New MISSISSIPPI RIVER BRIDGE PROJECT
Connecting Missouri & Illinois
St. Louis
Gregory Horn, P.E., Project Director
MoDOT
Mississippi River Bridge Project
707 N. Second Street, Suite 300
St. Louis, MO, 63102
(314) 236-2930
Fax: (314) 236-2981
Illinois Department of Transportation

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ATC Analysis

Alternate Technical Concepts (ATC) is an alternate design development and contract procurement that utilizes contractor input on design to reduce costs in the design bid build process.

MoDOT has used a smaller scale version of the ATC process on several projects in the past two years. This process allowed contractors to confidentially submit an idea for an ATC. Along with the idea a total savings breakdown is given. MoDOT would review the idea to assure it provided an equivalent or better product. Also an estimate of the design cost is made to assure a savings will be achieved that is greater than the design cost. If the ATC was accepted the contractor would bid the plans knowing their ATC concept was approved. If the ATC bidder was the low bidder then MoDOT or its designer would design the ATC to final signed and sealed plans.

The MRB ATC plan was similar and was as follows:

- *A Contractor was pre-qualified to enter into the ATC process during plan production.*
- *MoDOT laid out schedule for ATC concept review and published plans on website at 70%, 80% and 90% complete.*
- *At Contractors request, MoDOT engaged in 1 on 1 confidential meeting with contractor to discuss their ATC idea.*
- *Contractor submitted formal written ATC concept including estimate of cost savings.*
- *MRB Team reviews and responds in agreed number of days.*
- *MRB response included whether the ATC concept is: Accepted or Rejected, Major or Minor*
- *The Contractor was not locked into the ATC to bid. If market prices vary the ATC may not still be viable for cost savings. Therefore the contractor was allowed to still bid the baseline plans like all non ATC bidders.*

- *The ATC bidding documents would not be signed and sealed at the time of bidding. The plans would be developed so that the owner and contractor were satisfied that the bidding quantities were established to the same level of certainty as the baseline plans. Final signed and sealed plans would be developed for the successful ATC bidder. The development of plans to achieve reliable plan quantities would be approximately 80%.*

Major *means the contractor designs at his expense and becomes Engineer of Record for concept*

Minor *means the owner's designer will design at DOT's expense*

What determined Major ATC?

Major concepts affect other aspects/details of the bridge than simply confined to the area targeted by the ATC proposal
Or
Alternately, major concepts could be those determined to not to be economically feasible. I.e. Savings is less than estimated design cost.

There were certain criteria that the ATC could not affect.
- *It could not infringe upon any of the project goals.*
- *It could not violate any jurisdictional requirements.*
- *It must meet all design criteria and standards of the baseline design.*
- *It could not impact adjacent contracts (tie-in points, details, scheduling)*

The following is a look at some of the positives and negatives of the MRB ATC process. The purpose of the ATC process is to lower bid prices by allowing the contractors to utilize their innovation and expertise.

