

**Accelerated Bridge Construction (ABC)
Project Database**

USER GUIDE

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CHAPTER 1: INTRODUCTION

The Accelerated Bridge Construction (ABC) Project Database is a national databank of projects that have incorporated Prefabricated Bridge Elements and Systems (PBES) with other innovative planning strategies and construction techniques to accomplish the objectives of ABC. The purpose of this database is to facilitate the exchange of ABC-related project information including (but not limited to):

- Project planning and geotechnical and structural solutions facilitating ABC,
- New technologies utilized,
- Lessons learned by engineers and contractors, and
- Cost comparisons between ABC and Conventional techniques.

This database is the culmination of a number of major efforts undertaken by the AASHTO Technology Implementation Group (TIG) PBES Lead States Team and FHWA. For more information on the history of the database, please consult the project report.

CHAPTER 2: SITE STRUCTURE AND NAVIGATION

The information found in the ABC Project Database is secured on servers that are housed at Florida International University (FIU); these servers are backed up daily. A dedicated website (<http://utcdb.fiu.edu>) was created to serve as a user interface with the developed database, so that users are able to easily access and search the data.

The home page of the ABC Project Database, shown in Figure 2.2, is the portal into the rest of the site. The home page features (highlighted in Figure 2.2) are:

- Interface with the ABC-UTC website (consistent through all subpages of site)
- Database navigation pane (consistent through all subpages of site)
- Keyword search feature
- Ability to list all projects contained in database
- Interactive map with all projects contained in database
- List of states to narrow down database search

The interactive map search feature will be discussed in more detail in Chapter 4.

Database navigation is accomplished through the navigation page on the right-hand side of the site, highlighted in Figure 2.2 and shown in Figure 2.2. The navigation pane remains consistent on all the subpages of the website and was designed to allow for easy navigation of the site. The navigation pane includes:

- **Home**: returns the user to the ABC Project Database homepage
- **Project Database**: takes user to a list of all the projects contained in the database, searchable with the faceted navigation and keyword search functions described below
- **Research Database**: takes user to a list of all the research efforts contained in the database, searchable with similar faceted navigation and keyword search functions described below (currently in development)
- **Submit Project**: allows user to submit a project for consideration into the ABC Project Database (two stage process)
- **Submit Research**: allows user to submit a research effort for consideration into the ABC Research Database (one stage process, currently in development)
- **Training Videos**: videos designed to help the user better utilize the database website
- **Downloadable Database**: allows user to download the ABC Project Tracking Sheet
- **Key Search Words**: displays list of ABC-related keywords to help user with database searches and new project submittals



Project Database
Research Database

List of all projects in database

ACCELERATED BRIDGE UNIVERSITY TRANSPORTATION CENTER

Interface with abc-utc.fiu.edu

Home Research Projects Education Technology Transfer Resources Events News v 1.0



Keyword search feature

Search for bridges

Home

- Project Database
- Research Database
- Submit Project
- Submit Research
- Updates/Comments/Assistance
- Training Videos Overview
- Navigation
- Searching Projects
- Keywords
- Project Summary Sheets
- Downloadable Database
- Key Search Words

Database navigation

Click on pin icons to view bridge details:



Interactive map with ABC bridge projects

Click on states to view bridge results:

<ul style="list-style-type: none"> • Alabama • Arkansas • Connecticut • Florida • Idaho • Iowa • Louisiana • Massachusetts • Mississippi • Nebraska • New Jersey • North Carolina • Oklahoma • Rhode • Tennessee • Vermont • West V 	<ul style="list-style-type: none"> • Alaska • California • Delaware • Georgia • Illinois • Kansas • Maine • Michigan • Missouri • Nevada • New Mexico • North Dakota 	<ul style="list-style-type: none"> • Arizona • Colorado • District of Columbia • Hawaii • Indiana • Kentucky • Maryland • Minnesota • Montana • New Hampshire • New York • Ohio
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List of states to narrow ABC project database search

