



A PRELIMINARY STUDY OF ALTERNATIVE TECHNICAL CONCEPTS IN HIGHWAY PROJECT DELIVERY METHODS

R. EDWARD MINCHIN JR.¹, PARTH CHOKSI¹, LINDA KONRATH², SID SCOTT², and
YUANXIN ZHANG¹

¹*School of Construction Management, University of Florida, Gainesville, USA*

²*Hill International, Philadelphia, USA*

Department of Transportation (DOT) budgets are being stretched to the limits, while the infrastructure needs of the nation continue to grow. To address this issue, a few DOTs have adopted strategies that promote innovation and motivate industry to propose cost or time saving ideas. The advent of the Design Build (D-B) and General-Contractor-as-Construction-Manager (CM/GC) project delivery methods in highway and bridge construction has established the early involvement of the contractor in the design phase of a project. The next step on this evolution may be Alternative Technical Concepts (ATCs). The Federal Highway Administration (FHWA) has defined an ATC as “a request by a proposer to modify a contract requirement, specifically for that proposer’s use in gaining competitive benefit during the bidding or proposal process and must provide a solution that is equal to or better than the owner’s base design requirements in the invitation for bid (for a design-bid-build project) or request for proposal (for a D-B project) document”. ATCs have been reported to improve constructability, enhance innovation, and ultimately save costs. Issues with ATC use includes: time and resource constraints, confidentiality concerns, submittal issues, and difficulties in conducting fair “apples to apples” evaluations. This paper will report the findings of the research team as it goes through the early stages of identifying best practices for the FHWA to bring uniformity to the ATC process.

Keywords: Design-build, Innovation, Confidentiality, Constructability, Proposal.

1 INTRODUCTION

The highway construction industry in the US has evolved during the last 25 years, with projects delivered by alternative methods such as Design-Build (D-B) and Construction-Manager-as-General Contractor (CM/GC). State Departments of Transportation (DOTs) are aiming for innovative methods in project delivery, and the private sector is encouraged to suggest techniques and methods that can shorten project durations and reduce project costs. The process of Alternative Technical Concepts (ATCs) is a formal, contractual approach that encourages innovation in the proposals and can be implemented with all project delivery methods. ATCs were implemented on D-B projects for the first time in 2002.

ATCs promise and deliver savings to the project; however, only one state is integrating ATCs with the DBB delivery method, and at present, there are no specific guidelines or sets of rules with regard to implementing the ATCs on highway projects. DOTs implement ATCs into their respective projects according to their own convenience and technical capabilities. Furthermore,

ATCs cannot be incorporated for all projects. Projects that do not allow flexibility in design or methods of construction cannot be integrated with ATCs. If there are multiple solutions to the same design, only then can ATCs be used by choosing the best solution. There are some concerns in the construction industry with regards to the confidentiality of business practices, proprietary data, and the legal requirements for using ATCs, which vary from state to state. Further issues include procurement procedures, responsibility for the cost of redesign and design liability. As a result, DOTs are not able to fully explore and take advantage of ATCs on their projects. Some of the key issues that need to be addressed are the following:

Is it fair to allow one contractor to bid as advertised and another to bid using an ATC on a project? What are the appropriate procedures for accepting, reviewing, and evaluating ATCs during procurement and what practices should be considered ideal in contractually implementing ATCs? How should the confidential meetings be conducted and the information kept secret, and how detailed should the submittal process be?

2 LITERATURE REVIEW

The advent of the D-B and CM/GC project delivery methods has established the early involvement of the contractor in the design phase of a project. According to research by West (2012), the early involvement of the contractor in the design phase has ensured cost certainty at the beginning as well as at the end of a project. The practice of incorporating ATCs into project delivery methods has taken this further, as various DOTs across the US have adopted and integrated them with different project delivery methods. According to a report by the Washington State DOT, the ATC process is established such that the ATC furnishes a design/concept equal to, or better than, the original project concept. The Federal Highway Administration (FHWA), in one of its reports, recognized the ideas on which the ATCs could be considered valid to incorporate into project delivery methods. The two ideas were termed as follows:

- “Apples-to-apples” comparison
- “Level playing field” competition

The approval of an ATC by an agency indicates that the agency has modified the RFP requirements for a particular competitor. This challenged the apples-to-apples comparison, which was later resolved by requiring the ATC to be a standard equal to, or better than, the baseline concept/design. Papernik and Farkas (2009) stated that the ATC could not produce cost savings by reducing or neglecting quantities from the scope of the project. The report further stated that regarding a level playing field, the agency must give an opportunity to resubmit the proposals if the proposed change to the technical scope is the result of an error or omission in the design or method. This approach assures contractors that an agency maintains a level playing field.

When submitting the ATCs, the proposers must comply with federal statute 23 C.F.R § 636.209(b), which states that proposers can submit ATCs without conflicting with ideas agreed upon during the environmental decision-making process. Moreover, ATCs must be submitted separately from the baseline design. This method is cumbersome for a few DOTs because it requires extra time and resources to evaluate both the ATCs and baseline design. According to Carpenter (2012), a few DOTs—e.g., Washington State and Maryland—sought the help of FHWA’s Special Experimental Program 14 (SEP-14) for a programmatic waiver.

