

AASHTO Project Oversight TASK FORCE REPORT



American Association of State Highway and Transportation Officials

AASHTO Project Oversight Task Force Report

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American Association of State Highway
and Transportation Officials
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Preamble

Assuring Public Trust and Confidence

There are many challenges in the delivery of major projects. Even the best-managed major projects with good cost estimates, sufficient financial plans, high quality project development, the most modern construction, and the best professionals can encounter real or perceived financial and schedule problems. An atmosphere lacking public confidence and trust exacerbates those challenges and affects all other aspects of project management. By earning the public's trust and confidence and better managing its relationships with stakeholders, the DOT will provide more effective project oversight.

Achieving Project-Related Public Trust and Confidence

Solid project management and excellent communications planning are the foundation of public trust and confidence. If the project's main stakeholders have confidence in the people managing the project and can identify easily who is in charge, public trust and confidence is likely to be higher than if it is unclear who can answer questions and address concerns about a project. In addition, well-planned and executed project communications plans will help to grow and maintain public trust and confidence. Together, people and communication will go a long way toward stewardship of the public's resources.

DOTs should set up project management structures in such a way as to facilitate public trust and confidence. One approach is to designate a senior professional to be the overall project manager. Ideally, this project manager would stay with the project throughout its development and construction and work closely with an oversight committee made up of professionals from each major function that has anything to do with the project (e.g., planning, environment, design, right-of-way, and construction). The project manager is responsible for identifying a project's champions and maintaining their trust and confidence. The role of a project manager, in general, is to coordinate among the various functions in the DOT, with consultants, and with the project's champion to ensure coordination and internal and external communications leading to efficiency and effective stewardship.

The project manager must have absolute integrity and set that tone throughout the project team. Aided by a well-planned project schedule and communications plan, the project manager carries information between the stages of project development to ensure that one stage is informed by the other and that commitments are kept. Without an overall project manager, there can be continuity gaps as a project goes from one stage to the next; promises made at one stage may be forgotten later, resulting in loss of public trust and, in the worst cases, may even result in litigation. A project manager detects problems early and alerts management, then solves the problem and mitigates the effects, keeping stakeholders informed along the way.

Communication among internal parties in the DOT, as well as between the DOT and external stakeholders, is at the foundation of public trust and confidence. Ideally, the project manager has at his or her disposal a well-developed communications plan that, executed properly, will help to grow and maintain public trust and confidence.

The need for good public information during the construction phase of a project is commonly recognized and addressed by State DOTs, but DOTs who wait for the big public relations plan to go into effect in the construction stage may find their communication to be too little, too late. The construction-focused approach misses opportunities to make project management easier and more effective.

Maintenance of public trust and confidence for a large, complex project must begin in the planning stage; a communications strategy must be planned out like any other aspect of the project. In general, a public communications plan should:

- Be incorporated into each stage of project development as a project management tool
- Educate the public on a project development process
- Set and manage expectations
- Include strategies to solicit input in addition to disseminating information
- Identify and tailor information and its delivery to key stakeholders
- Make the project transparent to stakeholders and facilitate ongoing communication so that there are no surprises

Aspects of a communications plan may be tailored to various stakeholder groups. Stakeholders include users of the proposed project; business and residential neighbors directly affected by the project; elected officials; interest groups focused on environmental protection, economic development, or other issues; and the media—not to mention those who are funding the project directly or indirectly. Stakeholders also include DOT employees, consultants, and contractors who are outside the project team.

Meeting expectations gives a DOT credibility, and public trust and confidence is dependent on the credibility of the DOT. The public communications plan educates the public about a project's life cycle and sets expectations about acceptable changes in project cost, scope of work, and schedule as the project specifications become more precise. The plan smoothes the transitions between project stages and includes strategies for announcing updated cost estimates, changes in scope, and adjustments to schedules. It also allows the DOT to identify project milestones and celebrate them publicly when achieved.

Addressing General Public Trust and Confidence Issues

Responsibility will be placed on the DOT to prevent, manage, or mitigate the consequences of problems that arise with a project regardless of the cause. If a DOT's credibility with its constituents is low, the challenge of regaining public trust and confidence when a problem occurs is even greater. If the DOT is known as an organization comprised of highly qualified professionals whose main goal is to serve the public interest, the project management is much easier.

