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Best Practices In Accelerated Construction Techniques

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Executive Summary

A typical highway project, allowing for planning, design, and construction, can take from 10 to 15 years from its inception to completion of construction. This extended duration has very real consequences for the American public. Therefore, transportation agencies are seeking ways to accelerate project delivery. This scan documents case studies that demonstrate how transportation projects can be delivered much more rapidly.

Background

This scan focused on construction operations and management practices to accelerate the delivery of construction projects. Visiting five states from the East to West Coasts, the scan team sought information from DOT staff and contractors on practices that accelerate project construction. The team visited with transportation leaders in:

- Jacksonville and Pensacola, Florida
- Birmingham and Montgomery, Alabama
- Houston, Texas
- Salt Lake City, Utah
- Sacramento and Oakland, California

Transportation agency representatives, contractors, suppliers, and engineering consultants having accelerated project experience shared their viewpoints and knowledge at meetings with the scan team. The team then evaluated these practices for their potential application by other transportation agencies.

Summary Observations

The team found that, for every project examined, the primary factor leading to success was a spirited effort of partnership and collaboration between the DOT and the contractor, together with a supportive design and/or design process. The following summary observations are the principal findings of the study.

Partnering – People

People are the critical element in successfully accelerating a project. Formal partnering is a beginning, but partnering is more than meetings. To accelerate a project, all team members must agree to solve issues at the lowest level and, after contract award, there must be an openness to change as more detailed project information becomes available. During these projects, every team member must exercise tremendous attention to detail and commit to a project-focused, unselfish effort to ensure that there are no interruptions in moving the construction forward. On many projects, the co-location of the DOT and contractor facilitated the partnering atmosphere. Partnering keys include:

- **Align goals to customer goals** – Develop procurement, contract provisions, and construction management methods that better align the goals of the customer, owner, and contractors. Move towards integrated teams that are formed early and focus on customer goals throughout the project development and construction life cycle. The process must begin with disciplined risk assessment and strategic project delivery decisions. These early decisions need to be supported through procurement and construction management techniques that support and motivate the teams to achieve customer goals.
- **Delegate to the lowest level –** Empower the appropriate people to make immediate decisions.
- **Timely decisions –** Have technical expertise at the project site or available at all times.

Design – Material Availability, Fabrication Time, and Logistics

Contractors must be able to procure the necessary project materials expeditiously. Designers must consider the availability of materials and the difficulties of moving and handling items such as bridge girders and precast elements. Logistics issues must be considered when selecting a design approach. Construction speed is achieved when the design allows repetition of activities. Designers should always review the standard specifications for opportunities to remove barriers to acceleration.

Planning Detailed

A detailed execution plan is a critical component of the acceleration effort, and that plan must be updated regularly.

- Include suppliers, fabricators, and equipment suppliers in the planning.
- Develop contingency plans for all possible impediments.
- Schedule concurrent activities to speed the work
- Open multiple fronts to push construction activities with more crews and equipment..
- Require that look-ahead plans be prepared at regular intervals.

Contracting Strategy –Aligned with Requirements

The contracting method needs to be aligned with the project's technical requirements, and the time constraints, type of work, traffic, and project site conditions. Allocate risk to the party best able to exercise control. Set an aggressive schedule with proper incentives, and contractors will respond to the need for acceleration. The contract must clearly define work restrictions (e.g., work hour restrictions, vibration and noise restrictions, and any regulations that will limit work or logistic activities). The use of design-build (DB) contracting will facilitate the introduction of innovation in design and construction.

New Business Model – Serve the Public

Agencies can respond to the market of public desire. Going from accelerated project construction to an accelerated project delivery attitude is possible if an agency thinks in terms of a systematic and holistic delivery approach. The lowest total project delivery cost should drive design and construction and include consideration of societal cost. When an agency involves the community, local governmental entities, and regulatory entities, and establishes project goals aligned with those interests, construction acceleration will reduce the overall cost to the community. "The public can tolerate an awful lot if you tell them ahead of time and how long."

Emergency Projects

Successful delivery of accelerated projects under emergency conditions is highly dependent upon these underlying factors:

- **Contractor** – Find a contractor that has the resources to start immediately. The contractor must have the technical capability together with the ability to mobilize the necessary people and equipment rapidly. The contractor must also have the financial capacity and established trust with suppliers and fabricators so that critical material will move with only a phone call. Communication with the DOT, engineering support, suppliers, and fabricators is critical and sometimes, in the case of emergency projects, the contractor may have to assume responsibility for establishing a communication network.
- **Experts –** Timely decisions are crucial to accelerated project completion. In the case of an emergency project, communication can be difficult and distances can create time lags; therefore, ensure that key

experts are located on the project or are immediately accessible. Decisions are best made on the project site by experts who understand all of the issues.

- **Agreement –** Develop the agreement on site with the parties responsible for execution.
- **Delgate –** Push decision making, including contract award and execution, to the lowest possible level. Empowering project personnel and the designer of record to make project decisions accelerates the work.
- **Design-Build –** Scope for the basic need and allow the contractor to develop solutions. Often design is controlled by available materials that can be drawn to the project site.

Conclusions

Much more up-front planning is required to successfully complete emergency or planned projects that require accelerated construction. Contractors seeking to accelerate their work will have to develop their construction process plans to a much greater level of detail. Additionally, the DOT must research available materials before developing a facility design.

The foundation of accelerating project construction is a design based on resources that can be moved quickly to the project site. As protection against problems that can be caused by project unknowns, the design team should strive for a conservative design. The designer must maintain flexibility in the design approach. There is going to be change and the design must be such that it can easily accommodate adjustments.

Accelerated construction is about minimizing time impacts to the public. When goals are aligned and a partnering atmosphere created, all team members view the accelerated work as an opportunity to demonstrate excellence. As the owner of one company that delivered an accelerated project ahead of schedule stated, “It’s not about making a huge profit. It’s about pride and reputation.” The Chief Engineer for the DOT affirmed that attitude.