

Completion of the design survey and preparation of cost estimates for traffic works by the Project Management Unit No.7 under Ministry of Transport, Viet Nam

Tuan Anh Nguyen^{*1}, Hai Truong Trinh²

^{1,2}Ho Chi Minh City University of Transport

No. 2, Vo Oanh street, Ward 25, Binh Thanh Dist., Ho Chi Minh City, Viet Nam

ABSTRACT

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According to the Law on Construction No.50/2014/QH13, Decree No.15/2021/ND-CP and Circular No.16/2016/TT-BXD, the management of traffic construction investment projects of the PMU plays an important role in the effective project implementation. However, in recent years, there are still shortcomings such as poor design surveys, careless management of construction investment cost, poor construction quality, etc., that lead to the adjustment in the process of construction and cost estimation, delayed construction progress and difficulties in the project management and administration. The report presents the limitations, causes and recommendations to improve the quality of design survey and cost estimating, cost management for traffic works, thereby contributing to the completion of the management of traffic projects at PMU 7 under the Ministry of Transport, Vietnam.

Keywords: Project management, survey and design, cost management, quality, progress.

I. INTRODUCTION

The design survey and preparation of cost estimate for the construction works are the most important steps in the capital construction investment activities, play a decisive role in the project's socio-economic efficiency during the construction and operation phases. The design solutions are directly related to the progress, quality and cost of construction works.

As a representative of the Project Owner of Group A and Group B traffic projects in the South financed by the Ministry of Transport, the process of managing projects at PMU 7 shows that there are 04 key factors affecting the quality of design survey work: 1)

Capacity of transport engineering consultants; 2) the complete and synchronous technical standards are in consistent with the international practices; 3) Roles and management capacity of the State agencies, Project Owner and Project Management Unit (PMU); 4) Complete and transparent mechanisms and policies on construction activities of the State. In addition, the State should have policies to encourage the application of new scientific and technological achievements, materials into the construction projects (even without applicable technical standards and norms).

The most common issue that the PMU 7 faces is the application of new construction technologies or materials from developed countries such as Japan,

Korea or Europe, etc., into our traffic works while there are no standards and norms about construction and acceptance in our country.

Therefore, it is necessary to evaluate and identify the role and significance of the project design survey and preparation, thereby proposing appropriate solutions to further improve the capacity of consultants and the quality of surveying, preparing construction investment projects for traffic works.

II. SITUATION OF SURVEYING AND PREPARING COST ESTIMATES FOR CONSTRUCTION WORKS

A. Current situation of the design survey work

Currently, the cost of design surveying for traffic works is smaller than the cost of construction, only making up 0.4% - 0.9% for group A projects with VND 2,300 billion or more (1) but it is the stage that concentrates large amounts of gray matter to create qualified construction designs, ensuring the economic and technical aspects. The influence of the design phase on the entire construction activities is high and extends throughout the project's life cycle.

In the stage of preparing the feasibility study report, a number of design options have not fully considered technical, economic - financial, especially aesthetic factors due to the conception of transport works that mainly focuses on the operational function without paying much attention to aesthetic and the possibility of further improvement and expansion. Surveying tasks do not match the requirements of each type of work, the volume of design steps is overlapped. The technical requirements are sometimes not consistent with the surveying tasks because of the inconsistent and ambiguous standards. Geological, topographical and hydrological survey data is taken from neighboring projects or use the out-of-date data from many years ago, leading to inconsistent with the reality.

The route plans that are proposed by the design consultants are unreasonable and asynchronous. In addition, the consultants have not worked well with

the local governments in the design process, leading to overlap with the local construction planning. The survey of borrow pits has not been taken seriously by taking data of completed projects, causing the scarce material demand, high material cost that exceeds the total project investment.