Several states approach the issue of public trust and confidence in a general way by evaluating themselves and disseminating reports to the public. The performance measurement process starts with a committed CEO who monitors and questions results on a regular basis, and is built around

a regular review of measures as well as a business structure that encourages employee accountability. The final report from NCHRP Project 20-24(20), titled *Strategic Performance Measures for State Departments of Transportation: A Handbook for CEOs and Executives*, shows that the process of measuring is almost as important as the measures themselves. State DOTs that successfully monitor and widely report on selected performance indicators include those in New Mexico, Pennsylvania, and Washington. A follow-on research study that is just underway, NCHRP Project 20-24(37), *Strategic Performance Measures for State Departments of Transportation: Benchmarking Performance*, proposes to develop a core set of strategic measures that can be used as a framework to monitor performance at the State level.

Effective management of the State Transportation Improvement Program (STIP) is also tied closely with credibility. The financially constrained STIP is the foundation of every State DOT work plan. Each state has its own methods for formulating the STIP, but fundamentally, cost estimates and schedules must be realistic if the DOT is to be credible. However, cost estimating and scheduling are both art and science, based on quantitative analysis and responsive to qualitative factors such as politics. States must present financially constrained plans while hedging against the risk that some projects will drop off and including “priority projects” that are often backed by significant political forces on the STIP. This is easier said than done.

For example, pressure can lead to a project being scheduled earlier than it can realistically be delivered. When this happens, every priority must be given to the project’s delivery, even if it means slipping other projects to later years. This in turn exacerbates another problem. The Federal requirement for financially constrained STIPs, while theoretically sound, is disrupted in practice when projects slip into a future year. If a schedule slips, for whatever reason, Federal money could be lost if it goes unobligated. To compensate for this risk, some states “overbook” the STIP to insure against the loss of Federal funds. Overbooking allows another project to be substituted for the delayed project. When is overbooking violating the financial constraint requirement? When does the sudden designation of a new “priority project” justify schedule slippage? These are difficult judgment calls at best.

Another STIP management approach that is sometimes called into question is to divide projects into smaller pieces. This approach is not necessarily inappropriate. In fact, in most cases this is necessary since a STIP is divided by year of expenditure, by fund source, and by phase of the project. The pieces may functionally be stand-alone projects or part of a larger program of projects. Large projects often have multiple phases and the construction contracts are easier to track on a STIP as separate components. To track various appropriations for what really are “subprojects” of a larger project, a project might be divided to reflect that appropriation—e.g., a large project may be subdivided into an environmental study, a design project, right-of-way acquisition, or a single construction phase.

This approach is a problem if a DOT divvies up projects to make them appear smaller, to avoid requirements, or to fit unrealistic costs into the STIP financial constraints. The multiple listings for the same project in the STIP make it hard to track and control the major project costs. It is not uncommon for the overall project costs to be lost in the myriad of STIP listings with the attendant loss of cost control. The sub-projects may or may not tie back to the major project estimate. When all the pieces of the major project listed in the STIP are added up, they may or may not equal the whole. A mismatch between the overall project cost estimates and the sum of the projects listed in the STIP leads to more credibility issues.

Ultimately, the DOT must recognize that if STIP cost estimates and schedules are not realistic, the credibility will suffer. Some states have addressed this issue by significantly reducing the size

of the STIP for any given year and by only putting projects in the STIP that have a high likelihood of delivery. Utah took this approach more than five years ago with a high degree of success.

Introduction

With the growth of the Federal-aid Highway program, State departments of transportation (DOTs) assumed progressively greater responsibilities for managing growing programs of projects through the delegation of authority from the Federal Highway Administration (FHWA). As a result of concerns raised in reviews of several high-profile “mega projects,” the U.S. Department of Transportation’s Office of the Inspector General (U.S. DOT OIG) recommends that FHWA increase oversight of the Federal-aid Highway projects. Congressional committees have adopted these OIG findings and during the past several years have increasingly raised concerns about project cost control, project oversight, and the availability of qualified personnel to provide that oversight. Of particular concern are the so-called “mega projects.”

