For information
May 2014

Legislative Council Panel on Transport
Subcommittee on Matters Relating to Railways

The Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link Monitoring works by Highways Department on Delay Mitigations and Recovery Measures

Purpose

This paper aims to describe the follow-up works carried out by Highways Department (HyD) regarding the delay recovery measures implemented under the Hong Kong Section of the Guangzhou - Shenzhen - Hong Kong Express Rail Link (XRL) project.

The "Monitoring and Verification" Approach

2. The XRL project is the first government-owned railway project implemented under the concession approach. In 2008, HyD commissioned a consultant, Lloyd's Register Rail (Asia) Limited ("Lloyd's"), to review and develop the appropriate institutional arrangements for entrusting the MTR Corporation Limited (MTRCL) to implement the XRL project. Lloyd's recommended that the Government adopt the "monitoring and verification" role in the design and construction of the XRL, performing the "check the checker" role instead of "project manager" to monitor the MTRCL's implementation of the XRL works. This approach worked on the basis of MTRCL's project management procedures. The Government would engage its own "monitoring and verification consultant" ("M&V consultant) with railway experience to conduct monitoring and verification works to verify whether MTRCL had implemented the relevant processes as internally specified. Specifically, this would use a risk based sampling approach to verify delivery of the requirements of the project scope under the Entrustment Agreement (EA). Lloyd's also advised that the Government's resources could be utilized more effectively to avoid repetition and micro management of the project. Lloyd's recommendations formed the framework of the monitoring system adopted by

HyD and its M&V Consultant, Jacobs China Limited, for the delivery of the XRL project by MTRCL.

3. MTRCL is entrusted to implement the XRL project, responsible for the design and overall management of the project including contracting with contractors for the construction works. During the project implementation, MTRCL has an overall plan of the project and knows all detailed design and construction details. In the case of delays, MTRCL, being the most appropriate party, has the responsibility to negotiate with the contractors for the implementation of delay mitigation measure or delay recovery measures (DRM) to catch up the programme. With the "check the checker" role, HyD and the M&V Consultant will provide MTRCL with their professional advice on the proposed DRMs.

4. Specifically, under the MTRCL project management procedures, all proposed delay mitigation measures and DRMs would need the approval of their Project Control Group (PCG) before the proposals can proceed. MTRCL would forward all modifications and changes to the XRL with cost implications including DRMs to HyD before they are approved. HyD and the M&V Consultant would provide professional advice on the proposals and follow up with the MTRCL. If HyD has any queries or questions on the effectiveness of the proposals, HyD would request MTRCL to provide additional information to justify the proposals, or even raise objection to the proposals. Under the EA, MTRCL is required to furnish HyD with the necessary information on the implementation of the project.

Monitoring works by Highways Department and the Monitoring and Verification (M&V) Consultant on DRMs

5. HyD and the M&V Consultant have been using various monitoring means to systematically monitor MTRCL in the implementation of the XRL project. This includes regular site visits to major XRL works contracts and site meetings with the site supervisory staff of MTRCL (i.e. once a month spanning 3 to 5 days), during which HyD would inspect the progress of various contracts, and comment on any potential construction risks and areas of concerns for MTRCL's attention and appropriate actions. HyD and the M&V Consultant also attend the monthly Contract Review Meeting (CRM) with the site supervisory staff of MTRCL. HyD and the M&V Consultant would enquire MTRCL the latest situation on the works in the meetings, and discuss issues which may have potential impacts on the progress and programme of the XRL

project including important issues such as delay mitigation and recovery measures. In addition, HyD (led by an officer at Assistant Director level) attend the monthly Project Coordination Meeting with the General Managers of MTRCL to monitor the progress of various contracts, liaise and coordinate issues concerned with the delivery of the XRL project, e.g. liaison works with various government departments. The Director of Highways chairs the monthly Project Supervision Committee (PSC) meetings with the Projects Director of MTRCL and his team to review the project progress. Whenever there is a delay, HyD will request MTRCL for detailed explanation on the causes of delay and associated mitigation measures to catch up with the project programme.

6. Through the above multi-level monitoring mechanism, HyD can better understand the progress of various works contracts and progress delay in different sections of works, as well as notice any inadequacies on site, e.g. inadequate labour resources and work fronts, logistic and site coordination problems, etc. Whenever these problems are observed, HyD would urge MTRCL to follow up and implement effective mitigation measures to avoid further delay of works. If there are issues requiring liaison and coordination with various government departments, HyD would endeavour to facilitate MTRCL to resolve the issues in a timely manner so as to avoid affecting the progress of works.

7. The M&V Consultant also monitors the implementation of MTRCL's proposed mitigation measures and DRMs, and reports to HyD on the progress of relevant contracts whether the revised target programme can be met.

8. The following sections provide some examples of the delay mitigation and recovery measures implemented, and the monitoring actions by HyD and the M&V Consultant.