In the next design stages, the topographic survey documents still have shortcomings, mainly because the field survey works are performed incompletely or the volume of survey in the TOR is inconsistent with the reality or the data from other projects is used, causing the occurrence of topographical and geological differences. For example, the drainage culverts arranged at the canals that have been filled by the local people or the side ditches built in places where there are no residents or no horizontal culverts at the water basins, etc. As a result, the design must be adjusted, generating a large volume, exceeding the cost estimate of the package during the construction process.

B. Cost Estimation

It can be seen that the preparation and management of construction costs of many projects, especially infrastructure construction projects, have encountered uncontrollable difficulties in the implementation phase. This factor greatly affects the project progress, quality, and the overall investment efficiency. It is one of the causes of wasting time and costs. Therefore, it is necessary to be properly reviewed and paid attention to so as to limit problems and shortcomings.

Currently, the investment target for infrastructure construction in our country is not low in comparison with other countries in the region and in the world while we have many advantages such as favorable sources for construction material, abundant and cheap workforce, skilled construction teams, but the construction target and construction cost are quite high. Meanwhile, many big construction contractors have difficulties and cannot develop, which need to

analyze from the perspective of management to implementation.

In general, there still have outstanding issues in the cost estimation, management of construction investment project costs; legal documents in the construction field; norms, unit price; decentralization of powers and responsibilities; human resources in the field of making, controlling and managing construction investment costs; capital and disbursement process, etc. Thus, it is vital to analyze the causes to find solutions to overcome and innovate the management and preparation of construction costs.

III. ANALYSIS OF CAUSES

A. Design and survey work

i. Objective causes

The current design survey processes are being finalized by the management agencies, but these processes are asynchronous, causing difficulties for the design work. Some processes have been used for many years, the technical specifications are out of date and not suitable with the modern technology. Contents between technical regulations/standards or within technical regulations/standards are inconsistent. Some instructions of technical regulations/standards are generally copied from different standards, making it difficult to apply. There are many different interpretations between design units, appraisal units and project audit units.

The norm of consultancy costs for construction is calculated by the percentage (%) of the civil work value for all design solutions, regardless of breakthrough solutions and popular solutions. As a result, the design consultants do not focus on the efficiency and savings for the Project Owner, they only focus on increasing the construction value to increase the design costs and bring benefits to the consultants. Therefore, it will not create motivations to promote, explore and apply new technologies in the design of traffic works, reduce the improvement

in technology, science, and construction qualification of domestic construction units.

Many design costs have not been specified in the norm system (overall cost, etc.) or have been regulated at low level, leading to the failure to promote the intelligence of the consultants. No specific regulations are found in case of optimal plans and cost savings.

The site clearance work is prolonged, causing adjustment of the project progress and construction design solutions in project documents, designs and cost estimates; and the generation of unexpected changes.

Due to the regulations on the unit price and norm are incomplete and inaccurate, the determination of the cost estimate and package value is unreasonable. Construction norms are not yet tight with many different understandings and many work-items are not included in the norm.

Determining the unit price of construction materials is difficult due to inconsistencies in the regulations on determining the materials cost to the construction site. The implementation progress is too short, so the coordination between departments has not met the requirements. Meanwhile the topographical, geological, and hydrological conditions of some projects are too complicated, so the design solutions have not followed closely with the construction site.

ii. Subjective causes

Although there are many consultant units, most of them are newly established, unqualified or do not ensure the increasing requirements for the technical quality, not enough experienced and qualified team to carry out consulting work for major projects and national key projects. Many units even compete unfairly, some projects are divided into many small packages, leading to many conflicting design solutions in the same project, inconsistency in the design viewpoint that indirectly affects the design quality. The role of the State agencies and stakeholders still has many shortcomings, specifically:

The appraisal work is not performed well because the consultants have not understood the reality. The criticisms have not been voiced when approving the design documents. The review of design documents is not thorough.

The qualifications of a number of project management engineers, design team leaders and design managers have not met the requirements leading to errors in the design and cost estimates. The selection of input data is not really accurate, leading to inconsistent design results. The consultants often use the design coefficients in terms of safety, leading to a waste huge cost of construction investment costs.

