Welcome and Introductions with teleconference/webinar availability

Welcome and Agenda Review
The Chairperson Lesly Tribelhorn (Montana) welcomed the Technical Committee on Cost Estimating (TCCE) and reviewed the final agenda for the meeting. Final meeting agenda is posted at http://www.okladot.state.ok.us/tea-pug/pdfs/agenda_tcce.pdf

Introduction of Members present:
The following members were present at the meeting;
Lesly Tribelhorn, Chair (Montana), Natalie Roark, Vice Chair (Missouri), Alan Ellis (Vermont), Charles Nickel (Louisiana), Greg Davis (Florida), Terry Knouse (Virginia), Darrell Richardson (Georgia), Matt Vincent (Delaware), Christine Krall (Wisconsin), Ken Spear (Wyoming), Melanie Douglass (AASHTO Liaison), Edwin Okonkwo (Secretary, FHWA HQ)

Others Present:
Mary Lacho (Minnesota), Troy Patterson (Georgia), Dan Liston (Virginia), Valerie Svensson (MnDOT), Danica Stovall-Taylor (MoDOT), Jennifer McAlister (InfoTech), Mark Onan (Oman Systems), Brad Towe (Oman System), Ian Cavanaugh (FHWA), Zongwei Tao (Weris, Inc.), Richard Duval (FHWA),, Shawn Yu (CDOT), C. J. Schexnayder (ASU), Ray Drewett (LADOTD – teleconference).

Members on Webinar/teleconference:
Jack Young (California), John Riedl (Oregon), Dave Kent (New York)

Members absent:
Jeff Hisem (Ohio), Jay Drye (Washington)

Top 3 Cost Estimating Issues Facing State DOTs:
In advance of this meeting, the chair solicited from each member, top three issues that are most important to cost estimators. The issues were reviewed and extensively discussed during the annual meeting to find ways to navigate the challenges. The committee may propose research projects to help resolve the issues if it determines that research is the most effective way to resolve the issue. Some of the issues may be due to management decisions and are beyond the control of cost estimators. The table below shows the issues as submitted by committee members.
Summary of five most important issues of top 3 State’s Issues – Condensed and compared to last year

<table>
<thead>
<tr>
<th>Top 3 State’s Issue 2013</th>
<th>Top 3 State’s Issue 2012</th>
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<tbody>
<tr>
<td>Non-traditional bidding methods (including P3, Design/Build, CM/CG)</td>
<td>Funding Volatility: Limited resources, Instability of State funds, loss of tax revenue</td>
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<tr>
<td>Training and experience of cost estimators</td>
<td>Staffing: Staff development, Training, resources for training estimators</td>
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<tr>
<td>Funding uncertainty</td>
<td>Market Volatility: Market stabilizing, prices continue to fluctuate, Estimates have to be updated frequently, becoming a challenge</td>
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<tr>
<td>Market conditions</td>
<td>Bid Unbalancing: At cost bidding and bidding below cost, Movement of money in the bid</td>
</tr>
<tr>
<td>Bid unbalancing</td>
<td>Staffing; Inexperience, Training, Lack of resources, Outsourcing</td>
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**National Trends:**
This is a gauge of where the market is headed. Asphalts have been steady for the last couple of years, prices influenced by the number of bidders on major items. Environmental issues (flooding) have had an impact on bid prices in multiple states.

**AASHTO Inter-Committee Coordination**
The objective for the AASHTO inter-committee coordination is to ensure that efforts of one committee are not duplicated by another committee. The TCCE chair has been monitoring the activities of other Committees to ensure that their efforts are not duplicated. Rather we share in their efforts and extract useful information for Cost Estimating.

**Update on Technical Review Team (TRT) - AASHTO Transport Estimation Product**
Melanie Douglass, AASHTO Project Manager, reported that the AASHTOWare Project Estimation™ software will be available in December 2014.

**Session #1: Presentations/Discussions**

**Wildlife Crossing Projects and Cost Estimation (Ken Spear, WY)**
When you construct a highway in the vicinity of wildlife refuge, you can cut off wildlife routes. Typically, costs to pay for wildlife migration are not included in the project estimate. WYDOT shared their experiences in estimating wildlife migration mitigation projects; Tapper’s Point, US 191 West of Pinedale Nugget Canyon on US 30 between Kemmerer and Sage Junction, and Baggs WYO 789.

