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LOW VIBRATION TRACK SYSTEM – LVT

Experience on Viaducts

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Contents

# 1. Various applications of LVT on bridges

While the longest extent of LVT is found in tunnels, which have traditionally constituted the primary environment for slab track, LVT also benefits from a diverse and substantial experience on viaducts.

1.1 Hong Kong

LVT installations on viaducts in Hong Kong include:

- 6.3 km (3.9 mi) on MTRC's Lantau and Airport Railway in Hong Kong, where traffic started in 1998 with a 140 km/h (87 mph) train speed, 17 t (18.7 US t) axle load and an anticipated 75 million t (83 million US t) annual traffic.

  A typical cross section is shown below.
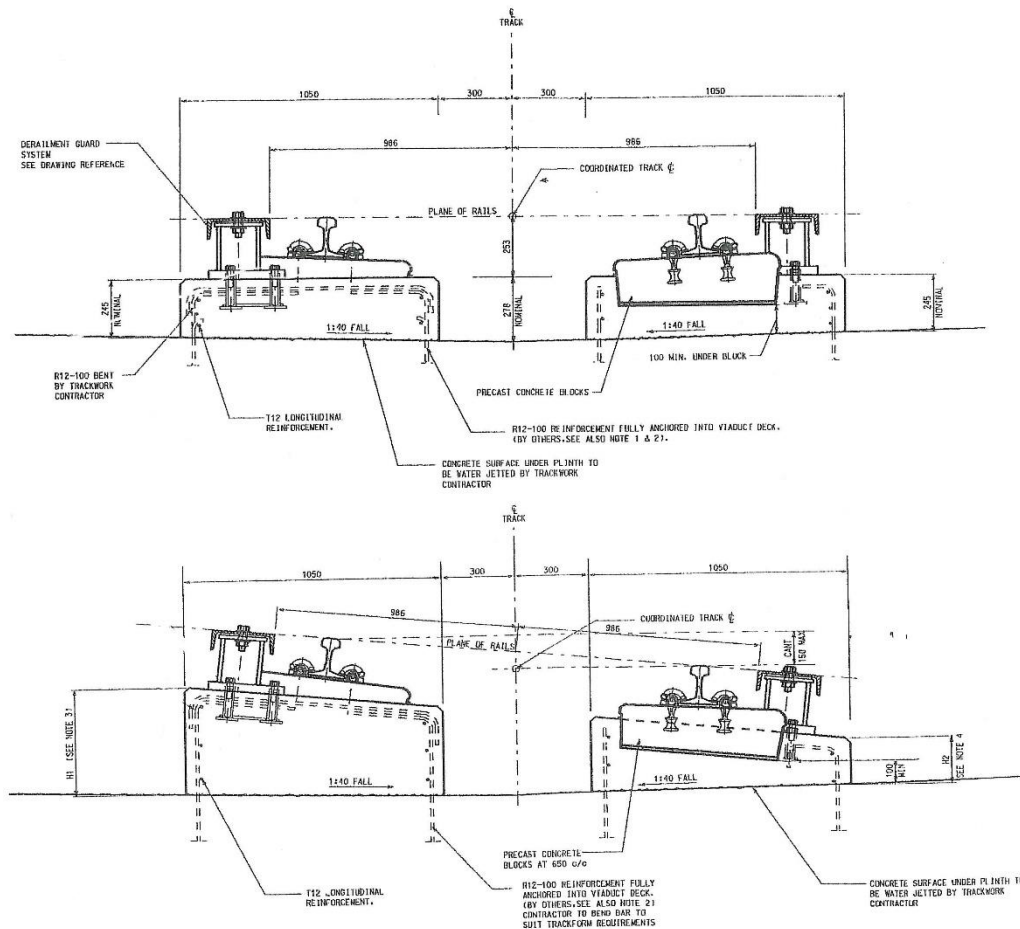
- KCRC in Hong Kong installed 1.4 km (0.8 mi) of LVT on viaducts on the West Rail line that started operating in 2003 and approximately 1.2 km (0.7 mi) mostly within turnouts on viaducts on the MOS extension of the East Rail line that started operating in 2004.