Some consulting units still lack author supervision during the construction process, therefore the changes in construction are not promptly adjusted.

The State issued a large number of documents and norms, but most of them are asynchronous. Design engineers update the information slowly, leading to inadequate application, etc.

For the verification work, some consulting units did not carefully consider the design options and perform the independent verification to propose other options (if any) but used the spreadsheet of the design consultants to check whether the applicable formulas and coefficients are correct or not, or sometimes they do not review input data to detect inconsistencies, or design experiences from neighboring projects, so no error detected because using the trail of design consultants.

B. Cost Estimation

The shortcomings can be caused by the following reasons:

i. Legal documents on the cost preparation and management

The legal documents applied in the preparation and management of construction investment costs is currently promulgated by many concerned ministries and departments, so these documents are fragmented and inconsistent. Some documents and regulations are

not in line with reality, so there are inadequacies right after the promulgation that need to be promptly changed and adjusted following the reality. Sometimes, a document of this ministry is changed, relevant documents of other ministries and branches may not be changed in time, leading to inadequacies in the legal document system. The previous method of management is from “very tight” to “loose” as at present with the concept of “publishing” to apply rather than the regulations to apply as before while the decentralization of powers, responsibilities and sanctions in construction management is not clearly defined, making the cost preparation, approval and management does not have common principles and consensus. (Especially the preparation and appraisal of the total project investment and adjustment, the addition of estimates during the implementation process to synthesize into the adjusted total project cost is not consistent with the set principle. A very important decisive content is that the re-evaluation of investment efficiency is hardly implemented. Total project cost of some projects increases by 150%, even 200% that cannot ensure project and investment efficiency).

Decree No.68/2019/ND-CP on the management of construction investment costs comes into force from October 1, 2019. However, the circulars related to guiding the determination and management of construction investment consultancy costs have been delayed. As a result, the management of construction investment costs faces many difficulties from the effective date of Decree No. 68/2019/ND-CP to the date of issue of Circular No.09/2019/TT-BXD of the Ministry of Construction on guiding and determining construction investment management costs as well as Circulars (10, 11, 12, 14 ...) promulgating the set of norms, price of machine shift, price index, etc., effective from February 15, 2020.

Labor costs in cost estimates and guidelines on the use of (general/local) minimum wages used to be inconsistency with salary-related documents of the

Ministry of Labor, Invalids and Social Affairs and other fields.

The method of determining the price of constructional machine and equipment shift has had specific instructions, but there are still shortcomings. Instructions for determining the original cost of machine shift and other related costs according to the supplier's quote, sale contract or the similar works which have been carried out make difficult in the process of preparing, verifying and evaluating construction investment costs. Each unit references a different supplier, each locality references different costs, leading to the same type of machine calculated for a project/work passing through 2 provinces is different from each other.

The BIM model has been widely applied in the world and is being developed quickly in Vietnam market due to advantages such as: many design options are given to analyze and choose the optimal option, minimizing waste, speeding up construction progress, minimizing conflicts during construction, etc. However, the application of BIM model to infrastructure projects has not been paid attention to and there are no incentive mechanisms for the implementation.

ii. Norms of cost estimate

The norm of construction cost estimate is a decisive factor to the estimated value of works, basically, it should be set up to suit the reality and characteristics of the work. Although we have a lot of norms, in fact, these norms are complicated and deficient. Many work-items in the norms are not realistic, leading to inaccuracies in determining construction costs. This is one of the reasons that make the cost management, estimation, appraisal, approval and implementation of construction projects difficult during the past time. (Confusions in norms, inadequate regulations, irrationalities in regulations on depreciation calculation, lack of reality in some types of construction work, etc.). The issues have been

analyzed, reflected, and commented but have not been revised in time.