Continuous game fencing of about 8’ high was used to connect underpasses in areas with large concentrations of mule deer. Underpasses can effectively move a variety of big game and other wildlife species underneath a two-lane highway. Wildlife crossing projects presented a challenge to estimators because they are a non-traditional type of work. A total of 8-bidders bid on the projects.
LADOTD Item Bid History and Estimate Builder for Consultants (Charles Nickel, LA)
Many of the designers, both department staff and consultants, who prepare estimates, were interested in quick and easy access to actual bid history and other minor statistical item bid information. A spreadsheet application was developed to offer a quick and convenient way for Louisiana DOTD Consultant Estimators to obtain an up-to-date item level raw bid history. It is currently linked to web Trns-port™ Oracle Database to pull in real time bid results. The spreadsheet will be updated once the next release of the web-based AASHTOWare Project software is available. Additional cost estimation functionality may be added but the spreadsheet is not intended to take the place of an experienced estimator’s judgment, but simply to provide an additional tool.


Session #2: Workshop

Change Order Cost Analysis (Allan Ellis, VT – facilitator)
After the Recovery Act funding and FHWA audits of their program, Vermont Agency of Transportation evaluated the review recommendations. As a result of their review, Vermont has made a commitment to strengthen the bidding process. Their Quality Assurance Unit is now equipped with staff that is dedicated to the practice of estimating. Tools that are extensively used include blue book, DSS system, Access queries, Certified payroll, TEA Listserv, and AASHTOWare Project SiteManager™. Recently, Vermont has been getting better prices for their change orders. If they do not get a good price on change orders, implementation of force accounts will be recommended.

Cost Estimating Training & Certification for Transportation (Matt Vincent, DE & Charles Nickel, LA – Facilitators)
The TCCE has been exploring the possibility of providing training and certification to estimators to help improve estimating skills. A number of factors need to be considered before quality training is developed. The following factors were considered:

1) Target audience (new estimators and experienced estimators
2) Who will deliver the training and cost for the training
3) How frequent will the training be administered
4) Will it be a certification class or just a training

Suggestions:

- Certification may be covered by NHI but a national group may administer the class.
- Certification should be at the Engineer’s Estimate level phase because it takes care of labor cost.
- Training should be in a modular type.
- The committee will continue to discuss and research the requirements for a training module.
Session #3: Committee Work

NCHRP 20-07; Task 344 – Practical Cost Estimating Professional Development Training
This proposed project is intended to meet basic cost estimating training to improve performance by disseminating estimating resources quickly and more widely throughout their DOTs. This project is led by Andrew Lemer and the total budget amount is $100,000. Time to complete the project is 10 months. A final report is expected to be delivered in May 2014. Development of an interactive web-based training is not included in the current budget. The training course can be customized and the target audience will be determined by the estimating methods used by the agencies. Missouri would be interested in being a test agency for the training course.

Session #4: Financing Roundtable

Funding issues and Idea Exchange (Greg Davis, FL and Jeff Hisem, OH – Facilitators)
Funding for construction projects has been an issue for Florida DOT. Recently Florida has employed a variety of innovative finance methods and strategies for construction projects. Florida’s traditional 5-year funding plan has come from; state (54%), Federal (30%), and other (16%). Typically, traditional funding is not enough to fund long-term mega projects. Florida embarked on some funding strategies to leverage future funding and projected revenues. Funding Strategies being used include: State Infrastructure Bank (SIB), Transportation Infrastructure Finance and Innovation Act (TIFIA), Bonding, Tolling, Design-Build, Public-Private-Partnership (P3), Toll Concessions, and Asset Lease. The FLDOT has been successful in the use of some of the methods to aid in financing long-term projects.

Challenges
- Proper risk allocation
- Stakeholder’s support
- Flexibility
- Using the right tool

Lessons Learned
- Each project is unique
- Flexibility is the key
- Secure stakeholder’s support
- Be transparent
- Expect the unexpected
Research in Progress

Below is a table of existing research topics that are in progress. Members assigned to monitor the topics will provide an overview and share their findings on the topics during the TCCE’s teleconference meetings. The topics will be monitored to determine how they can benefit cost estimating.