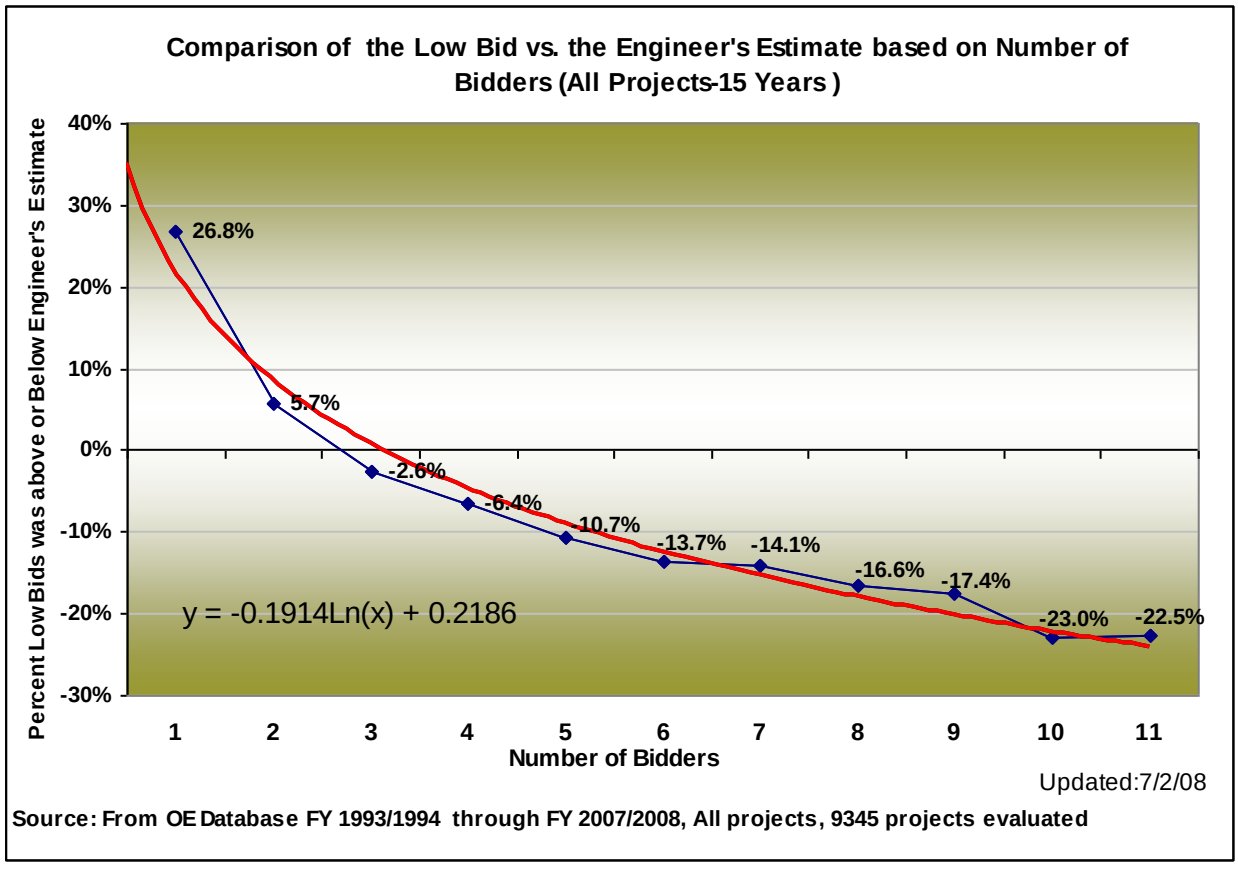
PROS:

- **Removes Contractor Risk** - The contractor will know at the time of bidding if the owner will accept their proposal. This allows contractors to give more competitive bids.

- **Allows Contractors Familiarity with Plans** - The early involvement of the contractors gives them a better understanding of the plans. Typically a contractor only has a few months to review plans and put together his bid. This process allowed the contractor up to a year to work with plans. This knowledge allowed them to identify savings and incorporate the savings in their bid as well as reduce surprises that may have occurred during construction.

- **Forces most Efficient Design** - Another factor is that this process challenged the designer to come up with the most cost effective base line design. Every day designers must make choices and sometime the decisions is based on a more conservative view if no one challenges the choice. With ATC, the designer knows that the choice will likely be challenged by the contractor, which forces the designer to design the most economical design that meets the design standards.

- **Enhances Competition -** Contractor competition is critical in keeping bid costs down. Contractors who do not participate in the ATC process have to bid aggressively due to the uncertainty of what their competitors may be bidding on. FHWA considered the ATC process in determining the likely cost of the MRB project. The ATC process by introducing competition could be evaluated as the equivalent of one additional bidder. Each additional bidder will lower the bid price. See below chart from Caltrans.



Cons:

- **Lowest Cost not Necessarily Best Value -** The ATC process cannot compromise the minimum design criteria. One of the inherent problems with ATC's is that the emphasis is on lowest price but not necessarily the best value. An ATC proposal will provide for the lowest price possible and meet minimum design criteria. This is similar to design build. However the ATC may not provide equivalent value of the baseline plans. This could expose the owner to a lesser design life or additional maintenance cost. Some design aspects are included in the original design because of engineering judgment and history of performance of some products or designs.

