

# Construction Project Effectiveness

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**Abstract:** As the competition within the construction market is fiercely increasing, the margin of profit in construction organisation is getting smaller and smaller, and price control of construction project become more and more important. The control of construction project cost becomes one among the cores in project management. Construction project management may be a systematic, comprehensive, dynamic subject, that requires the construction project manager to regularize and standardize the organization, goal, quality, safety, efficiency and cost of construction project.

The paper discuss the benefit made by construction sites operated by one organisation as a measure of their effectiveness. The different sorts of cost, that ought to be covered by income, were described. The distinction between indirect cost made on construction site and indirect cost made by headquarter of the organisation were shown, also as necessity of including both on them in calculating construction site effectiveness. Three different method of assigning organisation overhead cost to the construction site were shown and discussed. Their significant influence on construction site profitability was emphasised and determined for exemplary values. The necessity of calculating full cost for every construction site operating by one organisation was discussed within the article too, by showing which information is important for the organisation management, a construction site management and for organisation shareholders

**Keywords-** Civil Engineering, Construction Industry, Construction Project Effectiveness, Profit.

## I. INTRODUCTION

### 1. The Profit as a measure of effectiveness:

It is often said that a given project was successful if planned time schedule was kept and cost wasn't overrun [1], [6]. The time schedule is easily accessible document. It clearly shows the beginning and therefore the end of a construction project, so it's easy to see if milestones were kept by a contractor and if the completion date of a project wasn't later than planned its end. The cost of a project is not the same for a client and a contractor.

When the contract value is lump sum, a client expects that the entire cost of erecting a building object won't exceed the value stated within the contract signed with contractor. In the case of unit prices based contract, the client's expectations allows for a few changes within the contract value consistent with the differences between the estimated quantity and real number of works executed. A contractor's point of view on cost of a project is far different.

The value stated within the contract signed with a client is an upper limit of the contractor's income which will be achieved on a given project. A cost of the project are often managed and it should be less than income. It should cover the direct cost of construction project, indirect cost arised on site and at headquarter of the organisation. Remaining a part of income – if appears – constitute profit of a construction site.

### 1.1 Importance of making profit:

Profit figured out by an organisation allows for development. New machineries are often acquired, contracts of larger values are often won and financed. As a results of that higher profit can appears during a company financial statements. A tendency to creating profit higher and better are often explained by safety of the organisation existence on the market. The significant part of profit usually isn't spent, but left for a company as a reserve during crisis time. This is one of the most important reasons for making a profit – willingness to survive [8], [4].

### 1.2 Estimating a profit for the organisation operating only one construction site:

Considering that the organisation operates only one construction site, income achieved on that one construction site should cover cost (direct and indirect) and remaining part constitute profit. Fig. 1 shows how income is divided.

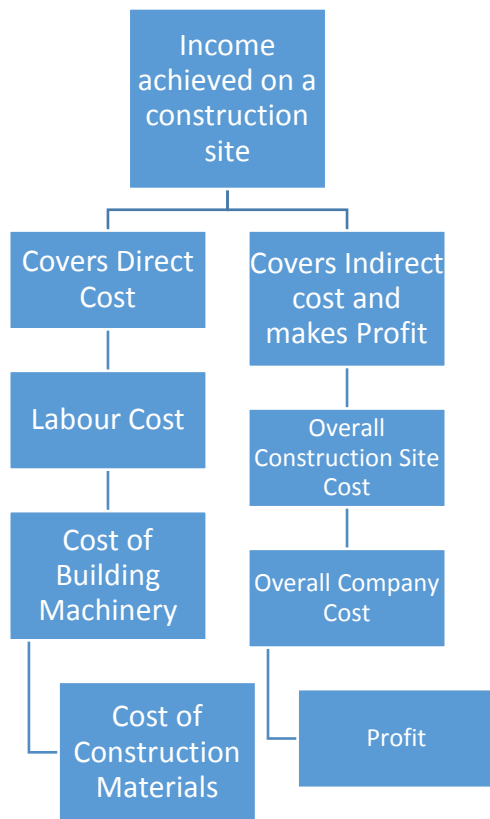


Fig. 1. Separation of income achieved on construction site.

