Built to Last*: A Construction Execution Plan to Meet Project Objectives for Expected Service Life*

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Overview: The Architecture/Engineer/Construction (AEC) Community currently faces a challenge indicative of the innovative and rapidly changing environment of the Information Age. In order to keep pace with user demand, infrastructure revitalization, and globalization, we are forced to modify age-old construction execution techniques with current and available resources.

The two key factors that will have the greatest impact on industrial construction on a global level are 1) Workforce Development; and 2) responsibility for Scope Development and Execution.

Vision: My vision of Design and Construction Management for the future includes two components – a qualified workforce, empowered with the necessary resources; and a construction execution strategy which can be monitored by project objectives.

Qualified Workforce

Adequate scope definition at the initial planning stages of any major construction project enables project management to prequalify contractors based on their ability to meet the design intent. Oftimes, the bid criteria furnished prior to contract award and execution contains standard terms and conditions that fail to adequately address the expectations of the end user.

The primary responsibility of the design professional would be to provide performance specifications which describe the end product in terms which clearly communicates to the general and subcontractors the expectations of the end user.

Furthermore, an empowered workforce would need to review and meet project objectives through implementation of the following key strategies:

Strategy 1. Promotion of Safety
Strategy 2. Comparable Wages and Compensation
Strategy 3. Multi-skilling
Strategy 4. Skills Assessment and Resourcing
Strategy 5. Accredited Education
Strategy 6. Craft and Supervisor Training
Strategy 7. Craft Certification and Standardization
Strategy 8. Benchmarking and Labor Productivity

In order to meet cost, schedule and quality objectives, alternative resourcing plans may be required. Innovative organizational agreements may result that encourage the formation of cooperative and joint-ventures, made possible through shared risk and shared resources, as well as self-performed work in functional (task-oriented) groups.

Construction Execution Strategy

Of the three primary objectives of the construction project - cost, schedule and quality - quality is the most difficult to quantify. Although the extent to which budget constraints have been met can be measured in dollars, and how well a project met its schedule can be measured in days; the assurance of quality, in relation to the project end user expectations and satisfaction alludes even the most experienced and qualified construction manager. The key quality attributes that define quality in the constructed project (Corbett, 1997) may be used to gage the relative success and compliance of the contractor in meeting the project design intent throughout the major phases of construction execution.

The phases of construction, key areas of impact, and related quality attributes are noted as follows:

Construction Phase	Area of Impact	Quality Attribute
I. Prework/Site Preparation	Environmental	Constructability
II. Civil/Structural	Infrastructure	Durability
III. Facilities/Utilities/Equipment	Technology/Innovation	Reliability
IV. Architectural Finishes	Aesthetics	Maintainability

Management by Quality, although an abstract concept in the traditional construction arena, establishes a criterion that can provide the flexibility in specification and execution necessary to meet the changing demands of the AEC industry.

Research Needs

The vision of construction management in the future described above identifies various areas of interest that can benefit from practical research of innovative execution strategies. Four areas that will most likely yield immediate benefit include:

A) Workforce Development - investigation of the eight (8) strategies; regional concerns and the implications of globalization.
B) Infrastructure and Support Systems - national directives, government/agency interface and cooperatives, environmental impact and innovative alternatives.
C) Benchmarking- collection of baseline data; projecting normal and expected service life.
D) Warranty and Asset Valuation - the long term impact and cost of innovation (efficiency) and constructability initiatives: capitalization and depreciated value: calculating reasonable deterioration and preventative maintenance.

Conclusion

The AEC industry is in an evolutionary phase which provides a unique opportunity to benefit from industry growth and demand as well as refine innovation and provisional execution strategies and techniques. There is no guarantee that such a fertile environment will exist for a period which exceeds our productive lifetimes. The recession of the 1980s claimed casualties of firms that survived the Depression Era, perhaps due to our inability to 'grasp' the moment and keep pace with changing times and user demands. Conditions are ripe for change. The question is, can we rise to the occasion?

Description of the Author

Deanna Corbett is a recent graduate of Penn State University's doctoral program in Construction Engineering and Management. The principles of her dissertation topic 'Quantifying Quality in Industrial Construction' (1997) are currently being implemented in the execution of a large, firm price, industrial construction project for her current employer.

She has obtained a Bachelor's and Master's degree in Mechanical Engineering and Engineering Management from University of Pennsylvania and Drexel University, respectively. She has five years experience in the telecommunications industry, five years self-employed in a mechanical design and CM firm; and has served as a construction volunteer in Africa and the Caribbean.

Research interests include the assurance of quality, constructability and durability in domestic and international applications.