- **Total Design Cost Could Outweigh Savings** -
    - The risk in the ATC process is that the design and review costs could be excessive. These costs could negate or possibly cost more than any potential ATC savings if all contractors are submitting ATC's but only one bidder will actually be awarded the contract. Therefore the ATC design costs of all bidders would have to be less than the total ATC savings of the successful bidder.
    - Additionally, the more alternate designs to be developed will possibly extend the amount of time to develop plans. The designer may have to obtain additional resources to complete the ATC proposals. This also could have a monetary impact.
    - There is no finite way to capture the savings produced by ATC. Therefore the owner may have difficulty justifying the additional design costs.

- **Confidentiality issues** – Confidentiality is paramount for the success of the ATC process. Great care should be taken with exchanging files and emails. A breach of trust could cause possible bid protests and contractors withdrawing from the bidding process. The designer will have to exercise great caution in keeping separate proposals independent of each other.

- **Limited Opportunity to Change Baseline Plans as Issues Arise** - Once the designer has declared a segment of design complete it cannot be changed. Any changes in the baseline after it is represented as complete could affect the savings and designs of ATC proposals. Therefore the designer does not have a second chance to refine designs at a later date. This is particularly a problem if a last moment issue comes up late in the project. How do you address the particular issue without affecting ATC proposers?

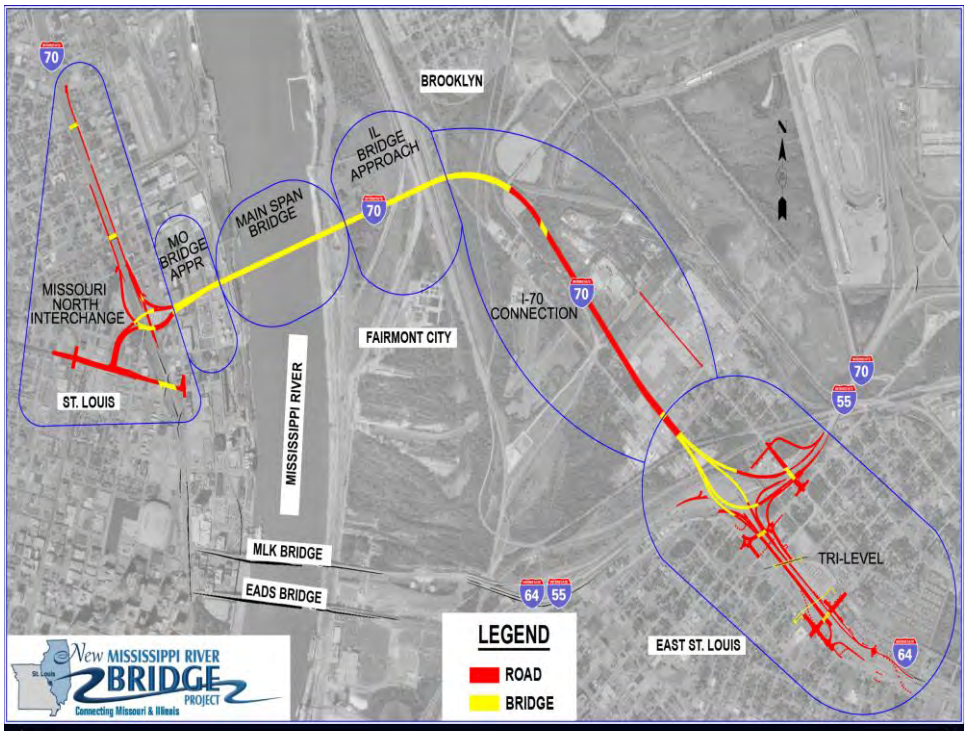
- **Utility adjustments**- Utility adjustments are typically made when the design is complete. If this is not possible before construction an agreement on the scope and relocation costs is agreed upon. The ATC process could affect the utility relocation scope and costs. This also presents a problem for discussing possible changes in utility relocations without disclosing a confidential ATC. The potential relocation cost differentials will have to be quantified on the ATC

