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## Document support of cost management in underground construction projects

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### Abstract

The article presents identification and aggregation of cost management processes in conjunction with project life-cycle in underground construction. For the purpose of improvement of the project effectiveness the article recommends the system of document support for cost project management. The article gives specification of the main types of documents, describes its assignment and the order of its inputting in respect to developers.

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### 1. Introduction

The main purpose of project realization by developers is profit-making and improvement of the maximal rate of the effectiveness. Longstanding coordination of building contracts, delayed resources support, wasted time, extension of terms as well as flow rate buildup influence on cost project increase and consequently negatively effect on project effectiveness. Modern economic situation also troubles the improvement of the project effectiveness: under the conditions of crisis tax level, volatility in materials prices and high risk of developers disability are evident. In that context hard cost reliance on other project management subsystems and general economic tendencies make it determinative factor of feasibility of the project.

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For the very reason in challenging economic situation the developers require focusing on cost management investment projects. The special value is devoted to the processes of project cost management, which include:

- cost estimating of the project and its parts (resource determination taking into account the life cycle of project phases);
- project budgeting, which consists in organization, acting and analyzing project budget;
- cost control, notably permanent estimation of fact actual expenditures, its compare with previously target budget expenditures and development of correcting and preventative activities.

## 2. Experimental part

Cost management goes with the whole life cycle of the project, but the processes of cost management are realized in different ways depending upon the project stages.

Cost estimating is the estimation of the whole expenditures for achieving planning project effectiveness. Cost estimating needs definition of structure of resources and works and formulization of the next positions:

- characteristics of building projects and its structural components;
- amount of work completed;
- list and number of components;
- costing standards, retail prices and transportation expenses for materials, furniture, fixtures and equipment.

The first group of positions connects with the technical characteristics of building projects (bills of quantities, rough drawings, specification sheet, etc.), the second group includes real time system of construction costs.

The logical extension of cost estimating is budgeting, which creates the budget formation. Budgeting is the basis of cost project management and varies with the project stages. In its turn, budget is a document, in which costs and revenues are classified by cost items, time periods and activity types. As well as cost estimating, the budgets can be of various levels of granularity according to the project stages [3]. The structure of project budget can consist of purchasing budget, sales budget, executive expenses, budget of costs and revenues, Cash Flow Budget.

Cost control is determined by influence of the factors (the reason of fluctuations of previously planned budget) and oriented to management of changes in the project cost in purpose to decrease negative aspects and increase positive consequences of change in project cost. Cost control consists in detection of budget fluctuations by means of monitoring the economic measures, entering and managing budget data, predicting and preventing erroneous decisions, informing all budget participants.

As main indicators for definition fluctuations in cost results of the project different types of expenditures are used. They are target cost of works, cost of completed work (planned on completed volume in a period), cost of works actually completed on current date or resource number (actual cost used on work in noted period). In process of project realization expenditures on current date are compared with target positions, the analysis is made, and the decision about the necessity of budget correcting is made.

## 3. Results

In view of the above the author offers decomposition of documents, which are necessary for realization of main processes of cost management. Offered documents includes document support of cost management of investment building projects, it can be used by developers under the conditions of economic insecurity.

In the context of cost management three types of main documents are worth sharing: summary estimate, financing schedule and the budget.

Summary estimate includes the whole complex of expenses for project realization. On the ground of designing data schedule of work is created, it contains the sequence and work terms. Together summary estimate and schedule of work are the base for formation of financing schedule and the budget. Financing schedule identifies necessary amount of finance and payment mechanics, is composed according with cost items of summary estimate, includes information about whole target construction cost. In accordance with schedule of work the cost of every work parts

with actual periods in schedule of work. In this case actual work periods from schedule of work and the conditions of building contract are recognized. Building contract provides payment on works with the periods (advance fee, partial performance, 100% work completed). Also on a current day the cost of construction in process and fluctuation between payment and target cost can be estimated.

