



overcome only by reinforced continuous crack problems. Therefore, the structure scheme of prestressed beam can be used to realize the simply supported continuous.

## 2.2. The Construction Technology for Simply Supported-continuous Prestressed Box Girder

The first step: the first precast box girder, after concrete to achieve design strength of 90% and meet the curing time, then tension prestressed steel beam in the sagging moment region, and grouting and timely clearance of the box girder bottom hole. Small box girder roof beam negative moment steel corrugated steel tube, should be embedded in the precast box beam.

The second step: setting the temporary support and installation of permanent support (United end without a temporary support), by installing holes in main girder, temporary support is simply supported, in bridge reinforcement and reinforced beam end panel. Temporary support can be made by available sulfur mortar. The internal electric heating wire embedded in sulfur mortar, system conversion electric heating method to lift the temporary support. Temporary support and permanent support should be the top surface elevation of the top surface elevation flush.

The third step: connecting the continuous steel beam joints, lashing bars, connecting box girder roof beam negative moment steel corrugated steel beam and flat tube wear.

In low temperature, pouring continuous joint, and its two sides and roof beam in negative bending beam with the length range of bridge deck. To meet the design strength of 80% and meet the maintenance time, tension in negative moment area of roof prestressed steel beam, and grouting.

The roof of the negative moment steel beam with both ends of the tension, and take one by one uniform tension. Joint construction is completed, the remaining part of the bridge panel pouring wet joint concrete. The remaining part of the bridge panel shall cross to the wet joint concrete pouring fulcrum. After concreting removal of temporary support in a joint, complete system transformation. Lift the temporary support, special attention should be paid to prevent the high temperature affects the quality of rubber bearings.

The fourth step: connecting steel roof beam tension for notch reinforced, cast-in-place concrete leveling layer, spraying waterproof layer, installation seam fence, bridge deck pavement construction and expansion.

## 3. Structure Calculation

The calculation of 30m simply supported continuous Prestressed Box Girder can use finite beam element method.

According to the section properties of beam section, combined with bridge section calculation of transverse

distribution coefficient of single beam. Mid span rigid connected beam method is used to calculate the supporting point calculated by lever method.

The transverse distribution theories are derived in simple structure, application in continuous structure, accurate rate, also need to verify. Therefore, the model space block unit established by MIDAS/Civil program, calculate and compare the effect of vehicle loading, the conclusion is the two transverse distribution coefficient calculation method basically meets the precision requirement of engineering design.

The results in this paper indicate that PBL specimens have relative large beam stiffness and ultimate load-carrying capacity, but a relatively small amount of slip on the steel-concrete interface. As a concrete slab cracks, the composite neutral axis moves away from the PBL plates, resulting in PBL plates being more effective at maintaining beam rigidity and loading capacity than stud shear connectors. The interaction among the PBL connectors, the reinforcing bars (transverse bars go through the holes of the PBL), and the concrete restricts interface slip. In addition, the results indicate that the stud specimens exhibit better mechanical behavior than PBLs with regard to the initial cracking of the concrete slab. But all in all, both PBLs and stud connectors are effective shear connective devices for composite beams subjected to a negative bending moment.

## 4. The Construction and Quality Control

### 4.1. Formwork Engineering

According to the construction plan and site conditions, the base concrete terrazzo precast box girder template, side mold and the internal mold with shaped steel formwork, to ensure that the beam has better appearance quality. Among them, making the bottom formwork in construction field, there are many factors affecting the quality, is the focus of the quality control of precast beam template.

### 4.2. Concrete Engineering

The proportion of concrete box girder C50 is strict accordance with the quality inspection station. The mixing of the concrete batching machine is on-site mixing. Concrete mixing each weighing; strictly control the concrete mix ratio. Accurate control of water consumption, the water content of sand should be carefully determined after deducting from the water, which is strictly prohibited in the concrete machine.

### 4.3. Prestress Engineering

Precast box girder tensioning key process quality control, the quality control of the hole and the steel strand tension quality control two aspects including prestressed pipeline. This bridge adopts the corrugated pipe pre buried pipe

forming method. The prestressed tensioning procedure main cable crossing, tensioning and grouting construction process three. Before the start of the tensioning procedure, box girder specimens for compressive test and spring back of the beam body detection entity, to verify whether it can control the strength of the design requirements. Through the cable is needed before the number of steel strand. Check the pipe is smooth, clean, not up to the requirements, the reasonable way to clean up the cable crossing smoothly.

The construction type of the piston is adopted by pressuring pump, grouting from one end to the other end .Until the specific effect reach the other end full pulp, we will stop to do this.

## 5. Conclusions

30m simply supported continuous prestressed concrete box girder structure has simple structure and convenient

construction advantages and continuous structure advantages of comfortable driving, and has a good economy, it is a kind of reasonable, advanced structure, and is worth popularizing.

## References

- [1] Lee P G,Shim C S,Chang S P. Static and fatigue behavior of large stud shear connectors for steel-concrete composite bridge[J]. *Journal of Constructional Steel Research*, 2005, 61(9):1270-1285.
- [2] Lee P G,Shim C S,Chang S P. Static and fatigue behavior of large stud shear connectors for steel-concrete composite bridge[J]. *Journal of Constructional Steel Research*,2005,61(9):1270-1285.
- [3] Ingerslev LCF. Understanding Immersed and Floating Tunnels. 29th ITA World Tunnelling Congress. Netherlands,2003 : 257~263.
- [4] Zhang Qinghua,Li Qiao,Tang Liang.Fracture mechanism and ultimate carrying capacity of shear connectors applied for steel-concrete joint segment of bridge pylon[J].*China Journal of Highway and Transport*,2007,20(1):85-90.