Figure 2.1: ABC Project Database homepage with interactive map

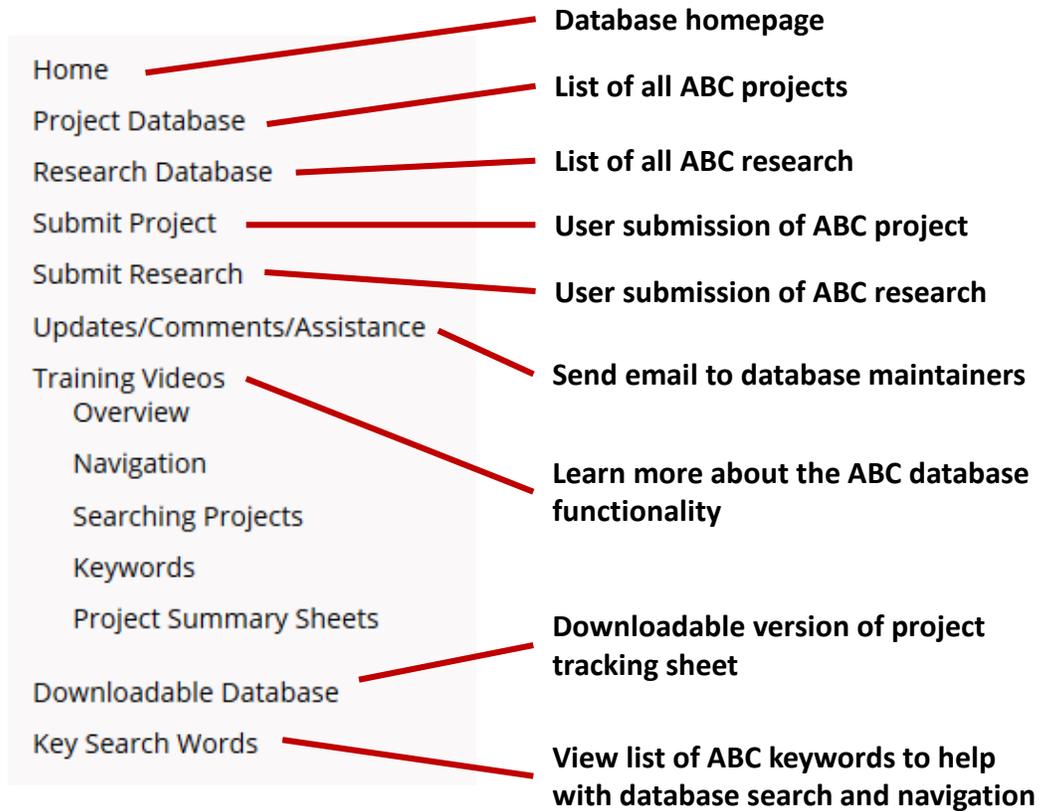


Figure 2.2: ABC Project Database website navigation pane

As mentioned, a complete list of all of the projects contained in the ABC Project Database can be accessed in the “Project Database” page, shown in Figure 2.3. The complete database was designed to be searchable using faceted navigation and keyword search features; these search features will be described in more detail in Chapter 4.

The screenshot displays the main features of the project database search interface. At the top, there is a navigation bar with the ABC UTC logo, Accelerat University branding, and the title 'Interface with abc-utc.fiu.edu'. The FIU Florida International University logo is on the right. Below the navigation bar, the interface is divided into three main sections:

