ICEC INTERNATIONAL LOCATION FACTOR COST MODEL

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ABSTRACT

Location factors are used by estimators to evaluate the relative cost differences for a project between two geographical regions. The increasingly global nature of capital investment in facilities has seen a concomitant rise in the need for accurate international location factor cost data. However, published sources of this data available to estimators are very limited. In recognition of this problem, the International Cost Engineering Council (ICEC) is beginning an effort to develop an international cost model/location factor product. Preliminary plans are in place for the development of two standard model designs with quantities - one for a commercial building and one for a process plant. To simplify the effort, the models will be greatly simplified proxies for a full design. ICEC members from various regions and locations will then be requested to estimate the cost of these model facilities using local costs, productivities, allowances, and so on within given estimate basis assumptions and guidelines. This paper describes the planned model, why it is important to the industry, and why professionals with international cost estimating/quantity surveying experience should consider contributing to the joint effort. The goal is to have a preliminary model ready to finalize at a workshop at the ICEC World Congress in Toronto in 2008.

Keywords: cost engineering, estimating, international location factors, international cost models

INTRODUCTION

Globalization is now a hot topic in the business and property development sectors. One of the outfalls of globalization is that owner firms must increasingly consider alternative worldwide locations for their capital investments in facilities and process plants. Because capital costs are a key determinate in the location decision, the globalization trend has also created a challenge for cost estimators and quantity surveyors. Cost professionals have developed excellent location factoring methodologies to address this challenge. However, the sources of site-specific “factors” that the methodology requires are very limited. The International Cost Engineering Council (ICEC) has long recognized this limitation and is now working to provide additional reliable location factor information.

This paper describes the ICEC effort to develop an International Location Factor Cost Model and provides background information on location factoring. ICEC is a worldwide confederation of cost engineering, quantity surveying and project management associations with a membership base of 44 national associations located in 40 countries. ICEC represents more than 100,000 quantity surveyors/cost engineers in over 120 different nations. All PAQS member associations (except one) are members of ICEC.

A major objective in the development of the cost model is to draw on this vast international network to obtain input into the model from cost experts representing as many member associations as possible. If successful, this project will provide a good example of how this international network can be effectively used to collaborate on further international research projects. The potential in this respect is enormous.

LOCATION FACTORING

Location factors are a vital product of any cost management service organization supporting clients 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[1].

All capital projects go through phases of project scope development. In early phases, owners identify potential opportunities for improving their business results and these often involve capital investments. There are usually many capital investment alternatives that will address the opportunity. Often, the alternative involves where to locate a facility (i.e. a building, process plant or other capital asset). Before investing major capital funds in developing the scope and design of a facility, owners need to narrow their options down to a few prime candidates. This early decision requires that cost estimates be prepared of the facility in alternative locations based on limited scope definition. These early feasibility or conceptual estimates (eg. AACE International Class 5 or 4) often involve some sort of factoring methodology. Simply stated, “factoring” means that the cost of an item is estimated by multiplying the known cost of a related item by a factor.

[1] AACE-I Recommended Practice No. 28R-03 – Cost Estimation & Budgeting – Developing Location Factors by Factoring (as applied in Architecture & Engineering and Engineering, Procurement & Construction), 2006

In Location Factoring, the cost of a facility in location B can be estimated from the known cost of the same “reference” facility in location A using the following relationship:

Location B$ = Reference Location A$ x (Location Factor)

This is a simplistic, but sometimes useful approach for the earliest screening decisions, particularly when the scope of the facility is highly uncertain. Unfortunately, there is no one single location factor for all cost types. For example, the cost of process equipment (exclusive of markups for shipping, taxes and so on) is more or less global in nature, while the cost of construction labor varies widely from location to location. This means that the location factor for a facility with no equipment and lots of field labor will be very different from that for a facility with lots of equipment and less field labor.

To address this complication, the cost engineering profession has developed a location factoring method that decomposes the facility cost into categories for which more detailed item-specific location factors can be relied upon. Simply stated, the method applies separate location factors to each cost type; e.g., one for field construction hours, one for labor rates, one for each type of bulk material and so on. This method was initially developed by Bernard Pietlock[2] from the AACE-I and then further developed into one of many Recommended Practice Guides produced by the AACE-I[3] .

Detailed item-specific factors can then be used to produce a single location factor for a given type of facility. For example, if you had a cost model of an office building of a given construction including the labor hours, rates, material costs by trade, and so on, the estimator could apply the detailed factors to the model components to derive an overall building cost in the new location, and a single factor [Location Factor = (Location B$)/(Reference Location A$)].

This paper does not go into the details of this method. However, the philosophy behind the detailed factoring method and the use of facility cost models is incorporated into the location factor product planned by ICEC

[2] Bernard Pietlock CCC, received the Jan Korevaar Outstanding Paper Award for his paper describing this method entitled "Developing Location Factors Using a Factoring Method" at the 13th International Cost Engineering Congress, London, England, 1994.
[3] Details about the AACE-I Recommended Practice Guides can be found at www.aacei.org/technical.