The oversight environment is expected to change with the passage of reauthorization legislation. The Bush Administration’s Transportation Equity Act for the 21st Century (TEA-21) reauthorization proposal, the Safe, Accountable, Flexible and Efficient Transportation Equity Act (SAFETEA), includes provisions to strengthen Federal oversight on projects with Federal funding greater than \$100 million, as do the bills passed by the House (H.R. 3550, Transportation Equity Act—A Legacy for Users, or TEA-LU) and the Senate (S. 1072, SAFETEA) in the spring of 2004. AASHTO followed the project oversight discussions closely prior to reauthorization and anticipated the need to assist its member states in improving their own project oversight capabilities.

As part of the consideration of issues in the reauthorization, AASHTO established a Task Force on Project Oversight in September 2001. The AASHTO Vice President serves as the Chair of the Task Force, which was originally led by Tom Stephens (Nevada) and currently is chaired by J. Bryan Nicol (Indiana). The task force objectives were to:

- Determine what AASHTO can do to assist the states in assuring sufficient project oversight.
- Gather information and provide input to the U.S. DOT, which will assist them in formulating policies and legislative proposals on oversight matters.
- Provide information on the efforts of the work underway or completed by AASHTO Committees and the U.S. DOT on project oversight.
- Prepare a report and recommendations for consideration in reauthorization, for future AASHTO policy directions and for use by the various states in their endeavors to provide good project oversight.

In keeping with its objectives, the Project Oversight Task Force, which is comprised of representatives of State DOTs, FHWA, AASHTO, and U.S. DOT, reviewed and summarized

what various AASHTO committees have already done to address cost control as well as issues of fraud and other areas of project oversight. The Task Force then developed proposals to further enhance project oversight.

This report summarizes the Task Force's work and includes non-binding recommendations pertaining to five key issues in project oversight:

1. Project cost control and cost estimating
2. Fraud
3. Quality control
4. Financial management
5. Human resources and technical resources

Chapter 1

Project Cost Control and Cost Estimating

Concerns about project cost control and cost estimating arise from uncertainty, scope creep, schedule delay, design errors, and fraud. Cost estimates are a moving target. They change as the project develops from the initial studies through the environmental process and through design and right-of-way acquisition. Outside pressures add to the scope of a project. Schedule delays add inflationary increases. Design errors or unforeseeable conditions cause change orders during construction. Some contractors try to take advantage of the unit price bidding system to maximize their profits. Additionally, delays in project delivery put inflationary pressures on the estimates.

In line with current planning requirements, preliminary cost estimates are made at the earliest stage of project development. This first preliminary cost estimate is highly visible because it is used to gain the initial project approval to proceed with an investment study or environmental review that ultimately will provide much more information on the actual costs involved. As the project progresses through the design stages, various alternatives, right-of-way needs, and environmental considerations—and the associated costs that are extremely difficult to estimate at the early stages—become clearer. However, such early preliminary estimates are based on limited information and general assumptions. The absence of detailed information at this early stage means that the earlier an estimate is made, the greater the uncertainty surrounding its accuracy.

In addition, the time it takes to develop a project is a major contributing factor in cost growth. The effects of inflation cannot be understated. It can take many years for a large project to make it through the planning, environmental, and project development processes. Litigation, in particular, can delay a project and add inflationary costs as well as result in scope creep. Even without litigation, the scope of a large project will change based on public input and engineering information. Various resource and regulatory agencies may also add requirements. By the completion of the final design stage, when plans, specifications, and estimates are fully developed, an “engineer’s estimate” is prepared that may be dramatically different from the preliminary cost estimate. This final engineer’s estimate is the amount used by the FHWA to program the funding for the project—and can be a long time coming from the initial benchmark.

To accurately reflect the uncertainties inherent in preliminary cost estimates and present them to the public more effectively, the Washington State Department of Transportation has developed a Cost Estimation Validation Process (CEVP) rather than using average cost data. Systematic project review and risk assessment methods are used to evaluate the quality of information at hand. The Washington State DOT approach publicizes the uncertainty related to cost estimates at various stages in the project, and cost estimates are reflected in ranges, not as single numbers. For example, at an early stage, it might be said that there is a 70 percent certainty that the project

will cost less than \$100 million in 2004 dollars and a 90 percent chance that it will cost less than \$120 million in 2004 dollars. In addition, project risks are described to the public, construction schedule uncertainty is taken into account, and schedule-based inflationary adjustments are made to the estimates. Additional accuracy is provided when accounting for inflation by stating the dollar year of the estimate. Washington State DOT has made their CEVP process information available to any project sponsor interested in employing the method. To engineers who are precision-driven, this sounds like predicting the weather, but elected officials and the general public need to be aware of the range of and uncertainty in cost estimates.

