



CONSTRUCTION INDUSTRY INSTITUTE MODEL PLANT UPDATE

Bureau of Engineering Research
The University of Texas at Austin

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Productivity Measurements Task Force
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SUMMARY

This publication represents the second report of the CII Model Plant Project. The first report, Publication 2-1, was published in 1986 and is an introduction to the project. This update presents comparative information on Baselines 1 and 2 of the project.

The need for an industry-wide construction productivity measurement baseline has been recognized for a number of years. Construction productivity data for nationwide use are either not available or considered unreliable. The Business Roundtable Construction Industry Cost Effectiveness (CICE) Project Report A-1, "Measuring Productivity in Construction," included a recommendation to measure site level productivity in selected private construction segments. The report suggested a logical segment scheme based on construction volume.

The CII Model Plant is a typical facility physical baseline against which to measure construction productivity. A typical petrochemical facility was chosen as the initial physical baseline facility. The primary goal of the Model Plant project was to develop a basic petrochemical plant, simple and generic in nature, such that the construction industry could have a physical base against which to measure productivity. Data from collection of direct labor estimates for a typical petrochemical processing facility were chosen as the foundation of the baseline, hence the name "Model Plant."

CII members (contractors and owners), based upon their own actual experience, have estimated the amount of construction labor that would be required to build selected parts of the Model Plant utilizing a code of accounts which has been established for the various scopes of work at both a detailed and summary level. Two estimates have been prepared, the first in 1985 and the second in 1987. The initial estimates were used to develop Baseline 1 and the second to develop Baseline 2. This report establishes the format for analysis in determining trends from the data generated.

Summary information on Baselines 1 and 2 and a comparative analysis are presented in this publication. For those who may wish to analyze the data in detail, CII Source Documents are available. In addition, the data for Baselines 1 and 2 are available in mini-disk form for those with personal computer capabilities.

INTRODUCTION

This report is a presentation of the results of the Baseline 1 and Baseline 2 estimates in summary form with a comparative analysis. It is important that the user understand the source of this information, and that the user analyze this data consistent with his own code of accounts in order to interpret the changes in productivity that may be reflected by the data and the comparative analysis.

To understand properly the data presented, it is necessary to understand how it was derived. As indicated in CII Publication 2-1, member companies provided drawings and specifications with quantity takeoffs for several elements of the Model Plant. With this baseline information, CII developed the two successive estimates of direct labor work hours to put the equipment and commodity materials in place as presented in the bid package. The member companies that submitted their bids, that is their direct labor estimates, produced these in the identical manner that they would produce a fixed price estimate for the accomplishment of the work by contract. This involves a process whereby the company's estimating staff would apply the company's standard work hours to the quantities estimated for the Model Plant, and then apply such productivity factors that they considered to be appropriate based upon their current experience for the kind of work involved, at the location involved, and for the conditions of the project. Thus, the Model Plant effectively extracts the collective information of the owners and contractors involved concerning current levels of expected labor productivity. Changes in the direct labor work hour estimates for any element of the Model Plant, in total, then reflect a consensus by the member companies that productivity has changed. The user will be able to utilize the summary information presented in this report to understand how this judgment defines productivity at any point in time and how the current productivity estimates relate to prior estimates.

Users will be able to interpret the information presented in this report according to how they prepare direct labor work hour estimates for their projects. If productivity judgments are applied at the detail level of the code of accounts, then the detailed productivity trends identified by the Model Plant will be useful in assessing the validity of the company's own experience with respect to productivity. If productivity judgments are assessed at the summary level, then the summary level experience of the Model Plant will be useful. In the same way, if productivity assumptions are applied at a project total level, then the results of the baseline analyses of the Model Plant will be useful in assessing a company's own experience.