

# **Study on benefit evaluation system of fair faced concrete construction technique——In Chengdu City 2nd ring road viaduct project as an example**

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**Keywords:** Fair faced concrete; construction technology; Benefit evaluation system

**Abstract.** This paper introduces the historical research on fair faced concrete, benefit evaluation system of the construction technique of fair faced concrete is studied, and the Chengdu City 2nd ring road viaduct project as an example, analyzes and expounds the construction technology of concrete benefit evaluation system of research results.

## **Study on the historical research on the fair faced concrete**

Enter since twenty-first Century, with the increase of population, excessive consumption of resources, environmental pollution and ecological balance destruction have become increasingly prominent, the concept of sustainable development has been paid more and more attention, and has become a major issue facing all countries in the world today. As a pillar industry of the national economy, China's construction industry, how to take the road of sustainable development is an important problem of concrete material is badly in need of solution. Therefore, the development of green concrete, not only can save cement, saving resources and energy, Protect environment effect, but also can improve the quality of concrete, improve the durability of concrete. Especially in the field of fair faced concrete and green concrete, because you do not need to paint, decoration, decorative and other chemical products, the structure of one-time molding, no chisel repair, plastering, reducing the amount of construction waste, is conducive to the Protect environment, but also avoid the plaster cracking, hollowing and shedding of quality problems, reduce the structure construction leakage, cracks on the floor quality problems, can be widely used in various fields of civil engineering.

At present, mainly is the study of water environmental protection and construction technology of concrete, no study of its economy and a complete set of economic evaluation system, so the research on the benefit evaluation system of fair faced concrete construction technique has become a new topic.

## **Construction of concrete construction technology in the system of economic evaluation:**

Benefit evaluation system to establish a set of scientific and effective water concrete construction technology, is a more complex issue. According to the research results, the economic evaluation system of construction technology of concrete at home and abroad, combined with actual investigation and water project (the research object: Design Institute, the construction unit, the concrete material manufacturers, government agencies, the supervision company, real estate developers, project cost, professional unit owners), consulting experts(Architectural Design Research Institute, Research Institute, universities, construction enterprises, cost consulting enterprises, concrete material manufacturers engaged in concrete research experts), through a large number of engineering case analysis, benefit evaluation system to establish a set of clear water concrete construction technology, see table 1:

Table 1: evaluation of the water concrete construction technology of Chengdu City two ring road viaduct table (evaluation)

Benefit evaluation index	Benefit calculation index	The calculation formula for the index of evaluation indexes benefit calculation index	Remarks
To improve the quality level	Increase in net interior space: To improve the indoor clear height and interior net volume: So bring new profit	Because this project is viaduct, excluding the construction area, so the project did not improve the efficiency of the evaluation calculation.	
To reduce the unit cost	Saving material	1, the calculation of fair faced concrete engineering support template, binding of steel bar, concrete vibrating, curing, demoulding, brushing the transparent protection film integrated unit price: 2015 Sichuan Province as the engineering quantity list quota C40 water commodity concrete columns are generally at 700 yuan /m <sup>3</sup> , 10 yuan /m <sup>2</sup> with a transparent protective film (calculate besmear brushes area, according to the 4 40 yuan), a total of 740 yuan of /m <sup>3</sup> .  Comprehensive unit price 2, ordinary concrete construction include: supporting template, binding of steel bar, concrete vibrating, curing, demoulding, curing, plaster and wall and ceiling decoration cylindrical) total cost, such as the 2015 Sichuan Province the detailed list of engineering quantity quota C40 ordinary commodity concrete columns are generally at 500 yuan /m <sup>3</sup> , 30 yuan /m <sup>2</sup> (calculation of plastering plastering area, according to the 4 120yuan), cylindrical decoration (by scraping putty, paint brush ordinary indoor decoration standard 50 yuan (/m <sup>2</sup> ) calculation decoration area, according to the 4 200 yuan), a total of 820 yuan of /m <sup>3</sup>  Cost savings of =820-740=80 yuan /m <sup>3</sup>  The engineering cost is reduced to X (concrete money saving) =P <sub>1</sub> (C <sub>0</sub> -C <sub>1</sub> )-M =126000 - (820-740) -2520000=7.56million	
To improve the quality level	Increase in net interior space: To improve the indoor clear height and interior net volume: So bring new profit	The total duration of 1, concrete engineering support templates, assembling reinforcement, pouring vibrators, maintenance, dismantling, brushing the transparent protection film.  2, ordinary concrete construction (including supporting template, binding of steel bar, concrete vibrating, curing, demoulding, curing, plaster and wall and ceiling decoration cylindrical) time.  The project originally planned duration of 420 days, the actual duration of 375 days, 45 days to save time.  Can save the scaffolding, tower crane, construction elevator rental fees, rain season, the temporary measures fee charges, and it is possible to obtain project award.  Calculation formula of efficiency: the water concrete technology to shorten the duration of savings measures for $X = \sum J \cdot \Delta D + \Delta T \cdot G + L + C$ =315*45+0+50*45+10*45=187.50 million  Calculation formula of efficiency: the water concrete technology shorten the duration of 45 days to save money $X = (W_0 - W_1) \cdot C \cdot P - M$ = (420/126-375/126) (126*820) /375) a professional]*126-20*126=98.784 million	
	Save money (yuan) total	=7.56 million +187.50 million +98.784 million=293.8544 million	