THE CASE FOR AN ICEC LOCATION FACTOR PRODUCT

Lots of international location factor information has been published. The first source the authors could find dates from 1962[4]. Most of the "factor" data was contained in technical papers using widely different sources of information, for different locations, and with varying basis of the costs (if documented). In 1990, McMillan and Humphreys published a compiled listing of all the recent location cost sources (including country specific cost references) they could find up to that time[5].

In 1994, John Barry stepped up to be a voluntary program manager of an ICEC effort, in conjunction with Richardson's Engineer Services (since acquired by Aspen Technologies), to publish international location cost factor information that was informed by ICEC experts[6]. The Richardson's product, together with a competing text published by John McConville CCC of Compass International[7], became the leading published sources of international location cost factors.

Unfortunately, in 2005, Aspen Technologies discontinued its updates of the Richardson's text. The loss of this product was felt in the industry. The remaining sources generally reflect the various authors' personal experiences and knowledge that, while valid and useful references, would be improved if confirmed through an objective "industry" wide source such as was envisioned by ICEC in 1994.

Estimating deals with a world of uncertainty and probabilistic costs, and it is never wise to rely on a single data point, or data with unknown bases. Providing that additional independent, objective industry datapoint is the case for this ICEC product.

[4] The first AACE paper that the authors could find that lists specific country location factors was "Foreign Costs And Financial Factors", Ralph Goddard, 1962 AACE Annual Meeting, M.11, AACE International, Morgantown, WV, 1962.
[5] McMillan, Barry G, and Kenneth K. Humphreys CCE, "Sources of International Cost Data", 1990 AACE Transactions, K.6, AACE International, Morgantown, WV, 1990
[6] Barry, John E., "Meeting a Worldwide Need - Location Cost Factors", 1994 AACE Transactions, INT.1, AACE International, Morgantown, WV, 1994.
[7] McConville, John, "2007 Global Construction Costs Yearbook", Compass International, 2007.

THE METHODOLOGY

The following is brief extract from the AACE-I Recommended Practice Guide[8] outlining the suggested methodology for the development of a factor model. This approach will form the basis for the ICEC Model.

Figure 1 outlines the process involved in using the Factoring Method developed by the AACE-I.