Direct costs are often easily assigned to the precise works being administered. The cost of site management, office and social containers, a fencing, guard service, lightening the location serves to all or any activities. As the construction site is settled as a single unit, there's no requirement to divide these indirect cost into specific activities. Achieved income should cover them all. The organisation has its headquarter, accounting department, human resources department etc. and their cost should be covered by income too [1], [7].

To determine the profit of the construction site, the following formula can be applied

$$Y = P - TCW - L_b \dots (1)$$

Where;

Y - profit of a construction site,

P - income achieved on a construction site,

L<sub>b</sub> - overall construction site cost,

TCW - direct cost of construction works,

Having Y calculated, the company profit Y<sub>p</sub> can be calculated too as

$$Y_p = Y - L_p \dots (2)$$

Where;

Y<sub>p</sub> - profit of the company (operating only one construction site),

L<sub>p</sub> - overall company cost.

### 1.3 Estimating a profit for the organisation operating a few construction sites:

Profit of the organisation that operates a few construction sites can be calculated on the basis of equation no. (2), where profits from all construction sites should be recapitulated. Then

$$Y_p = (\sum Y_i) - L_p \dots (3)$$

Where;

Y<sub>i</sub> - profit from *i* construction site being operated by the organisation.

In order to calculate profit achieved on each individual construction site, it is important to assign parts of overall company cost (L<sub>p</sub>) to each construction site.

## 2. Procedure of assigning overall organisation cost to construction sites-

### 2.1 Procedure description:

There is no obligatory method of allotting overall construction cost to building construction sites. The decision is left to the CEO (Chief Executive Officer) of the organisation. He/she is often advised by the financial experts but the choice is carried by CEO [1]. There are some methods widely used [6], [3]:

- in equal portions,  
L<sub>pi</sub> = L<sub>p</sub>/n ... (4)

Where;

L<sub>pi</sub> - the part of overall company cost assign to *i* construction site,  
n - number of building sites operated by the company.

- proportionally to site income,

$$L_{pi} = (P_i / (\sum P_i)) * L_p \dots (5)$$

Where;

P<sub>i</sub> - income achieved by *i* construction site

- proportionally to site profit,

$$L_{pi} = (Y_i / (\sum Y_i)) * L_p \dots (6)$$

Having L<sub>pi</sub> defined, it is possible to write a formula for profit of the *i* building site after overall company cost assigned, marked as Y<sub>i</sub>'.

$$Y_i' = Y_i - L_{pi} \dots (7)$$

CEO can choose method, even suggest his/her own one, e.g., the ratio 5:8:7:9 for four construction sites the organisation runs. Nevertheless, every method will have different results for individual construction site.

**2.2 Examples of organisation overhead cost assignments:**

Let's assume that the organisation operates three building construction sites 1, 2 and 3. The results achieved by each construction site are shown in tab. 1, also the company profit is calculated. It is to emphasize, that the building construction site profit is calculated before Lp assignment.

**Table 1. Results achieved by construction sites and the organisation.**

Results achieved	Site 1	Site 2	Site 3	Total
Income	20000	5000	7000	32000
Direct Cost	13400	3000	4550	20950
Overall Construction Site Cost	6000	1500	2100	9600
Construction Site Profit ##	600	500	350	1450
Overall Company Cost	#	#	#	1200
Company Profit	-	-	-	250

## - before Lp assignment

# - not assigned yet

Subtraction Lp from the building construction site profit, using three above described methods (as shown in Table 2. can give profit or loss for a given construction site. The method of assignment doesn't affect the entire profit of the organisation, of course.