## Analysis of three engineering examples in Chengdu City two 2nd road viaductt as an example

### 1 project overview:

The first, the bus rapid transit, highway two is a common frame of the viaduct Chengdu 2nd ring "fast" project a total length of 28.3 kilometers, is the first large capacity of Chengdu's first bus rapid transit road and central city road. The project was designed by the Chengdu Municipal Engineering Design and Research Institute, Luqiao nineteen, China MCC Chengdu Engineering Company to undertake the construction task. The project started in April 26, 2012, fully completed in May 6, 2013, 25 days earlier than the duration of the contract with the traffic capacity in Chengdu city in May 28th two new road viaduct bridge opened to traffic, the total duration of only 13 months.

In the two ring road viaduct bridge opened to traffic, the speed limit of 80 km / h, the bridge under the speed limit of 60 km / hour speed limit on ramp along the 40 - 50 km / h, in accordance with the provisions of the existing ring elevated road, pedestrians and nonmotorized traffic day ban. On - and off ramp is set 3 metres overhead, trucks and large and medium-sized passenger car all day ban on bridge. The two loop two upper middle lane is 18 metres long capacity bus rapid transit (BRT) 24 hour lanes, all without traffic lights, all located in the bus station 28, take the K1\K2 bus rapid transit through the ring only 40 minutes a week, at speeds of up to 40 km / h or more, while the original sit 51, 52 road two ring ring bus usually takes 90 minutes to 120 minutes, at a speed of only 15-20 km / h. The two ring road bridge on the two-way 6 Lane (2 lane for fast bus lanes), the road red line width of 42.5 meters of standard section.



Figure 1: the city of Chengdu 2nd Ring Road Viaduct (taken on May 28, 2013)

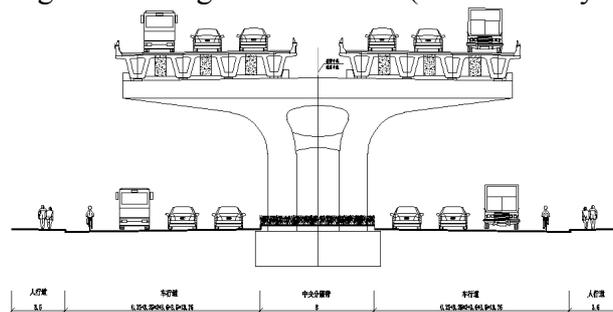


Figure 2: schematic diagram of Chengdu City 2nd ring road viaduct section

The two loop viaduct part of concrete using concrete, in order to ensure the construction quality and speed up the construction of all steel template, template is one custom, therefore the concrete after stripping smoothness is very good, after the completion of the piers of the green belt plant Ivy, ivy and other green the plant, after nearly two years of growth, has now extended to two layer overhead, the protection of the outer surface of concrete, and embellishment of the city landscape, become a green building, green model of exterior wall.

Benefit evaluation results in 3, fair faced concrete construction technology: see table 1.

After calculation, Chengdu two loop viaduct construction technology with concrete after saving the total capital of about 294 million yuan, accounts for about 1.5% of the total project cost, taking into account the Chengdu City two ring road viaduct in Chengdu city population dense commercial area, traffic pressure, various interference factors, the bridge construction technology difficulty (old overpass by jacking up technique and new the elevated bridge, the

original interchange overpass individual such as (temperature retention, demolition do), heavy construction tasks, the tight time schedule and other factors, so the water concrete construction technology in the evaluation of economic benefits and social benefits of better effect.

## **Summary**

After the construction of fair faced concrete base of Lenovo research, Chengdu City two ring road viaduct project, we study the efficiency evaluation system of the construction technique of fair faced concrete, laid a theoretical and practical basis for the future construction. I have the honor to participate in the Chengdu City construction cost consultation two ring road viaduct, hope to share with readers and communication, limited to my level, also hope you the reader more valuable comments and corrections, benefit evaluation system so as to form a set of scientific and effective water concrete construction technology as soon as possible, and then extended to other areas of the building, promoting sound and rapid development of economic construction, the early realization of the dream of the China construction.

## **Author introduction:**

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