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<thead>
<tr>
<th>TCCE Cost Estimating Research under review</th>
<th>2014</th>
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<tbody>
<tr>
<td><strong>Research projects</strong></td>
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<tr>
<td><strong>Title</strong></td>
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<tr>
<td>Determining Outsourcing Feasibility and Standard Pricing Methodologies</td>
<td>1341909</td>
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<tr>
<td>Guidebook for Estimating &quot;Soft Costs&quot; for Major Public Transportation Capital Infrastructure Projects</td>
<td>TRB, TCRP, FTA</td>
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<td>Development of Funding Project Risk Management Tools</td>
<td>FHWA, NCDOT</td>
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<td>Forecasting ENR Construction Cost Index: A Time Series Analysis Approach</td>
<td>1164193</td>
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<tr>
<td>Synthesis on Construction Unit Cost Development: Technical Report</td>
<td>FHWA/TX-09/0-6023-1</td>
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<tr>
<td>Cost Management in Road Construction Projects</td>
<td>Ministry of Transportation, Quebec</td>
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<tr>
<td>Forecasting ENR Construction Cost Index using Multivariate Time Series Models</td>
<td>ASCE</td>
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<tr>
<td>Critical Analysis of the Value Added by the Independent Cost Estimate to the Construction Manager/General Contractor Project Delivery Method</td>
<td>TRB Paper #13-0613</td>
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<td>Cost-Benefit Analysis and the Optimal Timing of Road Infrastructures</td>
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<tr>
<td>Historical Data Driven and Component Based Prediction Models for Predicting Preliminary Engineering Costs of Roadway Projects</td>
<td>ASCE</td>
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<tr>
<td>Design Error Costs in Construction Projects</td>
<td>ASCE</td>
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<tr>
<td>Stochastic Forecast of Construction Cost Index Using a Cointegrated Vector Autoregression Model</td>
<td>ASCE</td>
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<tr>
<td>Controlling Complexity and Cost</td>
<td>1472005</td>
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<td>Cost Construction Index Forecasting Model</td>
<td>1466374</td>
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<tr>
<td>Transportation Literature Search &amp; Synthesis Report: Research and State DOT Practice on Construction Cost Indices</td>
<td>1374406</td>
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<tr>
<td>Key Project Factors of Construction Time and Cost Performance during Incentive/Disincentive Highway Projects</td>
<td>FHWA</td>
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<tr>
<td>Preliminary Engineering Cost-Estimation Strategy Assessment for Roadway Projects</td>
<td>ASCE</td>
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<tr>
<td>A Preliminary Engineering Cost Estimation Model for Bridge Projects</td>
<td>ASCE</td>
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Session #5: Workshop

Performance Measurements and Data for Cost Estimating (Christine Krall, WI – Facilitator)
Performance measures for cost estimating establish benchmarking process used to identify best practices. Wisconsin construction management analyzes two performance metrics: 50% of estimate within 10% of Engineer’s Estimate and 75% within 10% of the low bid. Consultants that miss the performance criteria are penalized on a sliding scale.

- Missouri, does not track the Engineer’s estimate; they follow a 10% rule.
- Georgia checks Engineer’s Estimate internally
- Virginia concentrates on internal tools and methods that lead to good and reasonable Engineer’s Estimate.
- Minnesota and Florida track the Engineer’s Estimate for their performance measure but does not use it solely for rejecting a bid. The agencies may award to the lowest bid that is within the range 25% to 75% of Engineer’s Estimate.
- Delaware compares the Engineer Estimate to the PS&E estimate and not to the low bid.

Cost Estimating Methods and tools – Share and Test Drive (Lesly Tribelhorn, MT – Facilitator)
Montana has a cost estimating spreadsheet called Preliminary Engineering Tool (PET). The spreadsheet is posted on the State DOT website allowing district personnel access the spreadsheet to input their cost/mile data.

Wisconsin’s designers are responsible for developing preliminary Engineer’s estimate up to 30% of the project development. After 30% completion, estimators complete the estimate for the project. This practice ensures consistency in the project development.

New York’s design engineers complete the design estimate and then turn the estimate over to the estimators to complete for the whole project.

Florida uses parametric estimates for initial estimates. Through AASHTO Trns-port, the parametric estimate is then transferred to designers to complete the final estimate.

Missouri’s early estimates are based on cost per mile.

Session #6: Presentations/Discussions

Alternate Technical Concepts (Natalie Roark, MO)
The Missouri Department of Transportation adopted most of the FHWA’s Every Day Count (EDC2) concepts. The DOT has legislative authority to use Design-Build in construction of high dollar projects. The DOT also uses a variety of Alternate Technical Concepts (ATC). In 2007, the ATC helped the DOT to save between 9 to 15% below their program budget.