The norm of consulting costs is small, and it has not clearly defined the cost for the cost determination and project evaluation, so many consulting units do not pay attention to this task. It is time to change the mindset in determining consulting costs, instead of comparing consulting costs with the general income of the society, we will determine costs based on the effectiveness of consultancy services - a typical service brings great benefits if the consulting outputs are carefully researched. It is necessary to step by step quickly narrow the gap between consulting costs for domestic and foreign engineers in the same work, qualifications, region. Only then can we limit the brain drain and develop the domestic consulting market. It is certain that the reasonable cost for consulting services with high quality outputs will reduce waste and bring much greater investment savings to the society.

iii. Methods of cost estimation

It is difficult to identify the cost estimates and precise bid evaluation when maintaining the method of determining the construction costs with the detailed volume extraction and the use of local pre-made construction unit prices, especially for basic construction works such as transport, irrigation, ports, etc., with separate construction organization methods. The method of cost estimation should move towards the international practices, accordingly the measurement and analysis of unit price by bill item is a unit of work that is described in detail for an aggregated unit price and given in the B.O.Q, consistent with the specifications, convenient for unit price analysis and payment terms.

The analysis of unit price for work-items based on a norm system, qualified design documents, detailed technical instructions and attached specific conditions of each project can determine the appropriate cost estimate. It can serve as the basis for bidding price

consideration for bid evaluation, contractor selection and be controlled in the construction process.

There are big differences in construction targets or investment targets for each project/work or work-item. Therefore, the evaluation of construction targets or investment targets needs to be viewed generally and scientifically. If the construction investment indicators need to be attributed to more specific conditions such as: section scale, average excavation/backfill height, ratio of bridges/tunnels on the route, soft soil treatment and scale, number of intersections, the level of equipment operating or criteria for the treatment of the substructure for each m² of bridge, etc., then can have the criteria suitable for setting up and managing costs as well as limiting problems, inconsistency between State management agencies in the process of review, appraisal or consultation with key projects (Recently, some projects of PMU 7 such as North-South Expressway, My Thuan 2 Bridge, Dai Ngai Bridge, etc., have faced difficulties in commenting the total project cost, construction norms in comparison with the investment rate announced by MOC when submitting to the ministries and agencies for comments).

iv. Human resources, consulting and training on quantity surveyor

For a long period of time, the awareness of the role and position of those who are responsible for preparing, controlling and managing construction costs has not been appreciated. The training to get skilled engineers and experts in this field is less paid attention to. Currently, some bridge and road engineers are trained in a short time to undertake the estimation work, very few real quantity surveyors to be able to prepare, control the project volume, prepare bids, and select the construction contractors. Therefore, it can be seen that there are still shortcomings in the preparation and management of construction costs due to the Quantity Surveyors are less knowledgeable about structures, principles of calculating volume, orders of construction methods,

the legal procedures, the inadequacies in norms and some legal documents. In addition, the Qs have not yet conducted the volume measurement, built the unit price scientifically for making a close cost estimate and reflecting correctly the actual project value.

If the criteria of the International Cost Engineering Council (ICEC) are taken into consideration, there are either too few or almost no engineers/specialists meeting the requirements of being a Quantity Surveyor:

- Preparing the preliminary estimation and the basis of making cost estimate follow-up stages of the project;
- Preparing the forms of volume measurement of work-items;
- Preparing contract documents, prequalification of contractors, bidding documents (price, measurement, payment);
- Set up a ceiling price for a bidding plan; Making prices for contracts based on the volume listings as a basis for agreement;
- Analyzing and evaluating the unit price and bid price;
- Assessing on-progress works and disbursement;
- Preparing declarations and final reports for settlement work;
- Managing costs, prices, adjusting in accordance with the stage of project implementation;
- Calculating the life cycle, economic and financial efficiency for the investment projects;
- Preparing and attending the lawsuits;
- Monitoring the investment evaluation;

Regarding the consulting on the determination of construction prices, many consulting units are currently lacking seriously or almost no experts and engineers who are able to well perform this task. In many consulting organizations, the training to their members is also less important, they rarely go to the construction site. Therefore, they cannot estimate their actual works, they do not know the design and

construction organization, no thorough surveys of the material sources, quality, reserves, transport conditions and distance, supply capacity, etc., are found. As a result, there are many projects that have to be adjusted and changed, leading to the increase of cost estimate during the implementation process.