- Search Results (Left):** A faceted navigation interface with filters for 'Beam Material' (Concrete, Steel, Wood, Composite, Other) and 'Location' (Rural, Urban). A 'Reset Search' button is present.
- Keyword search feature (Top Center):** A search bar with a 'Search' button.
- List of bridge projects in database (Center):** A list of search results, including:
 - 2013 - Milton-Madison Bridge:** State: Indiana ; Year: 2013 ; Location: US Route 421 across the Ohio River between the towns of Milton in Kentucky and Madison in Indiana ; Spans: > Three-span ; Dimensions: > 3,200-ft-long and 40-ft-wide steel through-truss bridge with four river spans (599 ft - 560 ft - 727 ft - 503 ft), prestressed concrete approach spans Kentucky (71 ft - 90 ft - 92 ft - 134 ft), prestressed concrete approach spans Indiana (112 ft - 117 ft - 117 ft) ; Beam Material: Steel ; Structural Solutions: > BSE walls ; > Truss span with deck ; > CP reinforced concrete closure joints ; Geotechnical Solutions: > High-capacity piles ; Other - finite element analysis of existing pier caissons with passive soil resistance / scour mitigation ; Project Planning: > Design-build ; > Full lane closure
 - 2012 - I-95 Bridge over Hermitage Road:** State: Virginia ; Year: 2012 ; Location: Interstate 95 over Hermitage Road in the city of Richmond ; Spans: > Three-span ;
- Database navigation (Right):** A vertical menu with links for Home, Project Database, Research Database, Submit Project, Submit Research, Updates/Comments/Assistance, Training Videos Overview, Navigation, Searching Projects, Keywords, Project Summary Sheets, and Key Search Words.

Figure 2.3: Main features of project database search interface

The developed bridge summary sheets are accessed by selecting one of the projects from these two interfaces.

CHAPTER 3: BRIDGE PROJECT SUMMARY SHEETS

The bridge project summary sheet provides a clean and concise summary of all of the data for each bridge project contained in the database. A full version of the summary sheet is available for each of the bridge projects, as shown in Figure 3.1. These summary sheets contain the following information:

- Bridge project name
- Description of location
- State where bridge is located
- Coordinates of bridge (latitude and longitude)
- Bridge owner
- Year ABC component of bridge was built
- ID number (both State and National Bridge Inventory)
- Point of contact (generally the bridge owner)
- Mobility impact time (construction time savings using ABC)
- Impact category (Tier 1 through 6 based on total time of impact)
- Benefits of ABC
- Bridge information (length, spans, construction materials, ADT, etc.)
- Existing bridge description
- Replacement bridge description
- Construction methods description
- High performance materials used
- ABC aspects related to:
 - Planning
 - Geotechnical solutions
 - Structural solutions
- Costs
- Funding
- Incentive programs
- Designer contacts
- Fabricator contacts
- Supplier contacts
- Contractor contacts
- Subcontractor contacts

Available resources (which vary for each project) include:

- Photos
- Contract plans
- Specifications
- Bid tabs
- Schedule
- Other related information, including articles and other publications, URLs, etc.

2010 - I-15 / Pioneer Crossing Bridge

Year ABC Built: 2010

State: Utah

Owner: State

Location: Urban

Spans: One span

Beam Material: Concrete

Max Span Length: 191.00

Total Bridge Length: 191.00

Construction Equipment: SPMTs

State ID #: S-R399(42) and S-R399(59)

NBI #: Eastbound: 2F 785; Westbound: 4F 785

Coordinates: Latitude: 40.376667, Longitude: -111.819725

Bridge Description

Project Location: Pioneer Crossing over I-15 in American Fork, south of Salt Lake City

Mobility Impact Time: ABC: One or two of three I-15 lanes closed over 10-hr period during the night on two weekends, with one 30-minute full closure of I-15 per span; total 20 months; Conventional: Multiple long-term closures over 24 months

Impact Category: Tier 1 (within 1 day)

Primary Drivers: Reduced onsite construction time; reduced traffic impacts; improved work-zone safety; improved site constructability; improved material quality and product durability

Dimensions: 191-ft long and 69-ft wide single-span bridge roll-in; 2,300-ton self-weight (longest and heaviest multi-girder spans moved with SPMTs in the US to date)

Average Daily Traffic: 128475

Traffic Management: Traffic management alternative, if constructed conventionally; extended detour

Existing Bridge Description:

The existing four-span 2-lane bridge was 353-ft-long and 42-ft-wide and constructed in 1963. The existing bridge was being removed due to existing deterioration and due to the need to increase the capacity of the interchange.

Replacement or New Bridge:

The replacement bridge is on the new six-mile urban arterial connecting Saratoga Springs to Lehi that is part of Utah's Corridor Expansion (CORE) initiative to restore and renovate I-15 in Utah County. The Pioneer Crossing interchange with I-15 is a diverging diamond interchange (DDI), only the third such interchange in the US, which replaces the existing diamond interchange. The DDI was proposed in an Alternative Technical Concept process included in the specifications to allow a design-build team to propose innovative concepts.

