

AACE
INTERNATIONAL
RECOMMENDED
PRACTICE

28R-03

**DEVELOPING LOCATION FACTORS
BY FACTORING – AS APPLIED IN
ARCHITECTURE, ENGINEERING,
PROCUREMENT, AND
CONSTRUCTION**

SAMPLE

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DEVELOPING LOCATION FACTORS BY FACTORING – AS
APPLIED IN ARCHITECTURE, ENGINEERING, PROCUREMENT,
AND CONSTRUCTION

TCM Framework: 7.3 – Cost Estimating and Budgeting
10.4 – Project Historical Database Management

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Note: As AAACE International Recommended Practices evolve over time, please refer to www.aacei.org for the latest revisions.

Contributors:

Disclaimer: The opinions expressed by the authors and contributors to this recommended practice are their own and do not necessarily reflect those of their employers, unless otherwise stated.

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INTRODUCTION

Location factors are a vital product of any cost engineering service organization supporting industries with global assets and projects. One thing is for certain—location factors will be challenged. So, not only is it important to have an easily-understood and logical method of developing location factors, the process must be supported with hard data from a well-defined survey and a project execution knowledge that only comes through experience. This Recommended practice documents such a process.

International markets and politics are constantly changing, and those involved with developing location factors must constantly collect, analyze, and understand the effects created by these changes. Location-factor development should not be a mathematical exercise that is done on an as-needed basis, but should be a continually improving process. The factoring method of developing location factors is a tool for living that process.

This recommended practice provides a generic method of developing location factors in support of the Total Cost Management (TCM) cost estimating and budgeting and database management processes for construction related projects. The method applies to construction projects of all types including buildings, infrastructure, utilities, process plants, and so on. This generic method provides a basis for users to tailor their own detailed process around their own needs and computing capabilities. Location factors are used during preliminary project evaluations (i.e., Class 5 or 4 estimates). They are not intended to be used when preparing appropriation-quality estimates (i.e., Class 3 or better estimates).

A location factor is an instantaneous (i.e., current—no escalation or currency exchange projection), overall total project factor for translating the total cost of the project cost elements of a defined construction project scope of work from one geographic location to another. This factor recognizes differences in productivity and costs for labor, engineered equipment, commodities, freight, duties, taxes, procurement, engineering, design, and project administration. The cost of land, scope/design differences for local conditions and codes, and differences in operating philosophies are not included in a location factor.

Location factors provide a way to evaluate relative cost differences between two geographic locations. They often are applied to conceptual estimates for identifying "go/no-go" projects at an early stage. The ability to produce meaningful data during the conceptual stage is critical to the efficient management of the funds and resources of owners. This is what drives location-factor developers toward methods that are accurate, flexible, easily managed, and allow a quick turnaround.

Listed below are some common methods of developing location factors that do not use the factoring approach covered by this recommended practice. While the methods are valid approaches, reasons why these methods may not be preferred are noted.

Cost-versus-cost (comparing actual costs from two similar projects):

It is rare to find two projects that truly have the same scope. Even if they are the same, there is no assurance that all costs have been captured, or that the estimated average exchange rate conversions for offshore purchases were accurately identified. There is also the inherent possibility of error when trying to normalize historical project costs.

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Cost-versus-estimate (comparing the actual cost of a project at one location to an estimate for the same scope of work at another location):

Again, there is no assurance that all costs have been captured or that the estimated average exchange rate conversions for non-domestic purchases were accurately identified on the cost side. Also, comparing actual and estimated costs is complicated by the issue of contingency and risks that may or may not be properly addressed in the estimate.

Estimate-versus-estimate (comparing the same project scope of work estimated at two or more locations):

Project scopes and risks can be interpreted differently by different estimators. Also, the basis of estimates typically differ and are difficult to reconcile. This can lead to significant cost differences.

Aside from these drawbacks, given the need to capture and normalize costs on a one-off basis, these methods require more time, funds, and resources than most companies are willing to allocate or spend. This is not to say that none of the above methods should be used. Under the right circumstances, they all could be. It is just that they do not lend themselves to an ongoing continuous and expeditious process.