ATC was used for Bridge structures only in 2010. The first project with ATC was approved prior to bidding. The lowest bidder did not bid on the ATC and but the low bid with ATC was 18% below the engineer’s estimate. ATC was also employed in I-435/I-70 project where the DOT worked with FHWA for access justification report. The Alternate Technical Concept is a very useful tool when applied appropriately.
Enterprise Risk Management (Jack Young, CA)
The California Department of Transportation is in the process of implementing the Enterprise Risk Management (ERM) software. The Enterprise Risk Management is a process of management activities that focus on identifying and responding to the inherent uncertainties of managing a DOT and its assets. It identifies risks from various sources and how they relate to the Department’s strategic plan, goals and objectives. An execution of the ERM follows the general principle:

- Create value
- Explicitly address uncertainty
- Take into account human factors; employee ethics and professionalism
- Be an integral part of organizational process
- Be part of decision making
- Be systematic and structured
- Be based on the best available information
- Be tailored
- Be transparent, inclusive and defensible to withstand audits
- Be dynamic, interactive and responsible to change
- Be capable of continual improvement and enhancement.

The implementation of the ERM software is in its final stage and the outreach for the program is ongoing.

Changes in Buy America and potential impact to Cost Estimating (Edwin Okonkwo, FHWA)
The FHWA’s Buy America regulation was initially developed for Federal-aid construction projects. It requires domestic manufacturing process for all iron and steel products permanently incorporated into Federal-aid construction projects. Over the years, Congress has expanded the Federal-aid program to include non-traditional construction projects like Transportation Enhancement, Congestion Mitigation Air Quality (CMAQ) vehicles and Transportation Alternatives. Under MAP-21 Section 1518, Congress broadened the application of Buy America to apply to all eligible contracts that is carried out within the scope of the National Environmental Policy Act of 1999, regardless of the funding source of such contracts, if at least one contract for the project is funded with amounts made available to carry out Title 23 Section 313. Coverage includes construction contracts, utility and rail road contracts. Eligible contracts includes Federally funded and non-Federally funded. The application of Buy America to non-Federally funded contracts like utility contract has potential to increase the cost of the project. Estimators need to be familiar with the changes in Buy America requirements of MAP-21 Section 1518 to ensure that the estimate for the projects reflects the costs for all eligible projects.
http://www.fhwa.dot.gov/map21/qandas/qabuyamerica.cfm

Work Session #7: Committee Work

TCCE Webpage Revisions and Maintenance
The TCCE continued to work on improving its website, ensuring it is user-friendly. The committee worked on the following aspects of the website:
- Organization of the SharePoint, TCCE folders and posted documents.
- Process for updating and maintaining the website.
- General website editing and maintenance.

The committee will continue to work on the webpage during the bi-monthly teleconference meetings.
Work Session #8: Workshop;

Preliminary Engineering Estimates – Methods and Research (Terry Knouse, VA)
Highway project cost estimation methods that are used in the planning process have recently become a significant concern for the Virginia Department of Transportation (VDOT) due to the impact the estimates have on the final cost of a project. Metropolitan planning organizations (MPOs), local and federal government agencies, and the news media have increased their oversight regarding the accuracy of the results. VDOT has been directed to conduct a literature study/review of the methods used in highway cost estimation and to identify the state of the practice used by state DOTs for estimating highway project costs in the planning phase of project development.

This study is envisioned as a first step in an examination of practices for estimating highway project costs; therefore, its focus is on the initial cost estimate made for a project, typically during the planning stage. At this stage, only general information is known about the ultimate form a project will take and precise estimates of the quantities of project bid items are not known. Objective of the study is to develop list of PE cost and to provide the DOT with a better process than what they currently have in place. The study is expected to be completed by mid-2015.

Session #9: Presentation/Discussions

Construction Cost Indexing – Methods, Uses and Consistency FHWA Research Project (Richard Duval, FHWA & Zongwei Tao, Weris, Inc)
State highway agencies must estimate the cost of projects at several stages of the project development process. Several factors affect the accuracy of project cost estimates, fluctuations in the prices for raw materials, and the recent economic downturn and corresponding slowdown in private sector construction have resulted in lower bid prices in some regions of the country.

The use of a construction cost index (CCI) based approach to estimation holds promise for improving the accuracy of project estimates. A cost index measures the change in the cost of a group of products over time. Inputs for the CCI can include elements such as material and labor costs, general monetary inflation, and measures of productivity.

The Federal Highway Administration initiated a research project to study how index-based cost estimation could improve accuracy and precision of cost estimation. The research addressed three goals:

- Determine the current state-of-the-practice in using CCI data to develop project estimates and identify gaps in the current knowledge base.
- Develop a method for using CCI data to improve the accuracy and precision of project cost estimates.
- Assist State highway agencies in improving their current estimation practices.

The highlight of the interim report is as follows:

- Defining a process for using both program-level CCI and project-level CCI
- Defining what “precision” and “accuracy” mean to cost estimating
- Gathering a set of economic and market indicators
- Exploring application of Big Data analytics

A volunteer state DOT will be used to measure the effectiveness of research results.