# TECHNOLOGY OF OPERATIONAL CONTROLLING AT A GAS TRANSPORTATION COMPANY

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***Abstract:*** *The feasibility of controlling over costs at a gas transportation company was reasoned. The focus was placed on the need for transformation of methods for controlling implementation at the operational level. The basic specifics of Russian gas transportation companies' operation were considered designating the choice of controlling tools and their further modification. The algorithm for implementation of operational controlling of costs was submitted comprising the unit of analytical procedures, value chain creation opportunities, benchmarking implementation and ABC methodology. The specifics of applying each of recommended institutions under the conditions of comprehensive operation of a gas transportation holding were considered. The benchmarking methodology was transformed to be applied in diagnosing costs on gas transportation under which reference cost structure methodology was submitted. The sequence for implementation of modified ABC analysis guideline was submitted. Interdependency between recommended methods was shown.*

***Keywords:*** *controlling, costs, gas transportation company.*

## 1. INTRODUCTION

In the contemporary conditions of fuel and energy sector operation, it is hard to overestimate the urgency of cost management tools in any links of the product (work, service) value chain. The costs of transportation of hydrocarbon raw materials are not an exception here. One of efficient methods employing a wide range of tools is controlling (Akayev and Deberdiyeva, 2014). Its opportunities have been rather actively discussed in the contemporary scientific literature. However, practical application of that method is difficult because of the need of its adaptation to the sectoral conditions in which the organizations planned for introduction of controlling

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are operating. For instance, comprehensiveness of a Russian gas transportation holding, its external and internal operational conditions require serious modifications of controlling methods. Meantime, if on the level of strategic initiatives the attempts to differentiate and transform theoretic and methodological basics of controlling are being made, the level of operational solutions in studies of Russian and foreign authors is rather low. Meantime, it is the operational level on which it is feasible to do search and mobilization of resources to improve costs efficiency (Ivashkevich, 2011), including via adjustment of management tools used in that kind of business practice.

## 2. METHODOLOGY.

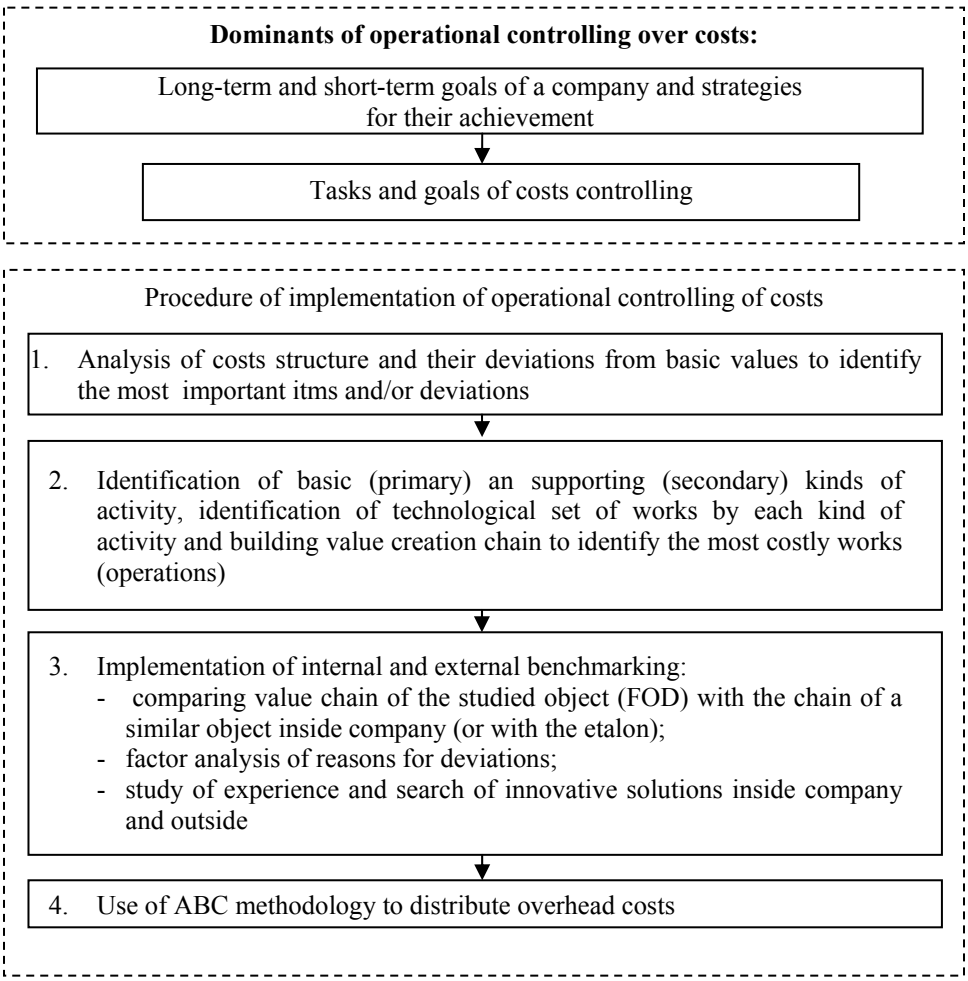
One of the disadvantages typical for controlling implementation practices in the national gas transportation companies is fragmentation and lack of sufficient penetration (Ostashkin, 2013). The controlling system is often implemented on the top level of management and does not cover executive structures (Kuznetsova and Kot, 2012; Andronova, 2006; Dedov, 2008). We offer to consider this level from the standpoint of its methodological provision with cost controlling tools. As the object of research, it is offered to consider field operations department (FOD), its core target being ensuring continuous operation of a line portion of the gas pipeline.

