

An Identification of Construction Project Overheads for Sustainable Cost Management and Controlling Practices (CMCPs)

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Abstract. Project overheads are allocated on a percentage basis to project costs and common to maintain multiple cost objects, but cannot directly be distributed to construction activities. Construction project overheads have to be identified their cost behaviours properly in order to sustain Cost Management and Controlling Practices (CMCPs) during the construction stage. The literature review method identified forty seven (47) project overheads and categorised into four hierarchies (unit, batch, project, and facility levels). Therefore, the identification of project overheads should enable a sustainable improvement to the CMCPs in construction projects.

Introduction

Academics and professionals are increasing their thought in project overhead researching construction practice, for instance: a calculation and recovery of general office overheads [37]; a case study on project overheads and profit point analysis for costing methods [21 and 22]; techniques for calculating unabsorbed general office overheads [32]; development of a decision support system model for mapping overhead rates [8]; and so on. The proportional ratio of project overheads to total construction costs has significantly increased compared with materials and labour [3 and 21], and are very important for sustaining most of the construction activities [9]. The ratio of overheads to the total project costs typically ranges between 8 and 15 percent [11]. The average overhead cost in real projects is slightly higher than reported in the literature and is very much dependant on the involvement of project participants, project stakeholders, project complexities, and utilisation of equipment and advanced technologies.

Overheads are defined from a cost accounting view point as *'those expenses of production which cannot readily be allocated directly to particular units of production or particular productive processes'* [6, p.7]. This definition indicates that overheads are unclearly related to particular activities of construction projects. It could result in a significant cost misrepresentation if allowing overheads arbitrarily allocated to activities, jobs and projects. This may lead to distorting the activity costing for related overheads during the construction operation, either one activity being budgeted too low or the other too high.

[34, p.C9-1] gave a definition of overheads as *'a cost item that is common to two or more cost objectives and cannot be identified specifically with any one of the cost objects in an economically feasible manner'*. It can be understood as being concerned with explaining the process of accounting overhead costs to fulfil multiple types of activity cost objects through multiple rates of activity cost drivers. However, the percentage addition basis of project overheads is added to total building costs [28], and that should not be compounded in a total construction cost [9]. Project overheads remain in an unclear relationship to construction activities [16 and 17] and consequently, it is inaccurately distributed to particular construction activities [18].

The traditional costing system does not clearly relate the specific project overheads to particular construction activities. It was argued that project overheads must be assigned and directly distributed to every construction activity to avoid cost distortion between different activities

[13]. The current cost accounting management approach concerns external standard requirements for recording, documenting, (sometimes) interpreting, communicating, and reporting economic information [10, 14 and 15]. The role of the cost accounting management approach is primarily criticised because it is focused too much on satisfying external parties, and consequently far too little attention has been paid to internal improvement on the management of project overheads during the construction operation. Both the traditional costing system and current cost accounting management approaches do not explicitly address specific project overheads during the construction stage. Project overheads should be clearly defined, accurately assigned, and effectively distributed to particular construction activities [19]. Therefore, construction project overheads are identified and analysed for improving the sustainability of Cost Management and Controlling Practices (CMCPs).

Approximately forty seven (47) project overheads were identified during the literature review stage, and they were categorised into four hierarchies, such as: (1) unit-level, (2) batch-level, (3) project-sustaining, and (4) facility-sustaining overheads. The availability of project overheads should enable the sustainability improvement of the CMCPs in construction projects. The following section elaborates the process of identification of construction project overheads *through the literature review methods* [refer to 12, 30, 31 and 36].

Identification of Construction Project Overheads

Identification of overheads only considers site-project overheads during the construction stage. Site-project overheads are referred to as allocated costs that are not apportioned to particular activities and which should not be included in the composite rates [9]. However, site-project overheads can be identified typically and their hierarchy of occurrences may be associated to related activities which require overheads for supporting the completion of jobs, projects or services. Therefore, *construction project overheads* can be categorised on the basis of their occurrences for sustaining construction activities, as unit-level, batch-level, project-sustaining, and facility-sustaining costs.

Unit-level overheads occur when supporting a single unit of particular activities on the basis of unit-level activity cost drivers. *Batch-level overheads* occur to support two or more parallel activities on the basis of batch-level activity cost drivers regardless of the number of construction activities within the batch. *Project-sustaining overheads* occur when supporting a particular group of activities on the basis of project-sustaining activity cost drivers, regardless of the number of units or batches of construction activities. Whereas, *facility-sustaining overheads* occur to support all project activities on the basis of facility-sustaining activity cost drivers, regardless of the number of units, batches, and groups of construction activities within the particular project.

Construction project overheads are synthesised and summarised based on works documented by practitioners and researchers such as [1; 2; 3; 4; 6; 11; 20; 21; 22; 23; 24; 29; 33; and 35]. The categories and items of construction project overheads are listed in Table below.