  A typical cross section involving single plinths with reinforced concrete derailment containment upstands and unreinforced track concrete is shown below.
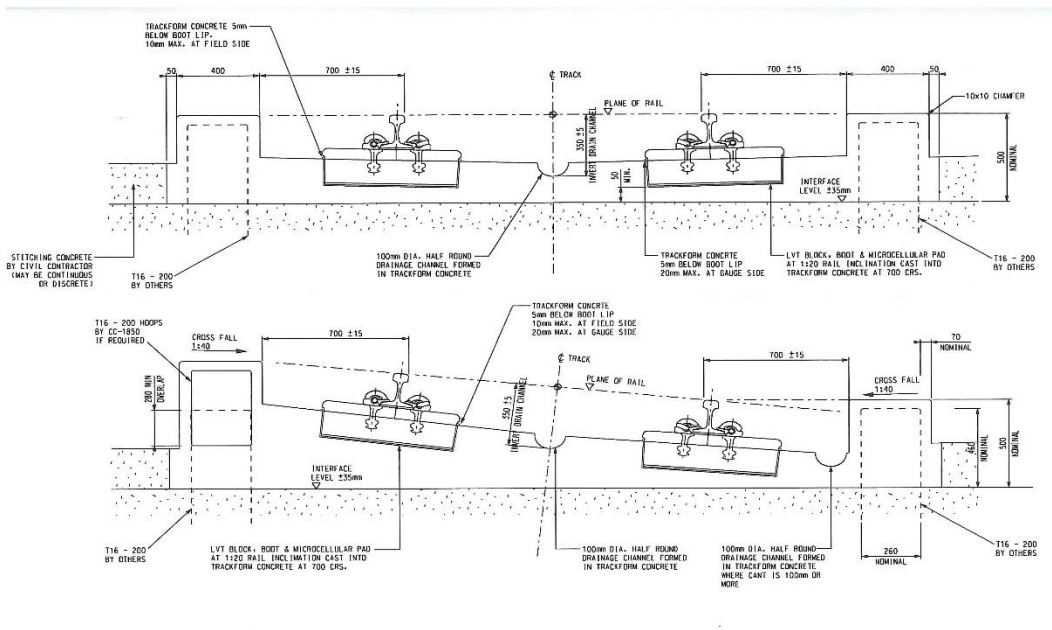
- 2006 saw the completion of KCRC's LMC Spur Line, where 3.2 km (1.98 mi) of LVT were installed on viaducts.

  For that project, the viaduct designers specified that 10 mm-wide (0.39 in-wide) joints be placed at 3.5 m (11.5 ft) intervals in the track concrete as shown on the photograph below taken prior to final concreting. Because of the resulting longitudinal discontinuity of the track concrete, fibre reinforced track concrete was used on viaducts for that project.

1.2   Texas, US

The inauguration of DART's first line in Dallas, Texas, took place within a few months from the opening of MTRC's Airport Railway and that line includes approximately 6 km (3.7 mi) of LVT installed mostly in tunnels but also on an 85 m (279 ft) long, double track bridge over Interstate Highway I30.

LVT has remained maintenance free both in the tunnels and on the bridge despite rail temperatures varying from below freezing in winter to above 60 °C (140 °F) in summer.

Part of that bridge is shown on the following photograph taken while trackwork was still underway.

1.3   Brazil

LVT installations on viaducts in Brazil include:

- The Unisinos-Sao Leopoldo extension of the Trensurb commuter line in Porto Alegre involved the construction of 5 km (3.5 mi) coming from 2.5 km (1.5 mi) double track of LVT on viaducts.

   Unreinforced track concrete was placed over the viaduct spans as shown in the photo below.

   Revenue service started in 2000 with a 90 km/h (56 mph) train speed, 21 t (23 US t) axle load and 20 million t (22 million US t) annual traffic.

- Line 2 of the Rio de Janeiro metro included the construction of a short section of viaducts on which 1.0 km (0.6 mi) of LVT was built using unreinforced track concrete in the same way as in Porto Alegre.

   That line started operating in 1998 with a 70 km/h (43.5 mph) train speed, 17 t (18.7 US t) axle load and 25 million t (27.5 million US t) annual traffic.

1.4   England

On the Bishopsgate Viaduct 0.5 km (0.3 mi) and Hollywell Viaduct 175 m (574 ft.) of the East London Line the LVT slab track was installed with fastening system Vossloh W14 with reduced longitudinal creep resistance.

LVT Standard system with low tow fastenings was installed near the joint of the viaduct as observed in the photo below in order to allow the rail moves due to temperature gradients.