2.1 Confidential Meetings in ATC

Gransberg *et al.* (2014) showed that confidential meetings after a preliminary ATC submission strongly influence the success of a project. The common approach was to set a date for the proposers to provide their intention to submit an ATC to the agency. According to Hitt (2012), the Missouri DOT provided 60% of their DBB plans six months prior to the scheduled date of submission of the proposals to allow for this.

2.2 Submittal and Evaluation Process in ATC

Gransberg *et al.* (2014) generated a flowchart pertaining to the generic ATC evaluation and review process. The flowchart indicates the steps from solicitation to contract award. The essential components of the process are preliminary ATC submission, confidential one-on-one meeting, formal ATC submission, proposal submission, evaluation and contract award.

ATCs were found to be successfully adopted in all project delivery methods. However, in the case of DBB projects, an early decision on ATC approval is essential such that the savings from using the ATC exceed the efforts put in the baseline design of the project. Missouri DOT has not only utilized ATCs on a DBB project, but has borne the design liability for the project. Because the ATCs were aimed at reducing the costs associated with the projects, the solicitation documents required the contractor to submit the cost data along with the ATC.

2.3 ATC Review Process

The ATC review process is unlike a normal proposal review process. Gransberg *et al.* (2014) found that the members who review the ATCs are required to be technically qualified to validate the proposed concepts and evaluate the impacts of the proposed ATC on the environment.

For some DOTs including Minnesota and Utah, the legislation provides the presence of authorities outside the agency. The outside authorities may include people from FHWA, local government, and state resource agencies. To safeguard the interests of the contractors, Texas DOT included a clause in its solicitations which stated that authorities outside the DOT may observe the evaluation process; however, they must sign the standard confidentiality agreement that Texas DOT has provided.

3 RESEARCH METHODOLOGY

The aim of this ongoing research is to analyze and identify the best practices for implementing ATCs in the DBB, D-B and CM/GC project delivery methods for highway construction in the US. Since most highway projects in the US are public projects, all DOTs will be contacted by the principal investigator to obtain data. To begin the process, the researchers contacted DOTs of 15 states in the Southeastern US, including Puerto Rico.

3.1 Research Instrument

The researcher, with the help of previous research and publications, developed a set of questions as a research instrument consisting of open and close ended questions. The questions aimed at bridging the gap between previous research and the best practices for implementing ATCs.

3.2 Data Collection

The research team then contacted the state (central) construction office of the DOT in each state via telephone. DOT officials were given a short description of the research and asked whether

they would be willing to participate in the study. All officials contacted agreed to participate. Once they agreed to participate, officials were sent a survey consisting of the open-ended and closed-ended questions. Responses from different DOTs were then studied.

3.3 Data Analysis

Once the data were collected from the agencies, the closed-ended questions were analyzed, followed by the open-ended questions. The analysis of closed-ended questions provided a general idea about how the framework of best practices will take shape. Eventually, all open-ended questions will be analyzed by performing a basic statistical analysis. After analyzing all responses, the researcher will draw conclusions regarding the practices currently adopted by the DOTs for implementing ATCs on highway projects. This same process will be implemented with the remaining 37 DOTs in the near future. Then those DOTs with the most experience and most innovative and effective practices will be chosen to participate in Focus Groups. Four Focus Groups will be executed via webinar technology. Then the DOT personnel that offer the most information within the Focus Groups will be invited to one of three workshops, to be held at geographically diverse locations around the nation, which will also be attended by top people from industry, academia and federal agencies. After the workshops, the researchers will conduct case studies on the four most interesting projects or programs discovered throughout the process. The team will then use all the knowledge gained in the research to write a Guidebook for all DOTs to use in implementing ATCs into construction project processes for any delivery system. This paper reports on the first 15 states contacted.

4 RESULTS

Five DOTs of the 15 contacted responded that they never delivered a project using ATCs. Out of the remaining 10 DOTs, five of them responded and five remaining DOTs were in a process of responding to the questionnaire at the time of this paper's publication. After the preliminary data were analyzed, the researcher found that DOTs preferred using ATCs on projects having minimum costs in the range of 15 to 20 million dollars in order to allow flexibility for the project. DOTs also agreed on providing stipends to the unsuccessful contractor, if the DOT felt the need to incorporate the losing contractor's ATC into its project. Since there is risk associated even with the use of ATCs on a project, the DOTs preferred transferring the risk to the contractors by making contractors responsible for developing an ATC. The questionnaire helped in understanding a critical aspect of the ATC submittal process. Four out of five DOTs recommended submitting an ATC within two to four months' timeframe after the RFP is issued by the agency. One DOT raised concerns about the complexity involved in a project. This could increase the time required by contractors to submit a formal ATC. This further led to a question regarding the number of confidential meetings required for a project. Four out of five DOTs recommended having two to three confidential one-on-one meetings. The fundamental reason was to provide sufficient time to understand an ATC such that the ATC would not increase complexities during the project. It was further found that four out of five DOTs preferred having no limit on the number of ATCs that a contractor can submit. In order to determine the most suitable delivery method for implementing ATCs, the data from Figure 1 showed that D-B is the delivery method most DOTs thought was the easiest delivery system with which to use ATCs. Every state also recommended D-B to be the easiest delivery method for implementing ATCs on a project.