Site 2 only shows the profit every time, independently from the Lp assignment method. Sites 1 and 3 are often evaluated as profitable or loss making just in case on choosing different assignment methods. Which method is that the right one, which method is fair. It cannot be said. The contract 1 (the biggest one) won thanks to low profit assumed. It has allowed for low bid price. Applying the tactic where the organisation's overhead cost are assigned proportionally to income, it puts this building on loss side. The contract 3 is middle profitable i.e. 5 % (350/7000), but its income is far lower that for contract 1. Dividing organisation overhead cost on equal parts creates loss for Site 3.

**Table 2. Construction sites profit after assigning organisation overhead cost.**

Methods of overall company cost assigning	Profit after Lp assigning			
	Site 1	Site 2	Site 3	Total
Equal portion	2,00,000	1,00,000	- 50,000	250
Proportionally to income	-150	31,250	8,750	250
Proportionally to site profit	10,345	8,621	6,034	250

The contract 2 is very profitable i.e. 10 % (500/5000) and for each method of organisation overhead cost assigning (chosen from aforementioned) Site 2 shows profit (varying from 86,21 to 312,5). On the opposite end, assignments are done proportionally to already achieved values. A project manager of contract 1 are often confused when consistent with his/her extraordinary engagement, planned profit (before assignment) has risen twice, but consistent with the assignment method applied, after deducting a part of the organisation overhead cost, the contract he/she managed become much less profitable or maybe loss making.

Taking a choice about the tactic of organisation overhead cost assignment should take under consideration the assumptions made on the stage of preparing a suggestion for a given contract – the assumed profit level and therefore the total value of a suggestion. Otherwise assignment of overheads can create false evaluation of construction sites profitability.

**3. The reasons of assigning organisation overhead cost to a construction sites:**

There are three groups of individuals curious about proper evaluation of construction sites operated by a given company [5]:

- management of the organisation,
- construction site management,
- shareholders of the organisation.

All of them so as to hold the proper decision, require precise information about profitability of the organisation and its construction sites. In a fact, it's a rare case when a construction organisation operates one construction site only. But even then, accounting, human resources, marketing and other functions of the organisation need to be provided and financed. There is no reason to omit these cost in calculating construction site effectiveness.

It refers to the organisation operating more than one construction site too. Owners of a company i.e. shareholders got to make certain that the size of administrative part of the organisation is matched to the size of organisation operations. The total profit of the construction organisation is not sufficient information to evaluate it. Building site effectiveness is needed. The total profit is often on the satisfying level e.g. according to one, big, very profitable construction site only, whereas other sites are poorly managed. In this case, the foremost of headquarter effort is directed to the present not profitable sites. Inaccurately chosen assignment method can produce false, misleading information. The management of the organisation should be given accurate, precise information concerning construction site effectiveness. Directors are responsible for selection of contracts for execution by the organisation. Proper financial information can help find the principles, and to work out which contracts are valuable for the organisation and which should be avoided. The profit of a construction site supported full cost calculation may be a measure of project manager abilities and energy too. False evaluation of the construction site results in wrong decisions. A project manager need to know the system of overhead cost settlements too. He/she mustn't be surprised at the top of the project, that the positive financial effect was turned to negative by the executive decision as choosing organisation overhead cost assignment method is. It is especially important for project managers who aren't the organisation employees, hired for a particular project only.

## II. CONCLUSIONS:

Construction organisation overhead cost are generated by its headquarter.

The roles of accounting, human resources, marketing departments etc. as a managerial function are important for operations and required to be financed. The effort of tangible assignment of aforementioned cost (of each headquarter department) to the construction site would be too high. CEO makes a choice about the tactic of assigning these overhead cost to a construction sites (projects). In order to make proper, precise and reflecting reality information about construction site effectiveness, the tactic should be chosen very carefully, taking under consideration initial assumptions concerning each project being executed. Wrongly chosen assignment method can transform the project evaluation. Profitable construction sites are often shown as a loss making

one. Shareholders of the organisation, top organisation management and project managers require precise, reflecting reality information about construction project financial effectiveness so as to hold correct, future decisions aimed to making a profit by the organisation.

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