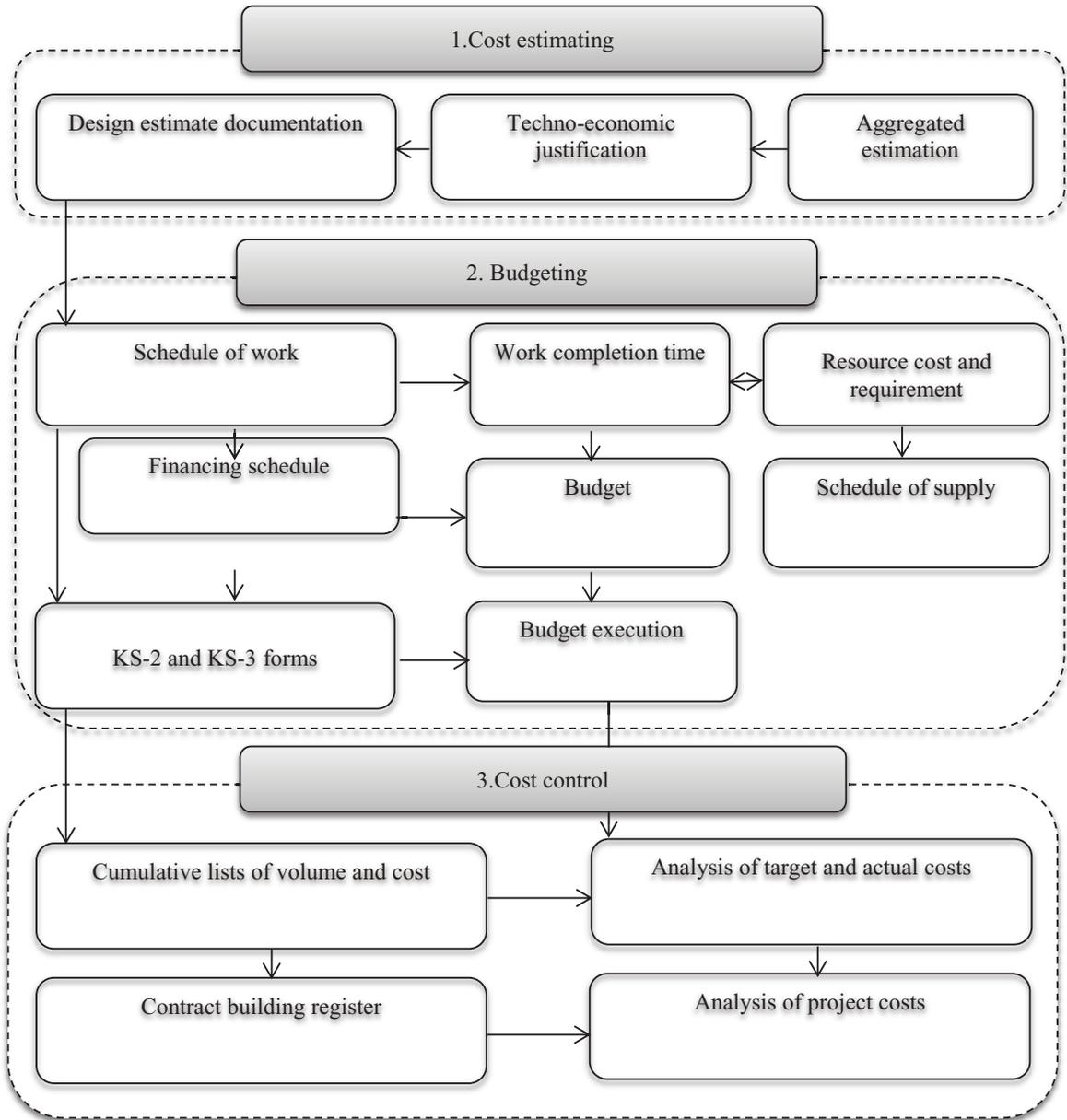


Fig. 1. Document support of cost management of investment project.

Project budget is used for estimating of returns, payments, rest of the money and demonstrates money deficit or profit. its quantity and company's needs.

The expenditures in Budget execution are formed in accordance with summary estimate. The result of financial month is the budget execution, it fixes plan and fact of payment, fluctuation and percent of execution.

With the help of the budget it is worth to control target percent of execution to the current date. After planning cash disbursement and estimating target square metres it makes sense to define the target level of the cost value. After target date it is necessary to calculate the actual data and current cost value.

During assimilating funds it is worth not to exceed the target cost and maintain accounting not only payment data, but also work completed data in money terms. For this purpose the contract building register is created with the data about project cost and work. On the base of the contract building register analysis of target and actual costs and analysis of project costs are made.

The document support allows to achieve the next key ideas of cost management projects [7]:

- Increase of cost project management system.
- Cost optimization by means of increase of authenticity, accountability and comparability of cost information throughout all project stages.
- Maintenance of cost control and support in management decision making according to project fluctuations.
- Decrease of factors of corrupt abuse and defaults by means of end-to-end cost analysis by all responsible executives.

#### 4. Discussions

Therefore, in the cases of economic insecurity the developers need to optimize project portfolio with good resource support. Think globally, act locally (motto of Club of Rome) is the paradigm of project management in crisis conditions [4]. In this regard the basic approaches to cost project management in crisis conditions are the next:

- Focus on actual projects.
- Process synchronization in cost management: cost estimating, budgeting, cost control.
- Clear connection between cost management processes and project stages.
- Abidance by document support of cost management as a factor of improvement of project effectiveness.

#### 5. Conclusion

At the present time low-quality cost project management system leads to risks of its realization. It means that use of modern methods of cost estimating, budgeting, cost control is in demand in practice.

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