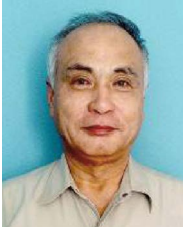


Courage and Hope Gained through Cutting the Construction Period by Half of an Overseas Project

— Hanoi City Ring Road No.3 Project Package 2 —

半工期施工で得た海外工事での勇気と希望
 — ハノイ市環状3号線パッケージ2工事 —



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Keywords: Half Term Construction.

DOI: 10.11474/JPCI.NR.2014.73

Synopsis

Our Contract Package 2 of Hanoi City Ring Road No. 3 Project is one of the three packages in all planned for the purpose of easing a heavy traffic in the new downtown of Hanoi City. The Original construction period was 30 months, but driven by strong desires of the Owner and users of the project, we made a bold challenge to cut the construction period by half.

Structural Data

Structure: 3-5 continuous span Super-T Girder bridge
 Bridge Length: Main 2,070m plus 4 ramps 448m

Span length: 28m, 33m and 38m (3 types)

Width: 24.0m (4 lanes)

Bored pile: Diameter 1.0 and 1.5m / 544pcs.

Owner: Ministry of Transport, Socialist Republic of Vietnam

Designer: Oriental Consultant

Contractor: Sumitomo Mitsui Construction Co., Ltd.

Construction Period: 20 Oct. 2009 – 20 Jan. 2014

1. Introduction

Hanoi City Ring Road No. 3 is a road located from Noi Bai International Airport down to South to crosses over Highway No. 1 and round up to North to close the ring at the South of Noi Bai Airport. The total length is 70km and it is from this Ring Road that Highway No. 1, No. 3, No. 18 and Hoa Lac road branch out in the radial direction.

Particularity of this project was the reduction of the construction period from 30 months to 15 months achieving such an early traffic opening.

This achievement was recognized as revolutionary in the construction industry in Vietnam where construction period is not commonly kept. This paper reports how the contractor overcame the problems and shorten the construction period.

2. Problems in the project

- (1) Project Site was located at the urban center of Hanoi with round-a-clock heavy traffic.
- (2) The existing frontage roads were running on the both sides of the project site allowing only 28m width working area.
- (3) Heavy equipment were not allowed to enter the working area in day time.
- (4) Any accident of falling could always cause a serious accident with third parties involved.

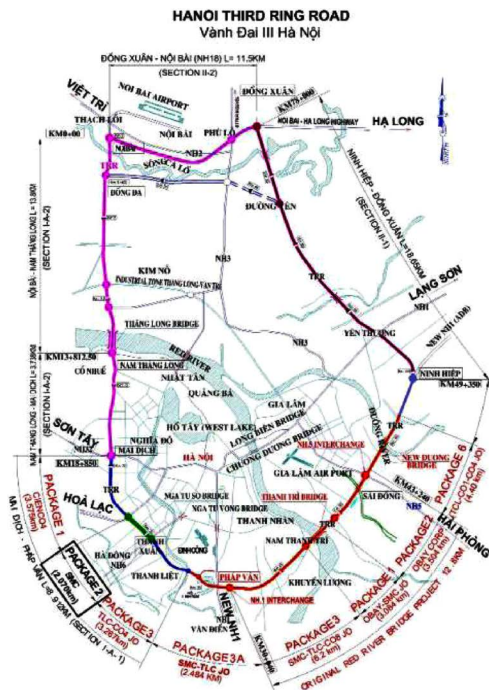


Fig.1 Map of ring road

- (5) There were many obstructions such as 110KVA electric cables, telephone and telecommunication cables, water and drainage pipes.
- (6) Our contract package being the last one among total three packages of the project, our completion date was decisive in terms to complete the project of the three packages as a whole.
- (7) It was necessary to modify our standard subcontract to match the locality.

3. Decision of Methodology statement

The contractor applied < Labor Saving Method > in all of work items due to below reasons.

- (1) The work was ordered 2 km long at once including substructure and superstructure so that there was scale merit to apply daring method.
- (2) The figures of the structures did not have novelty and variety like Japan but unified designs.
- (3) Night work was possible.
- (4) Fabrication cost of steel facility was less costly.
- (5) Land acquisition was almost settled and remaining obstructions were solved in early time.
- (6) The client and the consultant co-operated with us to shorten the construction period.
- (7) Our staff and subcontractors were almost the same members as for our past project two years ago.

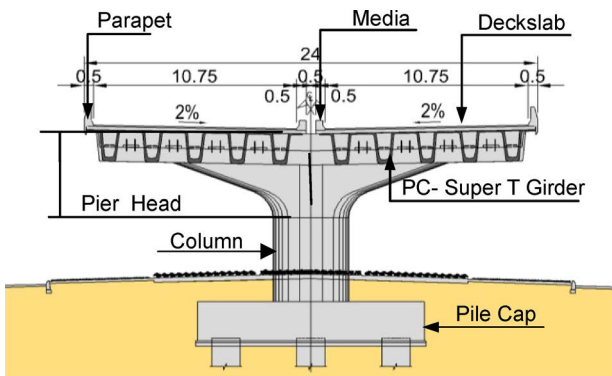


Fig.2 Section of bridge

4. Construction

The concrete <Labor Saving Method> is shown in below explanations with pictures.

(1) Setting of Site Slogan

At first, we had to appeal our intention to apply the Labor Saving Method to all persons concerned this project so that the authors set the slogan of <Speed, Beauty with Safety >. Later, this slogan was applied to all of our company's sites of civil and building section in Vietnam.



Fig.3 Slogan

(2) Substructure work used 60t Gantry crane

The working area was very narrow and any accidents caused falling down of heavy equipments had to be avoided absolutely so that the Big Gantry Crane was applied due to the view of its stability and safety. The ground condition was not so bad so that the railing system was installed on Steel Sheet Pile with 20 cm concrete and 40 cm gravel base.

