Selection and Evaluation of Alternative Contracting Methods to Accelerate Project Completion (NCHRP 20-5)

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Study Objectives

Identify
- Driving factors for the selection of specific ACM
- Advantages and disadvantages of ACM
- Implementation problems and lessons learned

Assess
- Possible impact on performance measures (cost, schedule, quality)
- Application of systematic processes in the selection and evaluation of ACM
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Study Methodology

- Selected 17 related methods from “Primer on Contracting”
- Performed literature review on selected methods (TRIS, TRR, AASHTO, ASCE, FHWA, etc.)
- Developed an electronic survey to include both quantitative and qualitative questions
# Selection and Evaluation of Alternative Contracting Methods to Accelerate Project Completion

## INTRODUCTION

<table>
<thead>
<tr>
<th>Method</th>
<th>Recommended by Authors</th>
<th>Recommended by Panel</th>
<th>Indicated by STAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Impact</td>
<td>Indirect Impact</td>
<td>May Impact</td>
<td></td>
</tr>
<tr>
<td>Cost-Plus-Time bidding</td>
<td>Active Management Payment</td>
<td>Design-Build-Maintain</td>
<td>Contractor Overhead Costs (COC)</td>
</tr>
<tr>
<td>Design-Build (Include DBW)</td>
<td>Construction Manager at Risk</td>
<td>Early Contractor Involvement</td>
<td>Alliancing</td>
</tr>
<tr>
<td>Incentives/Disincentives</td>
<td>Flexible Notice to Proceed</td>
<td>Public Private Partnerships</td>
<td></td>
</tr>
<tr>
<td>Interim Completion Dates</td>
<td>Quality Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lane Rental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-Parameter bidding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Excuse Incentives</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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INTRODUCTION

General Approach

Agency Information
- Currently implementing Alternative Contracting Methods?
  - Yes
  - No

What Were The Barriers?
- Organizational
- Legal
- Other

Method Related
- Does the agency have a business unit for Alternative Contracting Methods?
  - Yes
  - No

Does it have a weblink?
- Yes
- No

Does the agency have a systematic process for Alternative Contracting Methods?
- Yes
- No

How to access the documents?
- Online
- Hard copy

Does the agency track life-cycle performance of the projects?
- Yes
- No

What are the performance indicators?

Does the agency have experience regarding the selected method?
- Yes
- No

Does the agency have enabling legislation for the method?
- Yes
- No

What are the influencing parameters for selection of this method?
- Critical Completion Date
- Complexity
- Size
- Type

What were the Implementation problems?

What were the Advantages/Disadvantages?

What were the lesson learned?

What were the impacts?

Does the agency have a systematic process for Alternative Contracting Methods?

End
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Analysis Focus

- Use and Frequency of Implementation
- Selection Factors
- Impact on Performance Measures
- Implementation Issues
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ACM Organizational Issues

- Lack of Prior Expertise: 9, 24%
- Lack of Enabling Legislation: 11, 30%
- Other: 17, 46%
## ACM Organizational Issues - Other

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortage of qualified personnel and organizational structure</td>
<td>3</td>
</tr>
<tr>
<td>Lack of adequate funding</td>
<td>2</td>
</tr>
<tr>
<td>Adherence and familiarity with known and proven methods</td>
<td>1</td>
</tr>
<tr>
<td>Employee union opposition</td>
<td>1</td>
</tr>
<tr>
<td>Inexperience of contracting community</td>
<td>1</td>
</tr>
<tr>
<td>Lack of demand considering the type of projects</td>
<td>1</td>
</tr>
<tr>
<td>Lack of leadership for innovative actions</td>
<td>1</td>
</tr>
<tr>
<td>Size of contracts</td>
<td>1</td>
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Application of ACM

- Methods with *High Implementation* (16 or more STAs use this method)
- Methods with *Medium Implementation* (6 to 15 STAs use this method)
- Methods with *Low Implementation* (1 to 5 STAs use this method)
- Methods Not Used
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Frequency of Application of ACM