Contract 823A : Tse Uk Tsuen to Tai Kong Po Tunnels - Procurement of an additional Tunnel Boring Machine (TBM)

9. In April 2011, during the construction of the launching shaft of tunnel boring machine (TBM) under Contract 823A, the Contractor encountered rock head levels higher than those anticipated in the Geotechnical Baseline Report. This slowed down the progress of construction works and also directly affected the commencement of the subsequent tunnel excavation works. In order to recover the progress delay, MTRCL discussed with the Contractor and formulated a series of mitigation measures and DRMs which included the

procurement of an additional TBM to allow the two tunnel sections to be excavated simultaneously. MTRCL subsequently submitted the related DRM proposals to the PCG on 3 November 2011 and 1 March 2012 for approval. HyD and the M&V Consultant did not disagree with the effectiveness of the DRM proposals, and provided comments for follow up by MTRCL. Subsequent to the signing of a Supplementary Agreement between MTRCL and the Contractor in early 2013, the additional TBM was launched in March 2013.

10. HyD and the M&V Consultant monitor progress of the two TBMs through monthly and site visits, and discussed with MTRCL the performance of the TBMs and the issues encountered. In addition, HyD requested MTRCL to provide daily progress report of the tunnel excavation works for better monitoring on the operation and performance of the TBMs. This could allow HyD to timely review with MTRCL about the effectiveness of the DRMs and reflect concerns on the tunneling works. In view of the unsatisfactory performance of the two TBMs during rock excavation, HyD, in collaboration with relevant government departments, held working meetings with MTRCL on 23 July, 5 September and 16 December 2013 to discuss measures to improve the TBM operation and progress. MTRCL briefed HyD at various levels on the tunneling works and review the TBM excavation progress accordingly. The TBM excavation progress was improved after implementation of the improvement measures.

Removal and Re-provisioning of Nam Cheong Property Foundation

11. In mid-2010, in the course of pile-removal work under Contract 802, the Contractor found that the piles were deformed, and were not straight as indicated in the record drawings. Thus, normal extraction methods could not be deployed. As those deformed piles were in conflict with the XRL alignment, they had to be removed before the arrival of the TBM. Upon learning the above, MTRCL discussed with the Contractor about the measures to recover the delay. After exploring different options with Contractor, MTRCL suggested adopting a new “Rotator and Wedge” extraction method from Japan to remove these piles. Representatives of HyD, MTRCL and the Contractor visited Japan to inspect the effectiveness of the new method. It was concluded that the new method was effective. On 23 December 2010, MTRCL submitted a paper on DRM to the PCG. HyD and the M&V Consultant did not disagree with the effectiveness of DRM proposal.

12. In mid-2011, MTRCL reported that there was about a 44-week delay and a ten-week delay in the removal and re-provisioning of Nam Cheong Property Foundation against the original programme, and the revised working programme respectively. HyD and M&V Consultant kept monitoring closely the effectiveness and operation of the new method, visited the pile-removal site every month and hold CRMs with MTRCL regularly to track the removal progress. By adopting the new method, the Contractor successfully recovered the delay such that the piles were removed before the arrival of the TBM, and avoided affecting the interfacing tunnel boring works.

Temporary Traffic Management Scheme (TTMS) at Jordan Road (JOR)

13. Under Contract 811B "West Kowloon Terminus Approach Tunnel (South)", the original plan was to divert Jordan Road (JOR) northward on top of the completed diaphragm wall at north of JOR, allowing the diaphragm wall within the existing alignment of Jordan Road to be constructed. However, the construction of diaphragm wall at north of JOR had delays due to adverse ground conditions including encountering of core stones. If no DRM was implemented, the JOR northward diversion would be delayed for about eight months from December 2011 to July 2012.

14. In view of the situation, the MTRCL presented the DRM proposal to the PCG on 29 September and 6 October 2011, proposing to first move JOR to the south allowing the Contractor to take up the major portion of the original space of JOR to construct the underground diaphragm wall and, at the same time, continue to complete construction of the diaphragm wall at north of JOR. HyD provided comments on the proposed DRM with particular concerns on its effectiveness and requested the MTRCL to submit further assessment on its impact to the nearby construction sites.

15. Since the PSC meeting held in September 2011, HyD raised concerns about the implementation of the TTMS concerned and requested the MTRCL to regularly report the progress. After the TTMS implemented in February 2012, the HyD and the M&V Consultant inspected the site regularly, monitoring the progress after the TTMS implementation. As a result, the construction of the diaphragm wall panels at northern part of West Kowloon Terminus had recovered of about six months progress.

Conclusion

16. As the "check the checker" role, HyD and the M&V Consultant monitor MTRCL's works on the implementation of the project, and provide professional advice to MTRCL on the delay mitigation measures and DRMs proposal.

17. Apart from the above examples, the Independent Review Report prepared by the HyD also mentions other DRMs implemented under individual major contracts. Under the established monitoring system, the effectiveness of the DRMs implemented under key contracts has been monitored by HyD and the M&V Consultant.

Highways Department
May 2014