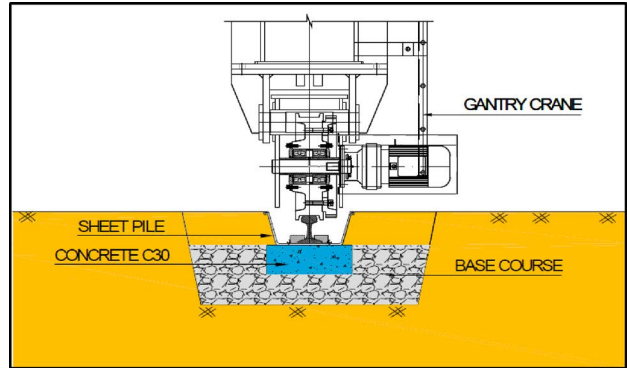


Fig.4 Section of gantry crane

(3) Pile cap work

Form was applied at the bottom open style as Labor Saving Method without dismantled into four pieces . It took two days on average.



Fig.5 Form of pile cap

(4) Column work

Column Form and Scaffolding was applied by Labor Saving method and it took three days on average.



Fig.6 Form of column

(5) Form of Pier Head work

Commonly, form of pier head takes a long time to execute so that we combined Form with Scaffolding and Supporting as Labor Saving Method. It took seven days only on average.



Fig.7 Labor saving method

(6) Rebar of Pier Head

It also takes a long time to install at actual site so that Labor Saving Method was applied. Two sets of rebar pre-fabrication cages were made on the ground. The rebar cage was transferred to pier column and set by the 60t gantry crane. Transferring and setting work at the pier took a half day only on average.



Fig.8 Installation of pre-assembled rebar

(7) Bearing and Diaphragm work

The design width of superstructure was gradually spread so that the adjustable scaffolding was made as Labor Saving Method for setting rubber bearing and making diaphragm.

(8) Girder Erection

Commonly, the girder erection work is the most dangerous step in a bridge construction. However, two sets of 40t gantry crane for erection work as Labor Saving Method were applied so that it became the easiest and safe work for us. By the reason of public traffic control, it was started from 22:00 midnight and it took only two nights for 1 span-10 girders. As compared with our Labor Saving Method, other two



Fig.9 Adjustable scaffolding

packages took 14 days per 1 span-10 girders by the reason of using erection girder. The handrail on the outside girder were installed previously so that bridge surface work was immediately started keeping safety condition.



Fig.10 Erection of super-t girder

(9) Slab Concreting work

The slab concrete was casted faithfully with design division of 2-4 span continuous girders. Therefore, working area became huge and it was quite difficult to keep the deck surface flat. In case slab concrete surface was uneven, asphalt loss increased even the value is within an allowable range. Accordingly the concrete surface finishing machine was installed.



Fig.11 Finishing of slab-surface concrete

(10) Parapet work.

The outer parapet was designed as the precast product. However, it was divided into 2.5 m and the weight was too heavy so that it is quite dangerous to set nearby frontage road. Therefore, the authors requested the client to change it into Cast-In-Situ type and it was approved. Gondola system was applied as Labor Saving Method not only at outer parapet but also at inner parapet.



Fig.12 Parapet work by gondola

5. Opening Ceremony

As the result, this project was completed by 10th of October and prepared the opening ceremony. At 9:00 on 20th October 2012, the opening ceremony was gloriously held by the client with attendance of Vice Prime Minister, Minister of Transportation, our President Director from Japan and other so many guests. The completion date was just earlier by 15 months of contracted period and after ceremony, the traffic was immediately opened in 8.9 km length from Package1 to 3.

In this ceremony, the contractor were appreciated for this unprecedented achievement. Vietnam government even gave us a testimonial.

During the construction period, mass-medias of TV, radio, magazine and newspaper came to the site for interview.

6. Effect of applying Labor Saving Method

In developing countries, the numbers of staff and workers with sufficient knowledge, skill and experiences are not enough. If the work is prolonged, a risk of unforeseen accident, fluctuation of currency and prices is higher. The said risk is even higher if the project site is in a downtown area.

In view of eliminating such a risk, a labor-saving method to complete the work earlier has a merit not only for the contractor but also to the local industry as it contributes to technology transfer, which is one of the major purposes of Japanese ODA by JICA, Japan International Cooperation Agency. Fifteen months earlier traffic opening gave social benefit of about 65 million US\$ as estimated value and reset the value of time in the minds of the client and contractors.

It is valuable to keep in our mind that the biggest reason of this success in the project was good human relations and cooperation beyond the borders between Vietnam and Japan. It gave us not only a great pleasure for an immediate success but also big courage and hope for our future overseas work.

The author would like to express many thanks to all the concerned persons by taking this opportunity. Thank you very much and BRAVO Vietnam!



Fig.13 Completion and traffic open

概要

ハノイ市環状3号線パッケージ2工事は、発注工事の90%が工期遅延するとも言われるベトナム国において、30箇月の工期を15箇月に半減して交通解放を果たした画期的なものである。そのため施工中から二十社を超えるテレビ、新聞、ラジオ、雑誌等のマスメディアで報道され、早期の交通解放の社会便益は工事請負金額の1.5倍に相当する65億円と試算された。これは施主や業者だけでなく一般市民へも大きな衝撃となり、今までの工事に対する概念を大きく変えるものとなった。

この快挙は決して元請業者だけで為し得たものではなく、施主、コンサルタント、ローカルスタッフ、協力業者、更には地元住民の強い思いと夢が大きな力の結集となって実現出来たものであり、様々な苦難に見舞われる海外工事に対して、関係者に大きな自信と勇気を与えた。