Number of Surveys: 30

Percentage of Surveys

Methods

- Incentive/Disincentives
- Interim Completion Dates
- Cost Plus Time
- Bidding
- Design-Build
- Lane Rental
- Flexible Notice to Proceed
- No Excuse Incentives
- Public Private Partnerships
- Early Contractor Involvement
- Design-Build Maintain
- Multi-Parameter
- Bidding
- Practical Methods for Paying for UHOC
- Quality Factors
- Construction Manager at Risk
- Alliancing
- Active Management
- Payment

- 11 & More
- 6 to 10
- 1 to 5
- 0

OVERVIEW OF ACM
## ACM by Level of Use

<table>
<thead>
<tr>
<th>High Use</th>
<th>Medium Use</th>
<th>Low Use</th>
<th>No Use</th>
</tr>
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<td>Construction Manager at Risk</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Lump Sum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Design Sequencing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liquidated Savings</td>
<td></td>
</tr>
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Influencing Factors for Selecting ACMs

- **Project size** – assessed in terms of the estimated cost of a project in dollars
- **Project type** – assessed in terms of preservation, rehabilitation, reconstruction projects and new construction
- **Project complexity** – typically assessed in terms of project location and other sources of complexity such as combination of pavement and structures construction, utility conflicts, significant traffic control requirements, etc.
- **Critical completion date**
Methods with High Implementation Frequency

- Incentive Disincentive
- Interim Completion dates
- Cost Plus Time
- Design Build
- Lane Rental

EVALUATION OF ACM

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Methods with Medium Implementation Frequency

- Flexible Notice to Proceed
- No Excuse Incentive
- PPP

[Bar chart showing the percentage of respondents citing decision influencing factors for various factors such as project size, project complexity, critical completion date, project type, and other factors.]
Methods with Low Implementation Frequency
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- **Performance**
  - **Schedule** – Measured by assessing the average reduction in project duration (relative to estimated or projected duration)
  - **Cost** – Measured by assessing percent under or over the anticipated total project budget
  - **Quality** – Measured by assessing whether quality was lower, the same or better when compared to a typical project that did not implement ACM
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**Schedule Performance - Methods with High Implementation Frequency**

![Graph showing schedule performance impacts for different methods.]

- **Incentive/Disincentives**
- **Interim Completion Dates**
- **Cost Plus Time Bidding**
- **Design-build**
- **Lane Rental**
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**Schedule Performance - Methods with Medium Implementation Frequency**

<table>
<thead>
<tr>
<th>Percentage of Respondents Citing Schedule Impacts</th>
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<tr>
<td>Flexible Notice to Proceed</td>
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</table>

- Increase duration
- No Impact
- Less than 5% decrease
- Between 5-10% decrease
- More than 10% decrease
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Schedule Performance - Methods with Low Implementation Frequency

- Early Contractor Involvement
- Multi-parameter Bidding
- Practical Methods for Paying for COC
- Design-build Maintain
- Lump Sum Bidding
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Cost Performance - Methods with High Implementation Frequency

- Incentive/Disincentives
- Interim Comp. Dates
- Cost + Time Bid
- Design-build
- Lane Rental
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Cost Performance - Methods with Medium Implementation Frequency

- Flex. Notice to Proceed
- No Excuse Incentives
- PPP
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Cost Performance - Methods with Low Implementation Frequency

- Early Con. Involvement
- Design-build Maintain
- Multi-parameter Bid
- Quality Factors
- CM at Risk
- Lump Sum Bidding
- Design Sequencing
- Liquidated Savings
- Prac. Meth. for COC
Quality Performance

- It is perceived that ACM does not impact the quality
- This result seems to contradict the perception that accelerating project completion negatively impacts quality.
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### Implementation Issues

<table>
<thead>
<tr>
<th>Category</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incentive/Disincentive</td>
<td>- Problem in handling Delays caused by unforeseen circumstances</td>
</tr>
<tr>
<td></td>
<td>- Not to be used for projects that are likely to have additional work</td>
</tr>
<tr>
<td></td>
<td>- Need for a realistic and detailed schedule</td>
</tr>
<tr>
<td>Interim Completion Dates</td>
<td>- Disagreement over delays</td>
</tr>
<tr>
<td></td>
<td>- Missed milestones due to weather</td>
</tr>
<tr>
<td></td>
<td>- Right of way issues</td>
</tr>
<tr>
<td></td>
<td>- Difficulty regarding coordination between related projects</td>
</tr>
<tr>
<td>Lane Rental</td>
<td>- Difficulty with monitoring contractor progress for works done at night</td>
</tr>
<tr>
<td></td>
<td>- Difficulty in trying to predict the contractor’s schedule and procedures</td>
</tr>
<tr>
<td></td>
<td>- The common cost problem encountered was in calculating the delay cost incurred by road users</td>
</tr>
</tbody>
</table>
### Implementation Issues (Cnt’d)