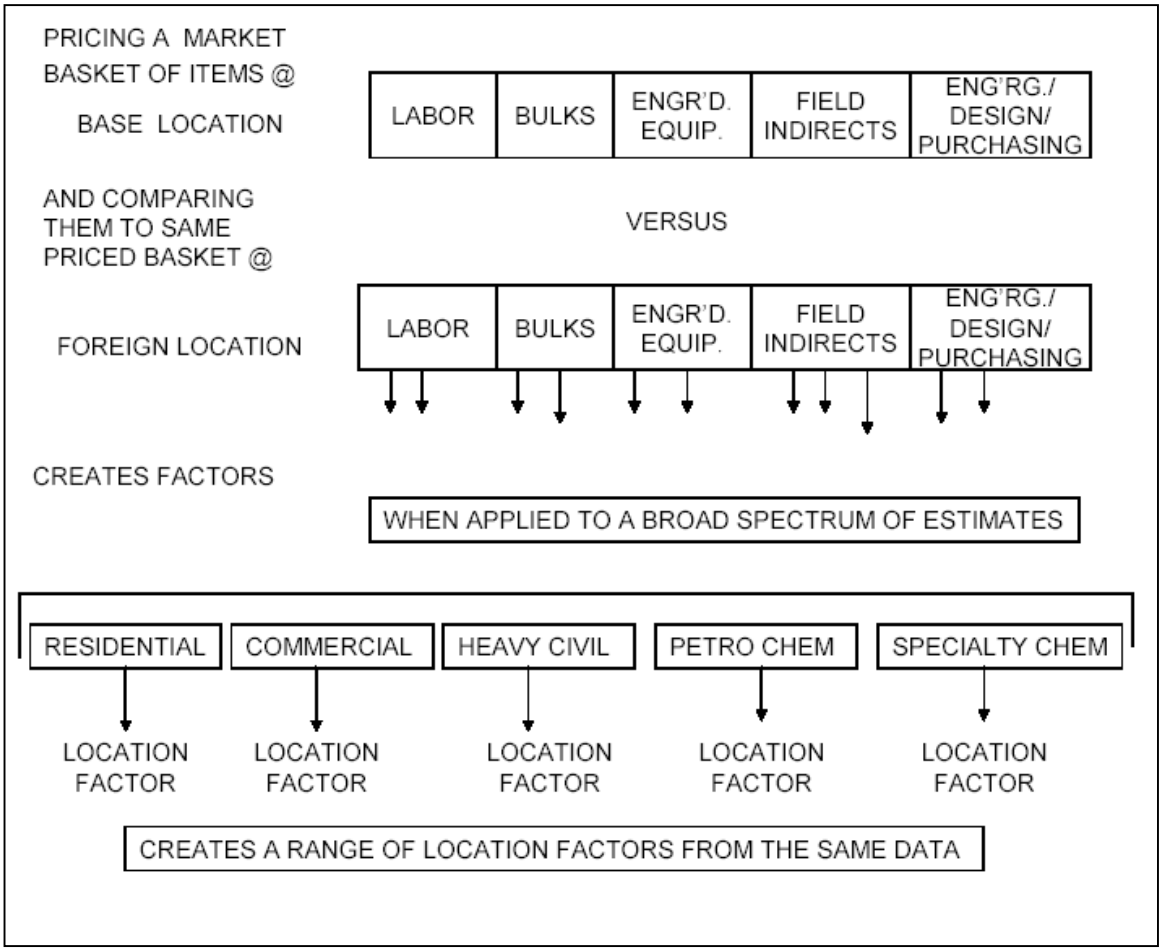

Figure 1 – The Factoring Method Process

[8] AACE-I Recommended Practice No. 28R-03 (2006) – Cost Estimation & Budgeting – Developing Location Factors by Factoring (as applied in Architecture & Engineering and Engineering, Procurement & Construction), www.aacei.org/technical

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 model facility 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; and
- ratioing the base estimate to the parallel factored/percentaged estimate to produce a location factor.

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 commoditiy 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.

A fully-developed factoring method requires a detailed survey of labor, material, equipment, and other project-specific data completed for the base location on a periodic interval (say once a year). The same survey then can be priced out in a new location and compared to the base data. The survey must be organized, constructed, and worded in such a way that the suppliers

understand exactly what is being requested. What seems clear and precise in one culture may not be in another. With first-time suppliers, a face-to-face explanation and walk-through of the survey and a review of the factoring method that the survey supports needs to take place.

Once a survey is priced out and compared against comparable base location data, the individual factors, as well as the resulting location factor, need to be shared with the suppliers. Obtaining several sources of data from a location helps to improve the accuracy of the output. The type of information that needs to be surveyed depends on the structure and level of detail required for the specific factoring method used. The most common sources for pricing a survey are active full-service design contractors in the various locations.

THE ICEC COST MODELS

The ICEC product will be based on the accepted principles of location cost factoring; i.e., factors for specific items of cost will be developed and applied to a pre-defined facility cost model to yield an overall weighted location factor. A challenge of the effort is to minimize the input required from volunteers while maximizing the number of observations obtained from them.

Preliminary plans for the ICEC product call for the development of two standard model designs with quantities - one for a commercial building and one for a process plant. To simplify the effort, the models will be greatly simplified proxies for a full design. For example, a building or process plant may be represented by a set of 10 to 20 material items, weighted in accordance with their significance to project costs. For example, ICEC may request that members provide material cost/tonne and hours/tonne and to procure and erect structural steel framework of a defined composition.

ICEC SOURCES OF INFORMATION

ICEC will cover as many regions as possible where statistically meaningful information can be obtained. ICEC members from various regions and locations will be requested to estimate the cost of the model components using local costs, productivities, allowances, etc. within given estimate basis assumptions and guidelines. Data for even a single unit rate for one material item will be a useful input.

A major challenge will be the development of the most effective communication forum for the project to ensure that as many countries as possible have cost experts providing data for the model. This will require clarity in terms of the information required and it is important that those involved are all made feel part of a team where ideas and suggestions can be canvassed and discussed.

One such mechanism for obtaining data may be through the AACE-I's Cost Estimating Committee listserv. Anyone can join this valuable email forum where fellow professionals seek and offer opinion, advice and data on estimating topics. Location factors are a common topic of discussion[9].

PRODUCT DEVELOPMENT AND IMPLEMENTATION

ICEC plans to implement the data input and final product online via the ICEC website.

ICEC will conduct a product development workshop at AACE International's July 2007 Annual Meeting in Nashville, Tennessee[10]. At that workshop, ICEC will solicit team members and further define the scope of the project and detailed plans. As many ICEC member associations will not be represented at this meeting, all associations are invited to put forward suggestions for consideration at the workshop. Details of the workshop outcomes will then be made available to all members on the ICEC website.

ICEC will then ask for cost expert volunteers from the various member associations to comment on the plans and then to provide initial data for their region. Each member society will be asked to identify a person in their organization that can help marshall input from its members.

The goal is to have a preliminary product ready to finalize at a workshop at the ICEC International Congress in Toronto in July 2008.

[9] Further information on how to sign up for this listserv can be found at www.aacei.org/technical/discussionlists.shtml.
[10] Details about the meeting schedule can be found at www.aacei.org.

CONCLUSION

This project is demonstrative of how the vast international networks and resources that exist within ICEC and PAQS can be utilized to develop international research projects that are of real practical benefit to the cost management profession. Recognising the voluntary nature of such projects, this project is deliberately structured so that the time required of individual contributors will be kept to a minimum.

ICEC would like to invite all ICEC and PAQS members to contribute to the project. Further information can be obtained from the Project Leader, John Hollmann at jhollmann@validest.com or the ICEC Secretary-Treasurer, Peter Smith at peter.smith@icoste.org.