Table1. Four Categories of Project Overheads

Categories of Site-Project Overheads	Items of Site-Project Overheads		
Unit Level Overheads	• Equipment depreciations	• Direct tool sets	• Safeguards
Batch Level Overheads	• General inspections • Mobilisation and setup equipment • Demobilisation materials and equipment • Drawing reviews	• Change orders • Sample of materials • Material tests • Placing purchase orders • Materials deliveries	• Receiving materials • Paying suppliers • Moving materials • Quality inspections • Intermediate project release
Project Sustaining Overheads	• General planning • Scheduling projects • Planning resources • Planning costs	• Engineering costs • Controlling costs • Project reporting • Soft drawing	• As built drawing
Facility Sustaining Overheads	• Site-office & project storage • Site-project administration • Site-project supervision • Site-project labour • First aids • Project insurance • Legal expenses • Rental plant and equipment	• Rental land, and base camp for workers • Scaffolding • Hoarding screen • Temporary building • Water supply • Power and lighting • Telephones and communications • Security services	• Cleaning services • Transport and haulage • Managing contract conditions • Project's working conditions • Project sundries

Every project can utilise different items and different categories of overheads as listed above and maintain costs in particular methods (e.g., overheads are arbitrarily allocated, or accurately assigned) depending on characteristics or complexities of the project. However, overhead costs should be appropriately distributed to support particular activities and properly managed and controlled during the construction operation. It would seem to be a lot of relevant issues and potential challenges as well as opportunities in order to improve sustainable cost management and controlling practices – the CMCPs of construction project overheads. The next section discusses the results of identified project overheads.

Discussion

Management of project overheads refers to the cost management definition as explained in the Project Management Body of Knowledge (PMBOK® Guide), where the cost management of construction project overheads primarily concerned with consideration of the '*stakeholder requirements*' for the cost of resources to complete project activities [26]. However, the management of construction project overheads should also consider the importance of '*managerial decisions*' and the subsequent effects of actual project expenses, to maintain the progress and performance of construction activities during the construction stage.

The construction stage (e.g., mobilisation and construction to practical completion) represents one of the five project phases according to the Royal Institute of British Architects - RIBA [refer to 7; 25; and 27]. Project overheads have specific characteristics of cost behaviours. [6]considers overheads as the indirect expenses that cannot readily be allocated to a particular activity or product. [34]defined that overheads are the resource costs which are common in supporting one or more cost objects, but cannot specifically be associated to particular activities. However, project overheads in constructions are classified into two types: *general-office overheads* and *site-project*

overheads. General-office overheads maintain general expenditure for the survival of the construction company, while site-project overheads are allocated to support all activities of the particular construction project.

Therefore, the cost management and controlling practices – the CMCPs of project overheads should consider the stakeholder requirements, project manager decision makers, and the characteristic of project overheads. The following section focuses the discussion on identification of the occurrence of site-project overheads during the construction stage.

During the literature review stage, forty seven (47) project overheads are identified and categorised into four hierarchies of construction project overheads (refer to Table before: Four Categories of Project Overheads). Project overheads support most of the construction activities using relevant cost drivers through their hierarchical cost pools that include: unit-level, batch-level, project-sustaining, and facility-sustaining overheads.

Unit-level overheads are identified as activity costs which are assigned for by the unit of occurrence of activity basis, where these overhead costs can be traced for every unit of activity. For example: project helmets, safety shoes, hand tools, etc. can be categorised to unit-level overheads because every unit rate of their actual project expenses may occur during a single activity, e.g., construction preparation activity.

Batch-level overheads are identified as activity costs that are assigned for by the batch of occurrence of particular activity bases, where overhead costs can be traced for every batch of activities, regardless of the size of the batches. For example, an excavator with an operator cost is categorised to batch-level overheads because every batch of their actual expenses may occur during parallel activities, e.g., preparation and excavation activities.

Project-sustaining overheads are identified as activity costs that are assigned for by the individual occurrence of the project basis, where overhead costs can be traced for related activities of the project, regardless of the size of units and batches. For example, site managers, quantity surveyors, drafters, and so on are categorised to project-sustaining overheads because every hour/week/month rate of their actual project expenses may occur during group activities which are included on all substructure activities, such as preparation, precast concrete piling, excavation & backfilling, pile-cap concrete pouring, tie beam & ground slab concreting activities.

Facility-sustaining overheads are identified as activity costs that are assigned for by the facility employed for the project basis, where overhead costs can be traced for sustaining a whole project. For example, site-office and supplies, administration staff and consumption, site-storage, security, telephone, power, water, and so forth are categorised as facility-sustaining overheads due to actual expenses of these services occurring during whole construction activities of the project.

Summary

Management of project overheads is increasingly becoming the interested area of research to both academics and professionals. Project overheads are arbitrarily allocated to project costs, and common for maintaining multiple cost objects, but cannot directly be distributed to construction activities. Construction projects would inevitably require overheads for sustaining most of the construction activities. Construction project overheads are expected to be slightly higher in real projects than is reported in the literature.

The literature review identified forty seven (47) items of project overheads. They are most often present in construction and categorised into four hierarchies: unit level, batch level, project sustaining, and facility sustaining overheads. These should be able to sustain and improve the cost management and controlling practices – the CMCPs of construction project overheads.

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