The capacity of many consulting units responsible for estimate verification is also limited, unable to recognize the nature of the decisive factors to the estimated value, sometimes just legalization also makes the estimated value inaccurate. Some Project Owners and project management units have not yet selected the proven consulting units to carry out the verification and determination of cost estimate.

In addition, the lack of independence in the role of a quantity surveyor, mainly based on the subjective instructions that makes the cost estimate sometimes inaccurate. A part of advisors in the management agencies has intervened in determining the cost estimate or the "impartiality" of cost reduction due to lack of design experience, construction organization, legal knowledge, construction practice, etc. has made the cost estimates not reflect the work value, and the accountability issue has not been clarified.

v. *Other issues affecting the construction costs*

Many contractors are not developed while the construction price is not low. It is a paradox. It can be clearly seen that there are still shortcomings in the cost preparation, bidding and management. In fact, many projects that the contractors could have completed on schedule, with quality and profits, but in fact they could not complete and suffer heavy losses because of site clearance, bidding documents, design, delayed disbursement, unpaid loan interests, low interest rate for contractors, redundant procedures, etc.

In principle, the construction contract shall be a high legal basis in the implementation process. In fact, it has not been placed in its correct position. According to the international practices, the contractual conditions are the highest legal basis for settlement of

payments and disputes (if any) during the contract performance. The Project owner shall pay all fees as regulated in the Contract when receiving construction outputs that meet the quality and progress requirements and without any other conditions. However, the contractual terms of a few projects have not been strictly complied with, making the disbursement process significantly affected.

Up to now, the price off-set for construction contractors because of volatility has not found an effective solution, so they perform construction activities in moderation, the prolonged progress creates a high cost of projects implementation.

The bid prices higher than the ceiling price have made many packages and projects unable to be implemented as planned. The main reasons are as follows: Too many prerequisites that make the bidder unable to set prices in accordance with their conditions and capabilities (regulations on the prices of materials, labor, construction machinery and equipment, institution, etc.) are requested to be included in the bidding documents; poor capacity of the contractors in analyzing unit prices and preparing the bid prices, many contractors use the whole system of unit prices, norms, labor cost, and machine shifts issued by the State to set the bit prices without having their own norm system in compliance with their actual construction capacity, even all the shortcomings in the current norm system, the inefficiencies in the price disclosure are used to analyze the bid prices; The quality of design documents and cost estimates is not ensured. As a result, it is certain that the bidding and bid evaluation will still encounter many difficulties in the reality.

IV. SOLUTIONS PROPOSED FOR THE FINALIZATION OF DESIGN SURVEY AND COST ESTIMATION

A. **The improvement of design survey quality**

Select a consultant unit with experience in designing similar projects, for large and complex projects

(highways, roads passing through difficult terrain, etc.), it is necessary to have specific regulations to select qualified consulting units to perform the design work.

The approval of survey tasks and volume must follow the consultant's recommendations on the basis of ensuring that the survey tasks match the requirements of each type of work and each design stage. Volume, content and technical requirements are suitable to the size of works, construction regulations and standards. Carry out adequate geological, topographic and hydrological surveys to have actual survey data and meet the design requirements. Avoid incomplete survey volume that lack of input data, affecting the selection of design solutions or in other words, low design quality.

Consulting units need to develop a quality management system in accordance with ISO 9001: 2015 to manage product quality, establish specialized divisions to improve consulting capacity, independent KCS.