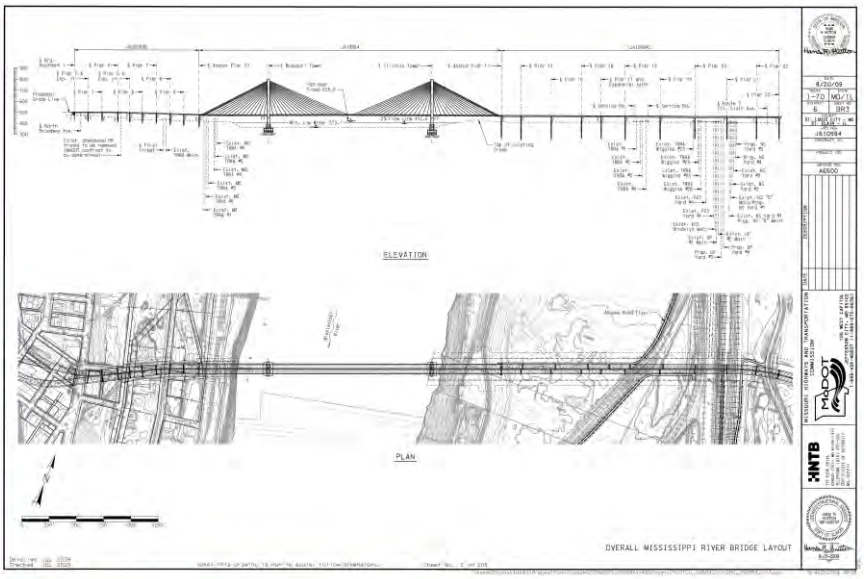
proposal to make sure it is properly accounted for. This could also delay utility relocations since they cannot be performed until the project is awarded.

- **Impacts to local property owners**- The ATC proposer would have to obtain any additional right of way or easements to perform their ATC. This also leads to the problem of disclosing an ATC to others. There may be certain expectations of the looks and functionality of the project by the public, adjacent landowners, and other public agencies. If you discuss the proposals with outsiders can it be kept confidential? If you do not discuss the optional ATC designs with others it could be construed as dealing in bad faith.

Project Description:

The MRB project consists of a relocated section of I-70. The roadway will have two lanes in each direction and includes a new Mississippi River Bridge. MoDOT is the lead agency for the corridor. However the Illinois Department of Transportation (IDOT) will administer construction projects in Illinois. The three projects the ATC process has been used on are the Missouri Approach, Main Span, and Illinois Approach. These sections are shown on the photo below. In addition we are anticipating using the process on the Missouri Interchange will be let in the spring of 2011. The plans for this project are already completed.





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ATC's on the MRB Main Span Project:

MoDOT had prequalified four contractors for the ATC process on the main span contract. Two contractors submitted ATC proposals. These same two contractor teams were the only ones to submit bids. Both ATC proposals involved modifications to the river foundations. The proposals had anticipated savings of $7.5 million and $8.3 million in direct costs.

The owner's designer designed both ideas. The plans were developed to biddable quantities in coordination with the respective contractors. Both contractor teams bid their ATC concepts. Both teams post award believed the ATC benefited their bidding. The bidding advantage was with reduced quantities, less risk, and project timesavings.

One team had submitted a proposal to alter the tower to precast. The savings would come from a 5-month savings on project overhead. This translated into a net proposal savings of $1.5 million. Preliminary design was performed. The contractor ultimately retracted this ATC due to constructability concerns.

The successful bidders ATC was developed to signed and sealed drawings. Contract award amount was $229,450,505. Programmed amount was $190,000,000. The total design costs for ATC on the main span was $72,662. Based on the assumption that the $7.5 million was built in the bid the ATC direct savings would be $7,427,338. In addition there may have been some indirect saving for less risk in construction, time-savings, and increased competition due to the uncertainty of what their competitor may have been bidding.

