SEMBENELLI

C O N S U L T I N G

NEW ESNA BARRAGE

Arab Republic of Egypt, 1990

PROJECT CHARACTERISTICS

Works: river diversion works and embankment component and cast-in-place plastic concrete cut-off of a new barrage across the Nile including navigation lock, powerhouse and spillway

Purpose: hydropower and navigation

Dimensions:

- *height:* 20 m
- *embankment volume:* 1 000 000 m3
- *crest length:* 600 m

Watertightness: plastic concrete diaphragm

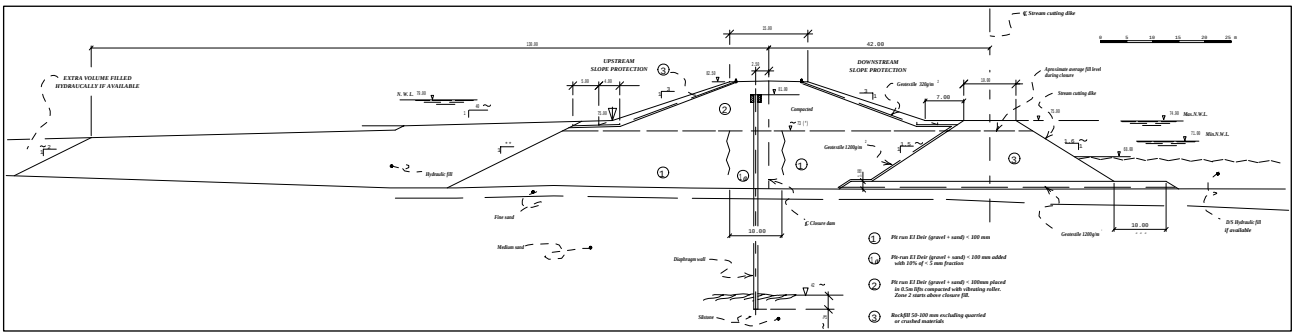
Materials:

- *foundation:* river sand,
- *embankment:* sand and gravel, river sand, selected gravel, rockfill

PROFESSIONAL SERVICES PERFORMED

Planning and analysis of complementary investigations, development of procedures to check the quality of the graded granular fill placed under water, design of the river diversion works (stream cutting dike and design of the anti-scour geosynthetic revetment) and computations of an embankment dam modified with respect to the tender solution.

Esna earth and rock dam belongs to the New Esna Barrage located on the Nile River some 70 km downstream from Aswan dam. The earth dam was built on the right and deepest portion of the river and connected to a concrete structure housing a navigation lock, a powerhouse and the spillway.
The dam's cross section is divided in 4 zones: - ***the stream cutting dike****, needed for river diversion, forming the dam's downstream toe and free draining zone, -* ***the centre dense zone*** *built with pit-run sand and gravel, scalped at 100 mm, dumped in moderately flowing water up to the level of the river at the time of closure (12 m above the riverbed bottom) -* ***the crown*** *built with the same materials of the centre dense zone placed in layers and compacted with heavy vibrator rollers, -* ***the upstream zone*** *built as hydraulic fill of medium fine sand dredged from the river bottom. The concrete diaphragm, built from a working platform 1.5 m below the crest, has cut through the crown and centre zone material and trough 20 m of in situ sand. Ample use of geotextiles has been done in several locations within the dam.*



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