The Pioneer Crossing DDI includes twin two-span prestressed concrete beam bridges. Each of the four spans has a 53-degree skew and nine 94.5-inch-deep prestressed concrete Washington State bulb tee beams spaced at 7.75 ft with an 8.5-inch-thick cast-in-place concrete deck. The deck was designed with additional reinforcement to account for the temporary tensile stresses during the move. To help minimize temporary stresses and to accommodate live load continuity, the last 10 ft at each end of the deck and the concrete end diaphragms were cast after the spans were moved. UDOT's SPMT manual was followed for stress limits, twist tolerance, and other criteria.

Construction Method:

The four spans were constructed on temporary falsework supported on large concrete spread footings in adjacent staging areas less than a quarter mile from the bridge site. The westbound spans were constructed in a staging area southwest of the bridge site, and the eastbound spans were constructed in a staging area northwest of the site.

The four spans were moved with SPMTs in four nights. Two lines of SPMTs supported the span at each end. Special tower stand jacks raised the span off the temporary supports and lowered it onto the new abutments. After the two spans were in their final positions, they were connected with a closure pour over the interior support.

The westbound bridge span over the I-15 northbound lanes was moved into place with SPMTs on a Friday night in October 2009. The westbound bridge span over the I-15 southbound lanes was moved into place two days later on Sunday night. The adjacent existing four-span bridge was then dismantled without reducing the three-lane capacity in each direction on I-15. [Note: The weekend timeline for the moves is described below for the eastbound bridge moves.]

Eight months later on a weekend in June 2010 SPMTs moved the eastbound bridge spans into place. The eight month period between span placements was utilized to accomplish multiple activities. The existing structure was removed and the proposed substructure was placed. The geotechnical site conditions required settlement time for the approach embankments leading up to the bridge. Concurrent with the final bridge location activities, the bridge staging area was moved and construction of the superstructure was completed.

Friday evening At 8 pm one lane of I-15 in each direction was closed. At 9 pm a second lane was closed in each direction. At 10 pm a rolling roadblock was begun by the Utah State Police to allow the SPMTs to move the span along I-15. Approximately 15 minutes later traffic in the one open lane on I-15 southbound was stopped and the SPMTs loaded with the span to go over southbound I-15 moved along southbound I-15 to the bridge site. After stopping traffic for half an hour, one lane in each direction of I-15 was reopened and detoured onto ramps around the bridge site. The bridge was



Stakeholder Feedback: (none)

High Performance Material: (none)

Project Planning

Decision Making Tools: State process

Site Procurement: (none)

Project Delivery: Design-build

Contracting: Full lane closure; Incentive / disincentive clauses

Geotechnical Solutions

Foundations & Walls: (none)

Rapid Embankment: Other - embankment surcharge

Structural Solutions

Prefabricated Bridge Elements: MSE walls

Prefabricated Bridge Systems: Full-width beam span with deck

Miscellaneous Prefabricated: CIP reinforced concrete closure pour

ABC Construction Equipment: SPMTs

Cost & Funding

Costs:

\$172 million design-build project

Funding Source: State Only

Incentive Program: (none)

Additional Information

Other Notes: (none)

Downloadable Resources

Contract Plans:

View Contract Plans

Specifications:

View SP 032535 SPMT_08-31-09

Bid Tabs:

Construction Schedule:

Bridge Description Summary Sheet:

View 120131 ABC_New_UT_2010_Pioneer Crossing.pdf

Other Related Information:

View 1-Aspire Winter - 2011 - Pioneer

View 2-Roads & Bridges - Pioneer

View 3-02010 FHWA Conference - Pioneer

<http://www.udot.utah.gov>

Figure 3.1: Example of information contained in Project Summary Sheets

The bridge summary sheets also contain a gallery view feature for displaying all input images of the bridge project, as shown in Figure 3.2. The gallery view feature can be accessed by clicking on the photo in the summary sheet and allows users to easily view all input photographs and images.



