of the 5 groups will be organised in stages as follows : ist stage—system corresponding to the 3 first generator groups, the 4 first converter groups and the power transmission lines;

2nd stage—system corresponding to the 4th generator group and the 5th and 6th converter groups; 3rd stage—system corresponding to the 5th generator group and the 7th and 8th converter groups. In the near future the construction of another power house on the north bank is planned where another 4 or 5 groups will be installed, which will increase the total capacity of Cabora Bassa to 3,600 or 4,000 nominal MW.

to 3,600 or 4,000 nominal MW. Under the contract, the contractor is obliged to spend an amount not lower than about 2 million and a half "contos" with the participation of the Portuguese activities, namely equipment, indus-tries, services, labour and several products. In addition the con-tractor will use nationally manufactured cement in the civil engineering works and aluminium-steel cable in the power transmission line.

mission line. The part of the project's design relating to the civil engineering works, both the open air and the underground works, has been done by Portuguese technicians and under the responsibility of the firm Hidrotéenica Portuguesa. At about 6km away from the dam site, on the Songo plateau, where at present the contractor's installations and the financial services are based a township of appropriate dimensions will be constructed for the accommodation of the personnel involved in the project. the project.

Access to Cabora Bassa will be assured by land, by means of a road extending 140km which joins the road connecting Tete and Vila Gouveia.

Access by air to Cabora Bassa is also guaranteed. At present, there is an airstrip of about 730m; however, the construction of a 1,500m asphalt runway is planned; the contract for the 800m 1st stage has already been awarded. Under the contract, the contractor assumes the obligation to see

that the commercial operation of the undertaking is started between March 1st and 31st, 1975.

-pumping between cofferdams 15th May, 1972

