

Address: Design-and-Build Concept for Intermodal Freight Terminals

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I am pleased to have the opportunity to talk to you about design and build in general and about the application of the design-and-build approach to delivering intermodal projects.

First of all, let me clarify that there are two basic types of design-and-build firms: the traditional contractor-led type, commonly referred to as "turnkey contractor," and the type that uses a professional project manager, who typically has a strong technical as well as a construction background. The project manager type normally does not self-perform construction work but contracts through subcontractors to accomplish the field work.

My firm, Sverdrup Corporation, exemplifies the design-led project management approach. This type of firm is generally appropriate for more technical projects in which design competence plays a key role in the successful delivery of the project. This differs from a more straightforward project, say an office-warehouse, for which construction-dominated project delivery is appropriate.

Before discussing the specifics of design and build, it may be of interest to look at the marketplace for those of us in the business of delivering capital facilities. Our observation, based on industry data, is that owners are increasingly accepting the design-and-build approach as a delivery method.

Building Design and Construction magazine reports as one of the results of a survey of 300 large building owners that 44 percent of the manufacturing group use design and build as a delivery approach; this percentage is up substantially from previous years.

Design and build is not the answer for all projects; however, the design-and-build market segment is continuing to increase in response to a growing demand for total project services. This growth is the result of more technically oriented firms (design companies) entering the business and more sophisticated owners viewing the design-and-build approach as a viable option for delivery of their projects.

WHAT IS DESIGN AND BUILD?

To understand the design-and-build approach, it is important to think in broad terms of all of the activities it takes to make a project happen.

Makeup of Design-and-Build Project

A project is made up of a long series of business, technical, and construction activities that are interrelated. Design and build typically spans several or all of these activities (e.g., design, real estate, financing, construction).

The extent of the "span" of services varies with each project. It is the span of the project that places the burden of single-source responsibility on the design-and-build team to assure close interface of all aspects of the project.

Definition

Design and build is a project delivery system that assumes single-source responsibility for both design and construction. It is a professional service that encompasses everything needed to plan, design, and construct the facility. When the scope of the project has been set and contractually agreed on, the philosophy is to contract for a single point of responsibility.

It is important to note that the design-and-build contractor is contractually obligated to deliver the facility from design concept through construction. Thus the design-and-build contractor has single responsibility not only for the project's design but also for its field construction.

Design-and-Build Contract

The design-and-build contractor is both the designer of record and the general contractor. The basic approach is to contract for design and construction through one source. The design-and-build contractor has contract responsibility for

- Cost,
- Schedule,
- Quality,
- Performance, and sometimes
- Real estate and financing.

To meet these contract responsibilities, the design-and-build contractor must manage all issues that affect a project.

Project Impacts

Even the simplest projects in today's world are becoming increasingly complex as they are affected by a multitude of priorities and pressures (e.g., financing, taxes, zoning, energy, labor codes, environmental concerns). Clients, especially those without sophisticated engineering or architectural staffs, are becoming overwhelmed with these complexities. This is the drive behind the change in the marketplace toward single-responsibility contracts.

Risk Curve

As additional responsibilities are assumed under the design-and-build contract, the risk factor must be addressed by both the owner and the design-and-build contractor.

The full risk burden of coordination, performance, interfacing, and management belongs to the design-and-build contractor under a single-responsibility contract. The design-and-build contractor must develop a proposal and negotiate a contract that balances the risk versus the potential profit.

Design-and-build contracts can range from minimal (services) risk to 100 percent risk. Consider not just cost guarantee but also the risk of other potential liabilities (e.g., schedule, financing, performance).

The contract terms are the measure of risk. Thus it must be fully understood that, as contract terms become more stringent, financial risk increases for the design-and-build contractor and the cost to the owner increases.

HOW DOES A DESIGN-AND-BUILD PROJECT WORK?

Design-and-build projects are typically effective in achieving two goals:

1. Early cost identification and
2. Fast-track delivery.

Design-and-Build Delivery Phases

To facilitate early cost identification and minimize early owner commitments, projects are generally done in three stages:

- Stage 1: Owner requirements, Concept design, and Budget estimate and schedule;
- Stage 2: Preliminary design, Guaranteed project cost, Schedule, and Real estate and financing; and
- Stage 3: Final design and construction.

Obviously, the time frame varies with the complexity of the project. Clear definition of project parameters and scope of work is critical and must be accomplished in Stages 1 and 2.

Cost Trending

A capital project today includes more than design and construction. It demands financial management. For a project to be completed on time and within budget, it must be controlled.

The critical time for controlling cost is in the early stages--not after construction begins. The

early criteria and design decisions are critical to controlling future project costs. Thus decisions made at Stages 1 and 2 must be technically sound in order for costs to be accurately projected.

Conventional Versus Design-and-Build Fast-Track Schedule

Under the design-and-build approach, projects move rapidly from concept definition (Stage 1) through preliminary design and costing (Stage 2) and into fast-track delivery (Stage 3).

The fast-track stacking of design and construction is typical of design-and-build project deliveries. Early delivery translates to owner cost savings by

1. Putting the project into productive use earlier (return on investment),
2. Reducing the project overhead and administration burden, and
3. Reducing escalation.

Project Organization

The design-and-build team's project management effort and communication are critical. The team makeup involves numerous interests, disciplines, and areas of expertise that must work together to deliver effectively and control risk.

Design-and-build projects are organized using a task force team approach. People with the appropriate expertise are assigned to each major area under the overall leadership of a project director.

Typically, a client representative is part of the team to facilitate rapid response to project decisions, owner coordination, and mutual involvement in working to execute the project.

The project director is responsible for the management and successful delivery of the overall project. He is separate from both design and construction; thus team members responsible for each activity act on their own professional judgment without undue bias or pressure to compromise.

BENEFITS OF DESIGN AND BUILD

The use of design and build is most prevalent when

1. Single-source responsibility is needed because the client has a staff limited in number and capability to coordinate all activities of the project,
2. A completed facility is needed as soon as possible,
3. Total cost commitments are needed early in the design phase,
4. Specific or unusual performance requirements are necessary, and
5. Technical expertise is required.

Design and build is an excellent delivery system for intermodal freight terminal projects. An intermodal terminal is no better than its ability to perform under operating conditions. A design-and-build team with knowledge of how all elements of an intermodal terminal should function can successfully deliver intermodal facilities. The design-and-build approach is applicable to

- Piggyback hubs,
- Transfer points,
- Container ports,
- Break-bulk ports,
- Roll-on/roll-off ports,

- Break-bulk land terminals,
- Air and truck transfer terminals, and
- Automobile unloading terminals.

With the design-and-build team directly accountable for all aspects of the project, specific benefits are generated:

- Single-point responsibility,
- Early cost guarantee,
- Early project delivery, and
- Reduced administrative cost.

To be successful, the design-and-build team must have a record of similar terminal design and con-

struction projects. Project experience will cross boundaries of size, complexity, geography, type of project, and scope of responsibility. The design-and-build team must know intermodal terminals and have staff capabilities in all professional disciplines needed for the project. For example, the design-and-build team must be experienced in marine, railroad, truck, and air terminal operations and, at the same time, have a thorough knowledge of the requirements for equipment, paving, buildings, and process control systems. The right design-and-build team can achieve the bottom line--saving time and money on an intermodal terminal project.