Figure 3.2: Gallery view feature for displaying bridge images

The bridge project descriptions all contain keywords in order to describe the ABC aspects of the project and allow for easy sorting. These keywords are listed and described in Chapter 6.

CHAPTER 4: ABC PROJECT DATABASE – SEARCH FUNCTIONS

The ABC Project Database has a user-friendly interface allowing all the information contained in the database to be easily accessed. The database interface borrows from several types of user interfaces that are commonly employed by other successful sites with search functions:

1. Interactive map search
2. Faceted navigation
3. Keyword search

Each of these searching techniques will be described briefly in the following sections.

4.1. Interactive Map

The location of all the ABC-related bridge projects contained in the database are shown in an interactive map, as shown in Figure 4.1. This interactive map allows for users to observe where in the United States ABC projects are being utilized.



Figure 4.1: Interactive map displaying all ABC-related bridge projects contained in the database

The map allows for panning around (by left-clicking and dragging) and zooming in/out on (using the scroll on the mouse) the country to further investigate the locations of ABC-related bridge projects. For example, a user can pan and zoom into Iowa to view the number and location of ABC-related projects in Iowa, as shown in Figure 4.2.

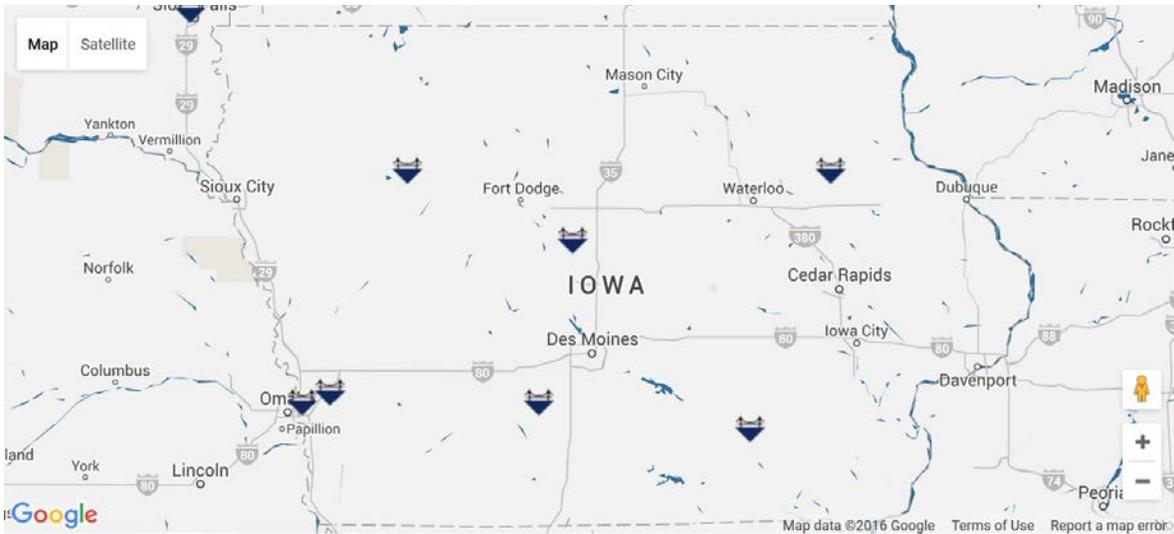


Figure 4.2: Example of cluster of ABC bridge projects located in Iowa

The project summary pages can be accessed directly from the interactive map by clicking on any of the bridge markers and then link, as shown in Figure 4.3. Clicking on this link will take the user to the project summary pages described in Chapter 3.