As in the objective of this research it was specified that the cost controlling system implemented in FOD is related to operational management, it is feasible not to stress the attention on strategic tools of controlling and work with operational methods. Meantime, qualifying by authors of any tool as a particular kind of controlling is rather biased and relative. Only detailed and deep study of the tool application practice and opportunity of its adaptation to the current situation in the company may give a view of its feasibility for use. Therefore, it is required to specify a few significant particular features of a gas transportation company operation.

One of the basic principles of gas transportation arrangement is its continuous operation, i.e., no breaks in the course of gas transportation services providing. Gas transportation product is non-production transportation of gas which means absence of material or real form of products. Other specific feature of gas transportation system is domination of costs not depending on the volume of oil and gas transportation. They comprise costs like salaries with accruals, administrative and management costs; most of buildings, structures and inventory, etc.

From the standpoint of authors' logics, taking into account the said specific features the sequence of operational controlling implementation on FOD level may look as follows (Figure 1).

**Figure 1: Technology for implementation of operational controlling of costs (field operational department level)**




According to the authors' algorithm, operational controlling of costs on the executive level should be implemented taking into account targeting and strategic initiatives implemented on top management levels and targets and tasks of general corporate cost controlling. Meantime, controlling procedures should be initiated from general vertical and horizontal cost analysis to identify the most significant ones in the general structure as well as the most critical fluctuations from the planned values or the level of previous periods

(Guseva, 2007). It is notable that plan/fact analysis may help find the problem areas not only in production but also in planning methodology. At the next stage of research, it is required to identify the technological scope of works in that comprehensive process, their sequence and which actions are the most costly requiring high costs and creating the basic value of the final product (repair) and which are of low significance in the cost of repair (Vdovin, 2011).

For those purposes the methodology for creation and analysis of works value chain is the most suitable which may enable to identify the major repair (MR) technology and in which links it is possible to achieve lower cost-price and where additional costs occur. Meantime, that tool is feasible to be adjusted to ensure correct formulation. For instance, it is hard to operate competition categories in the event of a division on the executive level of a holding's structure. In such a situation it is not quite correct to operate internal competition terms as the specifics of organization's technological structure prescribe subsequent transfer of transported raw materials from one division to another. So, one of the core features of competition – business in one market – is not complied with. Nevertheless, the use of this method may assist in implementation of further analytical procedures. With some allowances and adjustments we suggest using some terminology from the authors' approach.

At the next step, it is required to compare the efficiency of the enterprise with other similar profile organizations. The controlling tool enabling to compare the performance parameters of competitive and non-competitive environment aimed to improve competitiveness of an organization via search, adaptation and implementation of the best practices is benchmarking (Fukova, 2010).