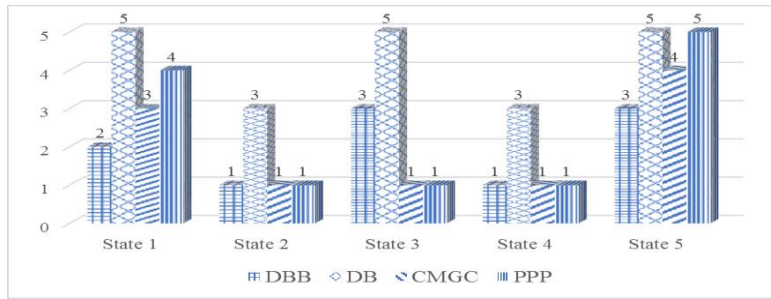


Figure 1. Ease of ATC use for different states.

One of the key aspects of understanding the submittal process of ATCs is to understand the impacts of ROW, project schedule, and permit fees. Figure 2 shows the type of information recommended while submitting ATC. It was observed that three out of five states emphasized submitting ATCs with permit fees as the most important criteria.

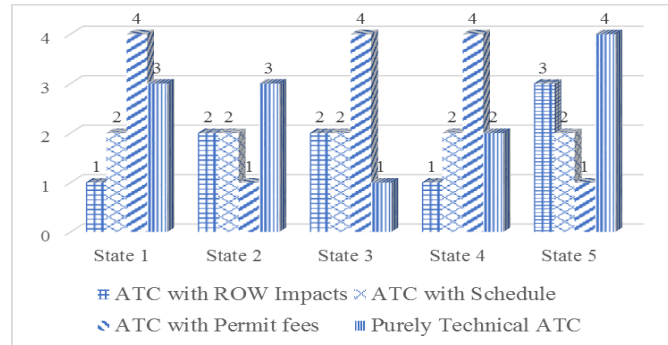


Figure 2. Type of information recommended while submitting ATC.

Another finding was the determination of the number of panelists that would review ATCs. DOTs preferred having a minimum of four to a maximum of six members on the panel. DOT officials further recommended the inclusion of personnel from FHWA, local government and state resource agencies as members of the panel. Figure 3 shows the importance of different authorities serving on an ATC review panel. It is evident from the figure that all states recommend including FHWA personnel on their review panel.

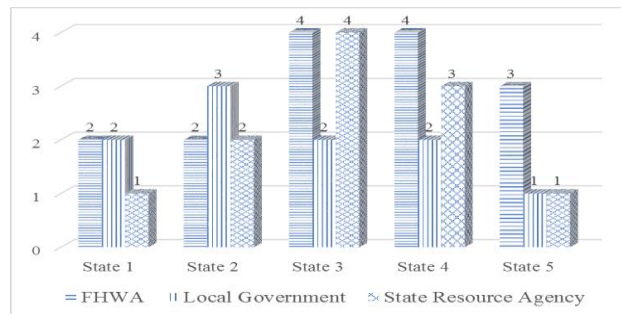


Figure 3. Importance of authorities in ATC Review Panel.

After collecting and analyzing data, the researchers wanted to determine the overall ease of using ATCs on highway projects. Figure 4 shows overall rating from each state for the use of ATCs on their respective projects, with “5” as the easiest rating.

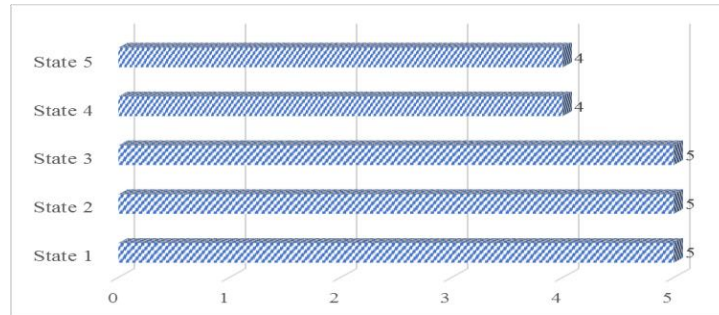


Figure 4. Overall ease of ATC for highway projects.

5 SUMMARY

The research provided useful information on different phases of implementing an ATC in a project. The data regarding confidential meetings, time constraints for submission, review team, type of ATC to be submitted and other information helped in understanding the approach of different DOTs for implementing ATCs. At this point in time, the researchers await responses from five DOTs for this preliminary study, and will eventually expand the study to include all state DOTs. Once more responses are obtained, more reliable conclusions can be drawn.

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