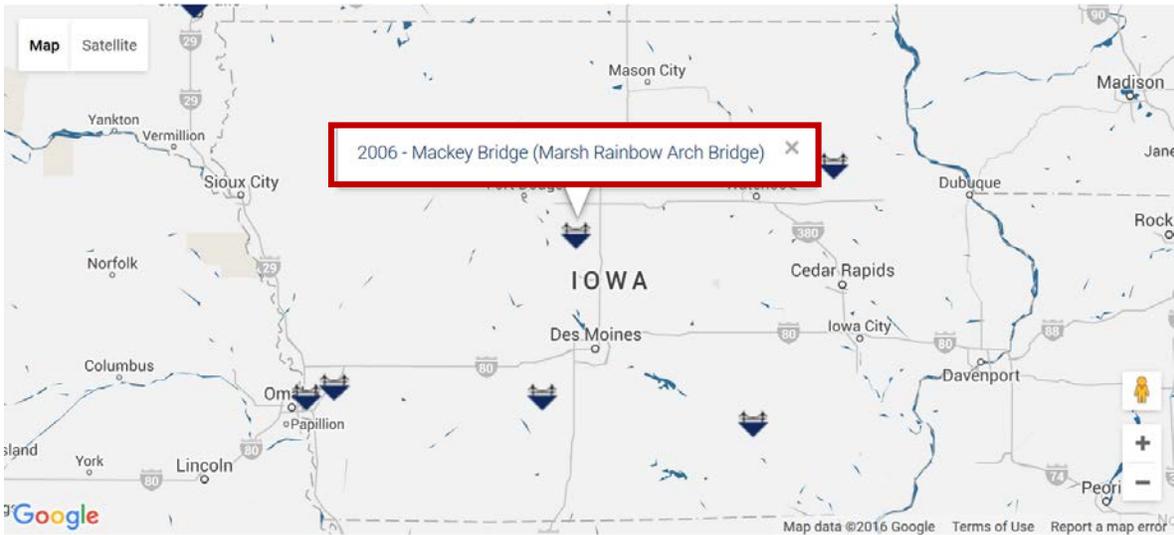


Figure 4.3: Project summary pages can be accessed directly from interactive map page

4.2. Faceted Navigation

A faceted navigation search option, shown in Figure 4.4, allows users to narrow down the ABC Project Database to show only projects of interest. Faceted navigation functions by allowing users to narrow down their search through selection of desired search filters in various

categories. The categories that have been included in the faceted navigation feature of this site are shown in Figure 4.4 and include:

- State
- Beam Material
- Location (rural or urban)
- Spans (number of spans)
- Construction Equipment
- Traffic Impact Category
- Max Span Length
- Total Bridge Length
- Year ABC Built
- Average Daily Traffic
- Structural Solutions
- Geotechnical Solutions
- Project Planning
- Funding Source

