

Detailed Description of Specific Research Activities Undertaken (Detailed Work Plan):

The Concrete Bridge Engineering Institute (CBEI) is the center of concrete bridge related research, education, and training at the University of Texas at Austin in the Cockrell School of Engineering. CBEI's mission is to serve the concrete bridge community and profession on the most pressing issues encountered in concrete bridges across the nation.

The objective of this pooled fund for CBEI to become a national resource for innovative workforce development programs and implementation of new technologies in the field of concrete bridges. CBEI will work with bridge stakeholders (primarily state and federal transportation agencies) and seek input from industry groups representing the concrete bridge community to develop pioneering, practical, and effective programs that will have national impact with the goal of addressing issues encountered in concrete bridges and implementing plans to work toward ensuring resiliency expectations for concrete bridges.

Three specific needs have been identified to be addressed by the pooled fund. There will be a curriculum developed for each of the three initial components, all of which will include both classroom and hands-on training.

- Deck Construction Inspection Program to meet the need of ensuring proper initial construction of concrete bridge decks utilizing full-scale hands-on components. Bridge deck construction techniques utilizing precast deck panels and associated technologies will be included in this program. The Deck Construction Inspection Program will look to implement the information in the upcoming FHWA document State-of-the-Practice Report for Partial Depth Precast Deck Panels and building in problems alongside the correct installation into the full-scale bridge components.
- Concrete Materials Program for Bridges to provide guidance on the proper selection and use of constituent materials to improve the service life of concrete bridges, sustainability of concrete construction, and provide hands-on examples of what happens when these are not considered.
- Post-tensioning (PT) Laboratory (aka PT Academy) to provide hands-on training for field installers and inspectors as well as test and verify promising post-tensioning technologies

Non-destructive Evaluation (NDE) techniques will be an overarching component included in each of the programs. New and existing techniques can be demonstrated and evaluated in a hands-on environment with components utilizing built-in defects. The training programs will draw on the latest technologies and provide an innovative approach by utilizing a hands-on intensive curriculum and cultivate the best, and most current, state of the art methods. CBEI is envisioned to meet the existing and future needs within the concrete bridge community and help bridge gaps between education, research, and practice.

Total Estimated Costs and Requested Contribution (Per Participant, Per Fiscal Year):

	Year 1	Year 2	Year 3	Year 4
Budget	\$970,000	\$770,000	\$570,000	\$570,000
FHWA Commitment	\$350,000	\$250,000	\$50,000	\$50,000
TxDOT Commitment	\$350,000	\$250,000	\$250,000	\$250,000
Remaining Commitment	\$270,000	\$270,000	\$270,000	\$270,000

The annual contributions from each pooled fund member are available in a tiered system over a four-year period consisting of three levels of participation: Level 1, Level 2, and Level 3.

Support Levels:	Annual Contribution
Level 1	\$ 50,000
Level 2	\$ 30,000
Level 3	\$ 20,000

Training for the given number of inspectors/engineers will be provided depending on the level of participation. Additional member benefits such as Technical Support and Webinars will also be provided based on the member level.

<i>Benefits</i>	<i>Level 1 Member</i>	<i>Level 2 Member</i>	<i>Level 3 Member</i>
# of personnel training seats per year at CBEI ¹	20	6	3
In-house Custom Workshop (2 day) ²	1		
Remote training module (live) by CBEI instructor – 1-hour modules	3	1	
CBEI Webinars	Unlimited	Unlimited	Unlimited
Technical Support / Concrete Solutions (Hours)	40	20	12

¹ If unable to attend in-person trainings in a given year, unused training seats may be deferred to a subsequent year.

² Workshop held at the member's choice of location, or remotely if preferred.

Training Seats: Members receive a given number of training seats per year which can be used for any of the programs. The trainings are held at the CBEI facility. Classroom materials are provided. Federal funds will be used for development of the center and materials. Hotel and transportation are not provided.

Concrete Solutions Center: Members are provided support through the CBEI Concrete Solutions Center including the following:

- Technical Support: CBEI will provide support for technical questions. CBEI will draw on both the University of Texas Staff and CBEI network of experts. The time included for each level annually are 40 hours, 20 hours and 12 hours for Level 1, Level 2, and Level 3 respectively.
- In-person Custom Workshop: Level 1 members will receive a two day in-person workshop at the facility of their choice (Department office, project site, CBEI, or other facility). The workshop is intended as mutually designed curriculum on a special topic, within the scope of CBEI.
- Remote Live Training Modules – CBEI will offer remote live training modules to Level 1 and Level 2 members three times a year and once per year respectively. These are roughly one hour long special modules on a topic developed with the stakeholder.
- Webinars: CBEI will host webinars throughout the year on relevant topics. Members will receive unlimited access to the webinars and recordings.
- Technical Information/Documents: CBEI will also maintain FAQ's, links to other relevant information, and technical information/documents that are not already available in other places.
- New Technology Implementation: Members, through the technical advisory committee, will be able to prioritize testing and implementation strategies for new technologies with CBEI.

Bridge Component Collection: Member support will help fund the growth and development of the Bridge Component Collection. The Concrete Bridge Component Collection at CBEI contains full scale specimens from decommissioned bridges as well as from previous research projects. The components include segmental bridge components, precast girders, bent caps, and specimens exhibiting concrete deficiencies such as alkali-silica reaction (ASR). This resource will be used for training and technology testing and can serve specific needs of a member with consensus of the Technical Advisory Committee.

The Estimated Duration:

The work associated with the study is anticipated to begin in 2022 and continue through 2026.

	Year 1	Year 2	Year 3	Year 4
<i>Available Benefits</i>	Sep 2022 - Aug. 2023	Sep. 2023 - Aug. 2024	Sep. 2024 - Aug. 2025	Sep. 2025 - Aug. 2026
Bridge Deck Inspection Program	Under Construction	Available Sep 2023	Available	Available
Concrete Material Program	Available Jan 2023	Available	Available	Available
PT Academy	Under Construction	Under Construction	Available Sep 2024	Available
Webinars & Technical Support/Concrete Solutions	Available	Available	Available	Available