We note that the specific feature of the Russian business is its closed nature, so the implementation of benchmarking opportunities for national enterprises is rather hard. Besides, a specific feature of building a main gas pipeline is its arrangement within a natural monopoly which evidences the absence of comparative basis. However, it does not mean inability to use the opportunities of cross (related) benchmarking, i.e., comparing and adoption of the best corporate practices from related/unrelated sectors or markets. In this paper we offer to study internal benchmarking which is used to compare divisions inside a company.

For main gas pipeline transportation enterprises the implementation of internal benchmarking of costs is suggested as follows. For the purposes of

identifying the reserves for enhancement of costs efficiency it is suggested to compare specific costs for pumping 1,000 $m^3$ of gas for 1 km separately for each division (department) (Table 1).

**Table 1.**
**Specific costs for transportation of 1,000 $m^3$ of gas/km**

| *Type of works (divisions)* | *Specific costs, thousand rubles* | | | | *Reference* | |
|---|---|---|---|---|---|---|
| | $FOD_1$ | $FOD_2$ | … | $FOD_m$ | *thousand rubles* | *Specific weight, unit share* |
| Basic (primary) | | | | | | |
| • gas compressor department (GCD) | $n_{1g}$ | $n_{2g}$ | … | $n_{mg}$ | $n_{getal} = \min (n_{1g}- n_{mg})$ | $d_g$ |
| • line maintenance department (LMD) | $n_{1l}$ | $n_{2l}$ | … | $n_{ml}$ | $n_{letal} = \min (n_{1l}- n_{ml})$ | $d_l$ |
| • instrumentation and automation department (IAD) | $n_{1c}$ | $n_{2c}$ | … | $n_{mc}$ | $n_{cetal} = \min (n_{1c}- n_{mc})$ | $d_c$ |
| Auxiliary (secondary) | | | | | | |
| • power, heat and water supply department (PHWD) | $n_{1e}$ | $n_{2e}$ | … | $n_{me}$ | $n_{eetal} = \min (n_{1e}- n_{me})$ | $d_e$ |
| • fleet vehicles (FV) | $n_{1v}$ | $n_{2v}$ | … | $n_{mv}$ | $n_{vetal} = \min (n_{1v}- n_{mv})$ | $d_v$ |
| • housing and utilities department (HUT) | $n_{1hu}$ | $n_{2hu}$ | … | $n_{mhu}$ | $n_{huetal} = \min (n_{1hu}- n_{mhu})$ | $d_{hu}$ |
| • administration and management departments (AMD) | $n_{1am}$ | $n_{2am}$ | … | $n_{mam}$ | $n_{ametal} = \min (n_{1am}- n_{mam})$ | $d_y$ |
| • current repair buildings and structures department (CRBSD) | $n_{1cr}$ | $n_{2cr}$ | … | $n_{mcr}$ | $n_{cretal} = \min (n_{1cretal}- n_{mcretal})$ | $d_{cr}$ |
| TOTAL | $N_1$ | $N_2$ | … | $N_m$ | $N_{etalon}$ | 100 |
| Euclidean distance | $E_1$ | $E_2$ | … | $E_m$ | - | - |

In this table, costs are structured by types of works (divisions). However, as the basis for comparison, costs structured by other characteristics (elements of costs, items, etc.) may be used. An important moment in using the suggested approach is formation of etalon structure of costs which in this case is suggested to be formed of minimal values of the above cost elements. To rationalize the quantity of reserves, Euclidean distance may be calculated,

i.e., finding deviation of costs by each division from the etalon value accounting for deviation value by each type of cost.

$$E_i = \left[\sum d_i \times \left(n_{ij} - n_{\text{jetalon}}\right)^2\right]^{1/2} \rightarrow min, \quad (1)$$

where $d_i$ – weight factor, reflecting the importance of the *i*th type of costs in their totality;

$n_i$ –value of the *j*th type of costs of the *i*th structural division in reported period;

$n_{jetalon}$ – etalon value of the *j*th type of costs.

As weight factors, it is suggested to use specific weights of each element of costs in the total value of costs calculated on the basis of etalon structure of costs. If there are any significant deviations of actual costs from their etalon values, it is recommended to do detailed factor analysis of deviations to identify whether such differences are biased/unbiased to further see the directions of future search for reserves.