There are many incentives to keep estimates low during the preliminary cost estimation stage that are not simple for DOTs to address. Politics come into play, creating pressure to use average costs and modest contingencies so that a high cost estimate will not kill a popular project. A high preliminary cost estimate can signal opportunity to property owners, designers, or interest groups. Property owners can use a high right-of-way estimate with a jury to justify receiving additional money for their properties. Designers have less incentive to hold down costs down if there is a large contingency in the estimate. Projects with substantial contingency money may also become targets for groups who want to add their own “enhancements” to the project, in spite of the fact that contingency funds are simply indicative of uncertainty. These intangibles cannot be accounted for easily by using probabilities and cost ranges.

Streamlining the project development process may improve cost control. AASHTO members have been working through the Association to advance streamlining and stewardship of the project development process in practice and through the TEA-21 reauthorization process. Recommendations include concurrent, instead of sequential, resource agency project reviews during the pre-design and design phase and early acquisition of right-of-way to eliminate delays and hold down costs associated with increased valuation of commercial right-of-way based on planned improvements to the transportation system.

Once a project is designed, it goes to bid. Design errors caught before bids are opened can be addressed through addenda to avoid unnecessary change orders during construction. Once the bids are opened, a contract is executed based on the lowest acceptable bid. Control over project costs shifts to engineers. During the construction phase, virtually every project has change orders that usually result in a higher final project cost. Good construction management should keep change orders at less than 5 percent of the bid cost for most well-designed projects.

However, the “unit cost” bidding methodology may also generate what appear to be cost increases during the construction phase. Unlike other construction projects, highway construction projects usually are not paid based on a lump sum contract. Rather, the low bid is based on a designer’s estimate of the quantities of various materials used in the project with each type of material paid for at a unit cost contained in the contractor’s bid. The actual quantities of material placed by the contractor will always be somewhat different from the designer’s estimate. Because the contractor is paid based on the actual quantities placed, the final contract amount will be different from the low bid even if there are no change orders.

This methodology can become a serious cost issue if there are significant errors in the designer’s quantity estimate. The low bidder can take advantage of these errors by bidding a high or low unit cost for the incorrect quantity amount. This is called “unbalanced” bidding. Bids should be examined closely before award to determine if some of the quantity amount are bid at very high or very low unit costs. This is not considered an issue if the contractor bids a reasonable unit cost for the mis-estimated item—if the quantity had been accurately estimated, the difference would have been reflected in the bids.

The other weakness of the unit cost bidding is that a contractor can deliberately overrun the quantity on an item for which he bid a high unit cost. For example, the contractor could bid high on asphalt by the ton and then lay down a 2½-inch course instead of a 2-inch course, increasing the tonnage used. Combating this type of overrun requires vigilance on the part of the inspection team.

RECOMMENDATIONS ON PROJECT COST CONTROL AND COST ESTIMATING

State DOTs: Prepare cost estimates at the planning, environmental, and design stages based on the best available data. Draw from experience derived from other projects. Express cost estimates in year of expenditure dollars to ensure the impacts of inflation are considered. Make contingent cost and funding estimates part of the estimating process to provide for the uncertainty and complexity of projects.

State DOTs: Employ cost management measures such as value engineering in both design and construction, and conduct aggressive constructability and bid reviews.

State DOTs: Develop coordinated financing and project management plans as required for major projects. Update plans annually to ensure accuracy and currency.

AASHTO and FHWA: Work in partnership to develop cost estimating guidelines for the planning, environmental, and design phases of project development based on the output from NCHRP Project 20-7, Task 152, *Cost Estimating Guidelines*, and from research currently being conducted through NCHRP Project 8-49, *Procedures for Cost Estimation and Management for Highway Projects During Planning, Programming, and Preconstruction*.

AASHTO: Develop an information dissemination process in coordination with FHWA to make available information on best practices in project cost control and cost estimating.

AASHTO: As part of TEA-21 reauthorization, ensure that the costs of development of project management systems continue to be eligible for funding under the Federal-aid program.