



GORONYO MAIN AND SECONDARY DAM

Nigeria, 1985 ÷ 1992

PROJECT CHARACTERISTICS

Works: Three homogeneous sandfill embankments: main dam (L = 5.3 km, H = 21 m), secondary dam (L = 1.8 km, H = 12 m) and saddle dike (L = 5.4 km and H = 6 m)

Purpose: flood regulation, irrigation and water supply

Dimensions:

- maximum height: 21 m
- embankments volume: 5 700 000 m³
- storage: 976 000 000 m³
- total dams' length: 12.5 km

Watertightness: semipervious bituminous facing on the upstream slope

Materials:

- foundation: river deposits, eolic silty sand, sand and coarse gravelly sand at some location
- embankment: silty sand



PROFESSIONAL SERVICES PERFORMED

Called in following the breaching of the main embankment. Analysis of foundation conditions, study of underseepage and breaching process, design and supervision of remedial measures, design of additional monitoring system, analyses and evaluations of instrumentation's readings, site inspections.

Goronyo dam, completed in 1984, is located on the upper Rima river, in North-Western Nigeria. Following a piping phenomenon occurred at a section of the main dam under a head of 3.6 m only SC-SEMBENELLI CONSULTING was asked to establish the causes, direct reconstruction and monitor the dam. Readings and observations were thoroughly collected and analysed for 7 subsequent cycles of progressive, controlled impounding. The maximum normal reservoir level was reached in 1991. In the same period additional remedial measures and instrumentation were designed. The dam was commissioned in 1992 and since then is in regular service.

In the main and secondary dams, a total of 156 new standpipe piezometers were installed in the embankment and in the foundation and 145 new relief wells were installed at some distance from the main dam's downstream toe.

In 1987, the upstream slope and an horizontal portion of the upstream toe of the secondary dam were waterproofed with a geocomposite attached to the asphaltic concrete of the upstream slope surface with a special adhesive.