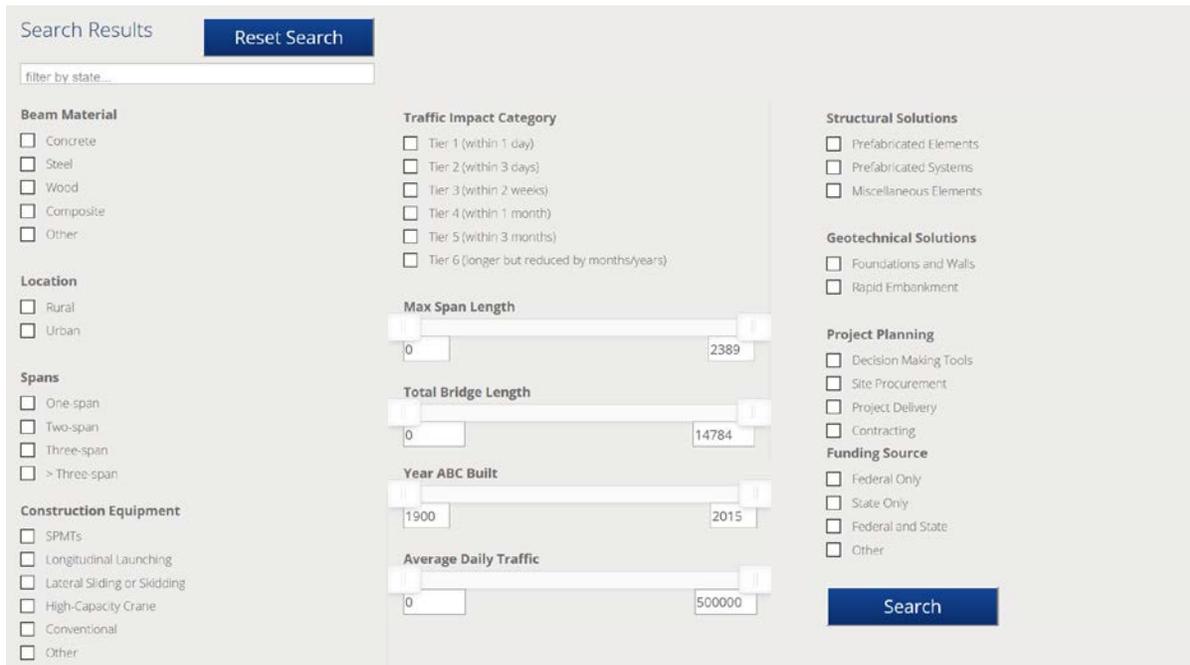


Figure 4.4: Overview of faceted navigation options

The search functions as an “OR” criteria within categories and “AND” criteria between categories. For example, if within “Beam Materials” both “Concrete” and “Steel” are selected, as shown in Figure 4.5, bridges will be included that have either concrete or steel beam materials.

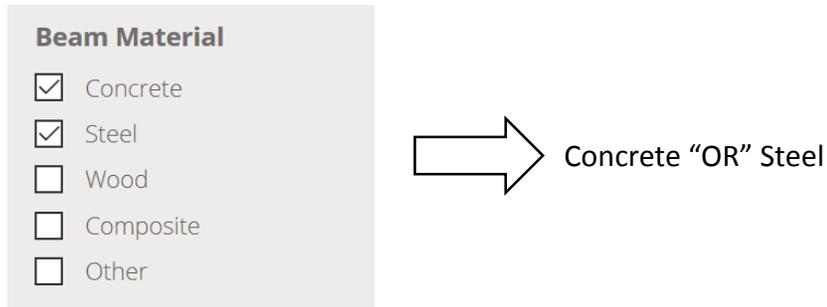


Figure 4.5: Example of "OR" criteria within categories

When multiple categories are selected, the search will filter using an "AND" search criteria. For example, if "Concrete" Beam Material and "Rural" Location are selected, then only bridges with concrete beam materials and in a rural location will remain after filtering, as shown in Figure 4.6.

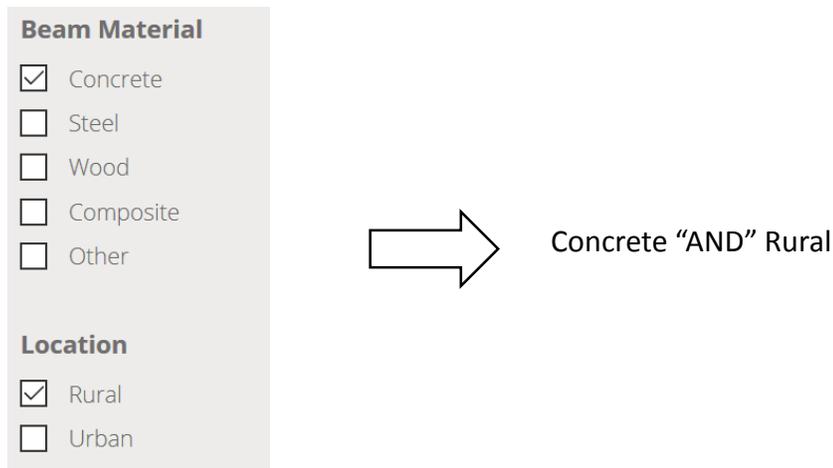


Figure 4.6: Example of "AND" criteria when multiple categories are selected

When multiple options are selected within a single category and multiple categories are selected, the filter criteria will be a combination of the "AND" and "OR" gates. For example, if "Concrete" and "Steel" are both selected in Beam Materials and "Rural" is selected in Location, then bridges will be displayed that contain either concrete or steel beam material and are located in a rural location, as shown in Figure 4.7.