ATC's On Missouri Approach Project:
There were 5 contractors that prequalified for the ATC process on the Missouri Approach. Four contractors submitted ATC proposals. Three submitted one proposal and one submitted three proposals. The project was programmed at $15 million. The award amount was $10,908,521.

One of the contractors had ATC plans developed for them but ended up bidding the baseline plans. The volatility in steel prices changed the savings from when the concept was developed and when the contract was bid.

The total cost of ATC's designs for the Missouri Approach was $326,275.05.
The successful bidder did not bid an ATC.

ATC's on the Illinois Approach Project:

There were two accepted proposals on the Illinois Approach. They were both designed to biddable quantities. The Illinois Approach letting was transferred from the Missouri Department of Transportation to the Illinois Department of Transportation (IDOT) just prior to letting. IDOT believed their state statutes did not allow for the ATC bidding

process. Therefore they will not allow ATC proposals to be bid. The cost of designing these two ATC proposals was $278,409.

FINAL THOUGHTS:

There were some ATC submittals with savings of around $1,000. The cost of designing these would offset the proposed savings. The multiple ATCs that you get into with these small amounts make bidding preparation and documentation very complex. With the added administrative cost there is probably no advantage of accepting a small value ATC. Therefore there should be a minimum savings amount established for an ATC to be approved.

The ATC process requires that a disc be submitted for bidding instead of electronic bidding. Therefore addendums and especially last minute addendum are hard to make. All unique ATC Electronic Bid Set (EBS) files have to be sent to all ATC bidders. This makes the bidding execution more difficult and introduces the opportunity for more bidding errors. Extreme care must be exercised to not accidentally place the wrong ATC information in each bid package.

Caution must be used to make sure baseline designs are finalized prior to any ATC submittal on that design element. The designer is locked into that design at that point. Any significant alterations could affect the savings on the ATC design. Any changes could possibly be construed as co-opting the contractor's proposal.

We did not utilize any major ATC's on our project. There were discussions with contractors on how this may work. There were significant issues on who the designer of record would be. This also required the contractor to obtain professional liability insurance and possible additional risk. The major ATC process would require much more legal research on the designer of record issue. This would be a significant impediment to implement it. Contractors would also be hesitant to extend large expenditures on design work. No stipends were paid. If a stipend were paid it would lead to concerns that the project would be close to a design build project.

The consensus from contractors who participated in the ATC process thought it was good. Contractors would not be very likely to participate if the design would have to be performed at their expense. The contractors liked having the opportunity to be innovative and utilize it to be more competitive.

The consultant designer thinks the process leads to the most economical design possible.

Contractors Comments:

- "We thought it was a good process overall.

The suggestions we would have for the future are:

1. There needs to be a cutoff set of documents from which the
Contractors can be confident that any changes they suggest will not be also included in some further internal development by the owner or his design team"

2. "That cutoff needs to be sufficiently developed so as to allow the contractor to make choices. Other than that we like the process."

- "The ATC process is a cheap imitation of the design build process. In true design build you and the engineer are on the same side – trying to find reasonable ways to make the project better and more efficient. The atc process puts you at odds with the engineer. Each comment we brought in they had a reason why they made the decision differently. There was already resistance"

- "We think it was effective. It stimulated some good Engineering thought. It fostered teamwork with the designer and allowed the contractor to have a greater understanding of the design. The only negative aspect is that we had to stay in the scope of the ATC submitted. We could not change other attributes of the design as we can with design build. Overall it was an enjoyable experience and can produce an efficient design much like the design build process."

It appears the foundation of ATC's can be a valuable tool to save money. It may not be a good candidate for all jobs though. Some smaller jobs and if there are numerous bidders may not be the best candidates. But on certain types and sizes of projects it can introduce the competition to drive down bid prices. The use of ATC's should be evaluated on a project by project basis.

This report is a summary of the ATC procurement process as required by the SEP- 14 agreement. A second report will be submitted upon project completion to include the ATC process on the Missouri Interchange project and any ATC-related issues during the construction phase.