<table>
<thead>
<tr>
<th>Method</th>
<th>Issues</th>
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</thead>
<tbody>
<tr>
<td>Cost Plus Time Bidding</td>
<td>- Lack of bids</td>
</tr>
<tr>
<td></td>
<td>- Problems in resolving delays and charging disincentives</td>
</tr>
<tr>
<td></td>
<td>- Problems regarding accurately defining costs</td>
</tr>
<tr>
<td></td>
<td>- Difficulty in determining the road user costs and value of reducing delay time</td>
</tr>
<tr>
<td></td>
<td>- Needs well written contract documents</td>
</tr>
<tr>
<td>Design Build</td>
<td>- Implementing is hampered mainly by legislation and problems developing and administering the DB contract</td>
</tr>
<tr>
<td></td>
<td>- Difficulties in providing a clear project scope for potential bidders</td>
</tr>
<tr>
<td></td>
<td>- Lack of experience</td>
</tr>
<tr>
<td></td>
<td>- Difficulty in pricing the risk to the design-build contractor</td>
</tr>
<tr>
<td></td>
<td>- Difficulty in defining the scope</td>
</tr>
</tbody>
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### Implementation Issues (Cnt’d)

<table>
<thead>
<tr>
<th>Method</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible Notice to Proceed</td>
<td>Difficulty in anticipating when field personnel resources will be needed by the STA</td>
</tr>
<tr>
<td>No Excuse Incentive</td>
<td>Delay related issues</td>
</tr>
<tr>
<td></td>
<td>Needs clear contract’s language in defining “No Excuse”</td>
</tr>
<tr>
<td>Public Private Partnerships</td>
<td>Difficulty in obtaining multiple proposers</td>
</tr>
<tr>
<td></td>
<td>Another difficulty cited with using PPPs is the use of “non-compete” clauses that are necessary to protect the franchisee’s investment</td>
</tr>
<tr>
<td></td>
<td>Need for clarification regarding the buyout provisions at the beginning of the agreement</td>
</tr>
<tr>
<td>Early Contractor Involvement</td>
<td>Difficulties in gaining effective contractor input at an early stage in the design process</td>
</tr>
<tr>
<td></td>
<td>Further, there were some legal concerns with ensuring contractors had not obtained an advantage through their early participation in the project</td>
</tr>
</tbody>
</table>
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States with Systematic Processes

- Minnesota
- Utah
- Ohio
- California
- Pennsylvania
General Conclusions

- Specific units for implementation of ACM in some states
- Legal issues still remain a barrier to implementation especially with Design-Build
- There is often shortage of qualified personnel and organizational structure to support alternative contracting
- Some agencies no longer use certain methods such as cost plus time and lane rental
- Very few systematic selection processes are used to guide the implementation of ACM
General Conclusions (Cnt’d)

- Every contracting method has its advantages and disadvantages so care must be taken when selecting it for project acceleration in a particular project.
- Project acceleration is influenced by other issues beyond selecting the appropriate contracting method.
Specific Conclusions – Methods with High Implementation Frequency

- Selection of these methods is driven primarily by the requirement to meet a critical completion date.
- All five methods reduce schedule duration and three reportedly reduce duration for approx. ten percent.
- Project complexity and type are the important critical factors.
- Cost performance for all five methods generally varies between five percent under and five percent over budget.
- Quality is generally perceived as being unaffected.
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Recommendaions

- STAs may consider establishing a business unit
- STAs could consider the development and use of a systematic process as a decision support tool to aid in the method selection
- STAs can be encouraged to document implementation results and perform an analysis of the results to more specifically identify the benefits
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Thanks