Besides, an important place in operational cost controlling is occupied by accounting for and controlling overhead costs (Saraykin, 2008). As the analysis shows, those types of costs make up a great portion in total corporate costs but their planning and accounting has somewhat probable nature. Frequently there are problems in finding true costs on production in the course of distribution of overhead costs as it is impossible to recognize them directly in the cost-price of a product (costs on administration, heating and lighting, amortization of fixed assets, etc.).

The traditional solution of this problem would be distribution of overhead (indirect) costs proportionally to a single basis for distribution onto objects of costs. Meantime no basis for distribution of indirect costs gives reliable exact information of actual costs for making a product/service/work, as overhead costs in essence are greatly varying connected to both production and non-production activity (administration and management costs). The latter having no mutual relation to the volume of production should in no way be distributed proportionally to the volumetric parameters (Saraykin, 2008). So, the traditional method of distribution of overhead costs disfigures the cost-price of products and causes wrong decision making. The urgency of overhead costs management methods is enforced by growing level of production automation followed by growing overhead costs (amortization of equipment, losses on reengineering, etc.).

One of possible and rational approaches in this situation and solution of the problem could be ABC method (Dzyobko, 2008; Han, 2005), the core difference being distribution of costs not on a particular product/service but stage by stage (in an iteration way): first, on a certain resource proportionally to chosen costs driver, then by transfer of value of resources onto operations proportionally to drivers of resources. Thereafter, the cost of production operations or production services is distributed on the value of a particular product proportionally to drivers of operations as a result forming a stricter, reasonably calculated cost-price of cost objects.

Implementation of ABC methodology at an enterprise is enhanced by the results of earlier used instruments. ABC analysis is a continuance of methods of analysis of value added chain and benchmarking resulting in identification of administrative portion and consideration of overhead costs. In that connection, a need for analysis of their distribution between each link of value added chain arises. Finally, ABC analysis helps identify core cost carriers in the works proportionally to which overhead costs should be recognized.

## 3. RESULTS

As a result of the research, the authors obtained an algorithm for implementation of operational controlling of costs in a field operational department of a gas transportation holding. This algorithm comprises the unit of analytical procedures and the use of opportunities of methods like building value chain, benchmarking, ABC analysis. Recommendations have been made in connection with adaptation of those methodological instruments to gas transportation enterprise's operation. In particular, internal cost benchmarking methodology was offered to form etalon structure of costs on gas transportation via main pipelines. That methodology is recommended not only as an analytical tool but as a basis for decision making in cost control as it allows not only comparing the levels of costs but adopting the positive experience in technology of works and their control. Besides, a modified methodology of ABC analysis was offered to account for and distribute overhead costs taking up a great portion in the cost structure. Meantime, interdependency of the said methods was shown and their implementation sequence was rationalized.

## 4. DISCUSSION

Controlling implementation issues at gas transportation enterprises have been studied by scholars rather well (Sidorenko and Kot, 2013). Some works

relate mainly to the adjustment of conceptual basics (Airapetov, 2007; Golovina, 2011; Karminskiy and Falko, 2009; Lukyanova, 2012). Some researchers cover on controlling implementation issues and informatization of those processes (Belotserkovskiy, 2010; Makarova, 2008; Shapchits, 2010). This paper makes an attempt to study methodological basics of controlling on the executive level. Meantime, it is suggested to adapt particular instruments, traditionally deemed strategic, to the specifics of the research object.

Surely, this paper covers only a limited set of controlling opportunities. In further research, other instrumental approaches should be considered, in a similar way adapting them to gas transportation enterprises operation and development. Considering high labor intensity of some methods and the need to ensure their systematic use, taking into account the IT opportunities is prospective to the extent of adjustment of software used in corporate management at present.

## 5. CONCLUSION

The analysis has shown fragmentation of existing approaches to controlling implementation process algorithmization and the need to create controlling sequence taking into account its specificity by types and levels of control objects. It predetermined the ability to form authors' sequence of actions in development of solutions in cost controlling on the operational level. That sequence should comprise the unit of analytical procedures, use of opportunities of building value added chain, implementation of benchmarking and ABC analysis. The algorithm created is aimed to implement the principle of comprehensiveness in the use of collected and systemized management instruments.

Finally, an integral mutually supportive set of cost controlling instruments was obtained enabling to avoid disfiguring of products' cost-price, providing more reliable and full information for cost control, enhancing improvement of organization's competitive position, also ensuring more strict and rational planning and arrangement of major repair.

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