Zeitschrift: IABSE congress report = Rapport du congrès AIPC = IVBH Kongressbericht

Band: 12 (1984)

Artikel: Metro Manila Light Rail Transit System, Philippines

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DOI: https://doi.org/10.5169/seals-12269

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Metro Manila Light Rail Transit System, Philippines

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The poster highlights some particular aspects of the design and construction of the elevated carriageway for the Metro Manila Light Rail Transit System. This public transportation system is located above the Rizal and Taft Streets which represent the main north-south traffic arterias. The total length of this structure is approx. 15 km and includes two end terminals, a central terminal, sixteen normal stations and a depot and maintenance area.

The finally adopted structural system was chosen based on a study comparing various options. In addition to a pure price comparison the following criterias had to be considered:

- Construction speed: a max. erection speed of one span/day was envisaged and subsequently achieved in practice.

- Quality and type of locally available labour, materials and equipment.

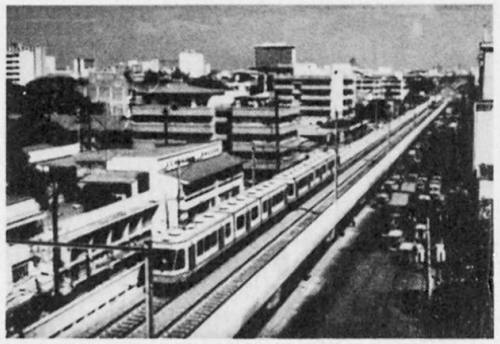
- Provisions against effects caused by stay currents (the railway system uses direct current).

- Provisions against earthquake actions.

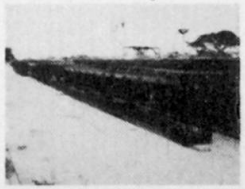
The actual construction work started late 1981 and is today practically finished. In practice the selected design has proven to be very feasible.

METRO MANILA LIGHT RAIL TRANSIT SYSTEM, PHILLIPPINES

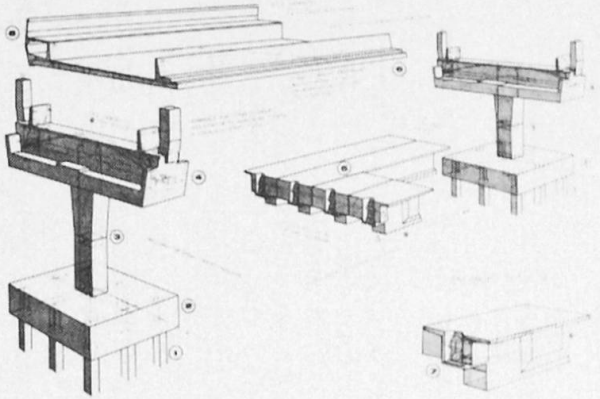
metrorail RIZAL-TAFT LINE



metrorail RIZAL-TAFT LINE



metrorail ISOMETRIC VIEW OF A TYPICAL CARRIAGEWAY SPAN



Within the scope of the design of the Metro Project -Provisions against Stray Currents on Reinforcing and Prestressing Steel- and -Seismic Design Criteria for the Typical Elevated on Line Stations- were taken into consideration. The isometric drawing shows the suggested protective measures against stray currents.

- Driven pretensioned PC.C. piles with dimensions 406 x 406 mm up to 30 m long. In some areas bored piles had to be used. Under each pier 9 piles at 1.50 m centers were used.
  Load per pile: vertical max. 130 tons / min. 4 tons (metric)
  horizontal 11 tons (metric)

  The piles were analyzed for various conditions. Due to earthquake and corresponding vertical loads the piles are rigidly fixed in the pile cap and actually supported by the soil.
- R.C. pile caps, + R.C. columns and + P.T. copings were made in cast-in-situ concrete.
- Superstructure, each span consisting of four post-tensioned PC.C. girders with specially formed end-diaphragms for immediate sealing with -Tixoprint- and stressed together with one ⊕ bar dia. 32 mm. The girder length is varying from 22 m to 27 m.
- The cast-in-situ R.C. deck slab, thickness varying between 170 and 190 mm, has been analyzed acting as a compression member longitudinally and as a load distribution member transversally.
- End block detail of the post-tensioned PC.C. girders showing the specially formed end-diaphragms.
- PC.C. parapets acting as an acoustic protection of the neighbourhood.

Due to technical reasons and site conditions, structural design described above was clearly favoured to other solutions and proved to be the most economical solution.