EVOLUTION OF THE FACTORING METHOD

Years ago, when many owner companies in the process industries needed appropriation-quality estimates for non-domestic locations, they would develop a major equipment and engineered items list with detailed specifications. Then they would go out and get hard quotes from the vendors who would be supplying this equipment for the project. For chemical and petrochemical projects, this could amount to 25 to 50 percent of the total project cost.

Engineering/design/procurement and field administration budgets would make up another 20 to 30 percent of the total project cost. That left only the labor and commodities to estimate, which would account for the remaining 30 to 40 percent of the cost. To do this, they would survey the site for labor and commodity pricing (primarily steel, piping, and wiring) and compare them to domestic costs. Labor and commodity factors would then be developed and applied.

It was from this factoring activity that the factoring method evolved. Since computer estimating programs were being written to help with the factoring of labor and commodities, it became obvious that this factoring process could be extended to an entire construction project as well as projects of any type.

THE FACTORING METHOD

The term *factoring method* is descriptive of a process as shown in Figure 1.

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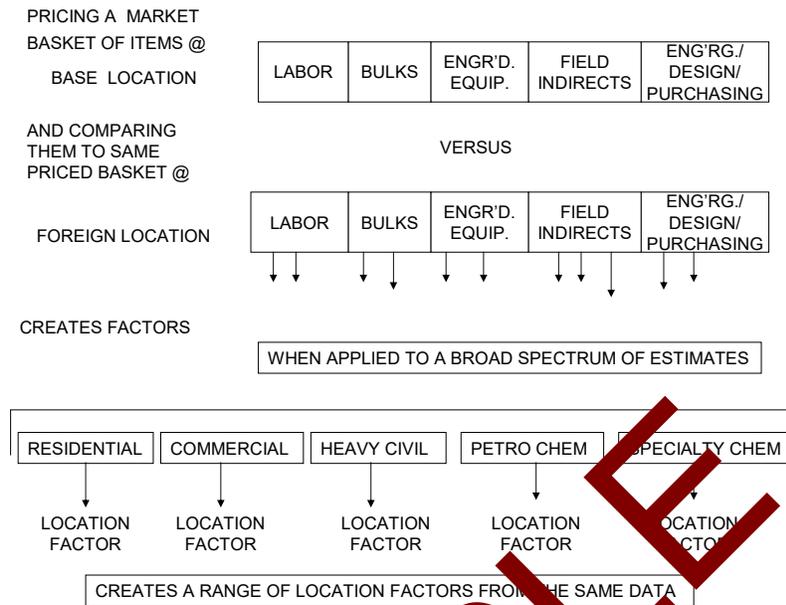


Figure 1. Factoring Method Process

A factoring method offers a disciplined, logical, manageable, and cost-effective approach for developing location factors. Although these factors are usually developed to reflect the relative cost differences between various countries, they also can be developed to reflect regional differences within the base country itself. This method does require a certain level of computer-aided estimating capability. That amount is dictated by the budgets and needs of the users. A simplified overview of a factoring method includes the following:

- selecting a detailed estimate of a moderate complexity for the base location;
- creating a parallel estimate by applying non-domestic labor, material, and equipment factors (all developed at a constant exchange rate) to the base estimate, then calculating allowances for taxes, fees, import duties, freight, etc., with expected percentages for the foreign location, then calculating engineering, design, procurement, and project administration costs with expected percentages or factors for the foreign location;
- ratioing the base estimate to the parallel factored/percentage estimate to produce a location factor.

Benefits

The benefits of the factoring method include the following:

- It generates relative cost differences (percent), not absolute currency values, which means that estimates for factoring can be used over and over again, and various estimates can be used and maintained for providing location factors that represent various types of construction (civil, residential, petrochemical, specialty chemicals, etc.); and
- The pricing of labor, material, equipment, and other project-specific data is compared and tracked at a trade and commodity level and can be surveyed on a periodic basis. Because the factors are not project scope specific, this helps ensure consistency and continuity and can be an ongoing process – not only used on an "as-needed basis". Turnaround is quick and it can be managed by one person.