There are policies to encourage the application of new science and technology, modern materials right from the design stage. In fact, the State management principles stipulate that the follow-up design stages must comply with the previous design stages, the construction process must be based on approved design documents. This is a barrier that needs to be removed in terms of limitations of the current regulations, on the other hand, if only improving and applying new technology in the construction phase, it cannot create a consistent quality to reach the highest economic efficiency, use efficiency of the project.

Control the design quality from the input data. For the design preparation: Conduct a field survey right from the bid preparation to assess the content that may arise in the design process and have appropriate recommendations.

During the implementation process, closely coordinate with the survey unit to monitor the site progress as well as check the data, carry out field

inspection and comparison with the survey unit, the KCS to comprehensively evaluate survey data and design solutions. Boldly apply new technologies to improve design quality, focusing on volume calculation and cost estimation.

The innovation of design technology to improve production quality and efficiency must be step by step applied, for example:

The input data from the route design will use the Civil 3D software to build the site plan and precise height;

The bridge structures will use TEKLA STRUCTURE software to build 3D models (instead of calculation by manual and drawing 2D by Auto Cad as before) including full details and parameters to improve quality and accelerate the design progress. The designs are checked immediately during implementation on the 3D model and after printing by checklists for each type of work.

Use specialized software to calculate the design (RM Bridge 2010; MIDAS Civil 2011 software: analyzing the design of bridges and structures; Midas/FEA, ANSYS 10, 11: dynamic analysis, local analysis; MCOC, FB-PIER software: calculating the pile foundation of 3-dimensional high-base for abutment and pier; Use Hec-Ras software to calculate pier and abutment erosion; Use Storm and Sanitary analysis 2017 software to calculate bridge deck drainage, etc.)

The overall design documents must be presented consistently from the content, form, main design solutions, construction plans. These issues must be taken into account right from the preparation phase to completion with the involvement of stakeholders: design, KCS, design managers, design team leaders, etc.

Changing the method of calculating the cost of construction investment consultancy by the application of new technologies, materials into the design options in order to bring practical efficiency to the Project Owner and the feasibility of the project. The design cost calculated by the percentage (%) of

the current civil works value has not had any impact on promoting economic efficiency of design solutions. The consulting unit conducts the design without concerning whether the design plans will bring the best economic efficiency to the Project owner or not. The saving of construction investment costs is not attached to the entitlements of design engineers, therefore, there are no motivation to explore and innovate the design outputs so as to improve the quality and reduce construction investment costs.

In the preparation of FS report, it is necessary to consider comprehensively technical, economic – financial aspects, environmental protection, national defense and security, pay attention to the possibility of further renovation and expansion, and give out alternatives such as: location, alignment and technical scale of the road.

B. Perfecting the cost estimation

In order to perfect the regulations on managing the construction investment costs for traffic works to ensure the principle of correctness, completeness, in accordance with the market mechanism and international integration, stemming from shortcomings and limitations through a number of traffic work projects in PMU7, some proposed solutions are as follows:

Developing and perfecting the system of legal documents on construction management and investment, the proper operation of works in accordance with the reality. Assigning and decentralizing the development and management of the construction norms and prices in a clear and transparent way.

Consolidating and improving the quality of investment policies, linking the interests and responsibilities of the State management agencies and Project Owner in the determination of the investment policies. Strengthening the decentralization of the preparation, appraisal and approval of investment projects for units and localities. Strictly implementing the order of capital

construction investment. Simultaneously, renewing the investment capital allocation; stop listing construction investment plans that have not yet completed construction procedures, not yet met the fund conditions and financing sources. Making investment decisions only on projects that have identified financing sources and the capital mobilization to ensure the completion of the project.

Complying with the approved planning and investment projects, no addition of work-items that increase construction investment capital in the process of project implementation.

Continuing to collect, research and analyze information on construction investment costs in regional and international countries in order to propose the complete construction norms and unit prices in Vietnam.

Supplementing resources for relevant agencies to research and build norms, determine costs for monitoring works and projects with new technologies, coordinating with the construction units, supervision consultants to synthesize and develop suitable norms. Researching on converting the management mechanism of construction norms and prices, socializing the norm development with the involvement of specialized consulting units suitable for specific works, especially works subject to many factors such as (topography, geology, construction conditions, construction methods, the application of new technology, the source and ability of material supply).

Enhancing the legality of construction contracts, respecting the contract contents as well as the value signed between the State management agencies, Project Owner and contractors. Clearly defining the responsibilities of the entities in setting up and managing costs to create a transparent and competitive construction market.

Immediately supplementing and handling the inadequacies in current norms. At the same time referring to the construction norms of developed

countries. Rebuilding the sufficient norm system scientifically as a basis for making cost estimates suitable for each type of works in the specific construction conditions by defining functions, reference formulas, lookup tables from standard norms convenient and scientific for users with correct results and no differences for same type of work.

Organizing the construction in a scientific way and disclose accurately the investment rate of work construction and the general construction unit price of the work associated with the area and size of work such as highways, special works, etc., for reference to serve the management of preparing and conducting the investment so far.

Developing HR training plans in universities and reality so that each engineer can meet the job requirements upon graduation.

V. CONCLUSIONS AND RECOMMENDATIONS

A. For the design survey work

Vietnam is one of five countries that are forecasted to be greatly affected by climate change globally. A construction work that is built by our generation today not only meets the current needs but also meets the further needs of the next generations. Therefore, such work must ensure its quality.

Designing and building traffic works with complicated technique in mountainous, flooded areas requires the use of breakthrough solutions. To ensure more environmentally friendly and safe, the management agencies and consultants are recommended to comply with the principle: "excavating the tunnel when making roads through mountains, building bridges when making roads through valley", using high quality materials and special construction technology. It is necessary to have a further planning vision and if there are not enough financial resources, stop working or research on solutions that can be expanded in the future. It is better to build the firm foundation once, rather than making works with too short longevity or small scale,

short exploitation time, causing waste of investment resources.

The Government and competent State agencies (ministries, departments and localities) is recommended to adopt policies to encourage agencies and organizations involved in traffic construction to implement the management model in compliance with ISO standards at all stages, from offices to the construction site;

The Ministry of Construction is requested to review and revise Circular No.16/2019/TT-BXD dated December 26, 2019 on the norm of design cost of traffic works. Accordingly, the Group B projects or more should be taken into account incentives and coefficients for unique and advanced technical solutions that have never been used before to encourage the innovation of the design consultants.

Changing the management and design thinking towards the sustainable traffic design solutions that have a close, reasonable and harmonious combination between three aspects of the development: (i) optimal technical-economic solution; (ii) effective operation; (iii) environmental protection and friendliness. Construction quality must fully cover the requirements of economic development, social justice and environmental protection. That is a responsibility and also a challenge for people involved in the construction of traffic works in our country today.

B. For the preparation of construction investment cost estimates

Performing the State management from the central level of the natural resources serving the construction. Planning the construction material mines in each locality. At the same time, it is necessary to have funds for surveying, designing and testing of excavated materials to make use of filling materials (soil, rock) from the excavated materials and avoid wasting the natural resources and minimize construction investment costs in the early stage of design.

For the unit price of construction materials, the Ministry of Construction is requested to have specific instructions to create a transparent and open market in accordance with Vietnam's market mechanism and the international practices. At the same time, it should build a database system on construction norms and prices according to the market mechanism to better serve the management of construction investment costs.

The Government is proposed to accelerate the application of new technologies, materials, economical and reasonable technical solutions, BIM technology, etc., in the management of construction investment costs.

The Government shall have policies on human resources development, expansion of domestic and international training forms about Management - Construction - Exploitation of Infrastructure works to improve the capacity of stakeholders such as the Project Owner, PMU, Consultant, Contractor.

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