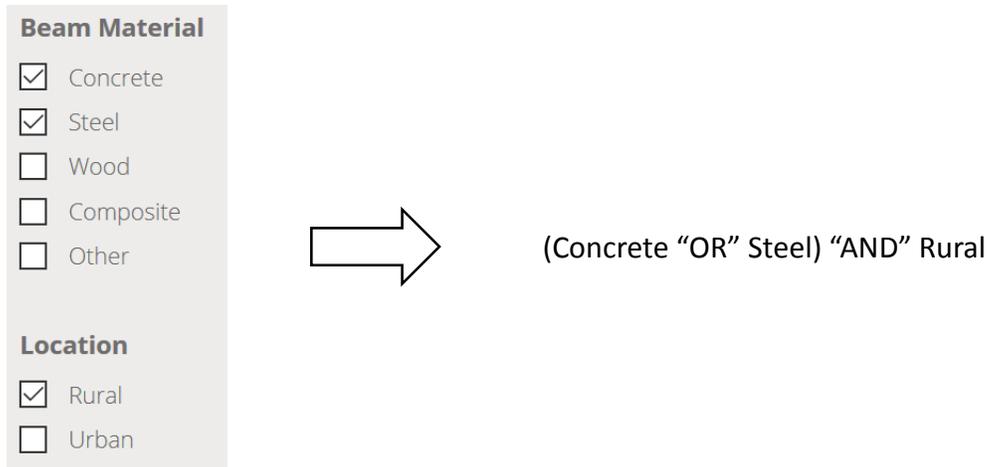


Figure 4.7: Example of “OR” criteria within category combined with “AND” criteria between categories

An example of a completed search using the faceted navigation is shown in Figure 4.8. If the user wanted to find a bridge with the criteria shown:

- Concrete beams
- One-span
- Use SPMTs for construction

Then the appropriate options can be selected. In this case (at the time of user guide publication), only two bridges in the ABC Project Database have concrete beams, are single spans, and used SPMTs in construction. The user can then view additional details on these bridges by clicking on the bridge names.

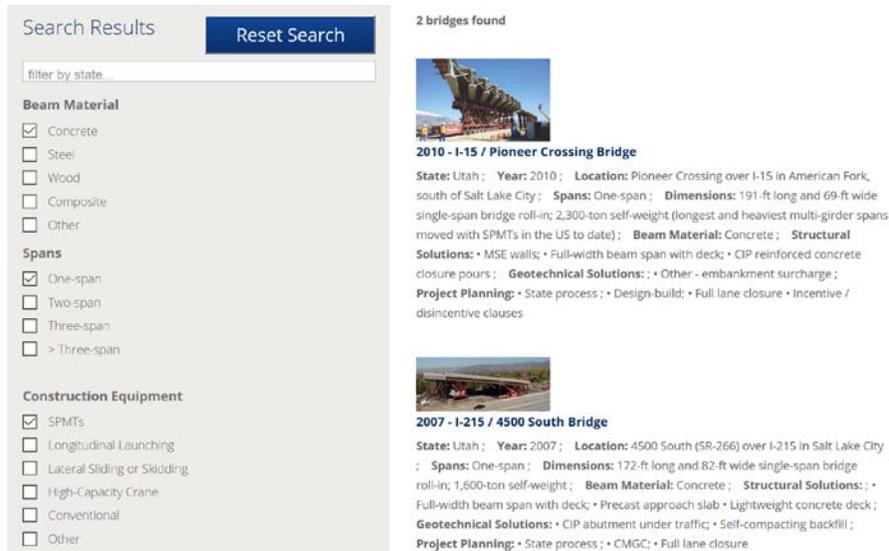


Figure 4.8: Example of faceted navigation search

The faceted navigation can be combined with the keyword search described below to conduct more detailed searches.

4.3. Keyword Search

The keyword search feature, shown in Figure 4.9, provides a supplement to the faceted navigation feature and provides added search flexibility for the user. The keyword search functions similarly to the way additional categories function as described in the faceted navigation section.

Users can enter into the keyword search any words that may help them to narrow their search (e.g. lightweight concrete, UHPC, etc.). However, a user who may not be as familiar with ABC may go to the keywords page (described in Chapter 3) and use these predefined keywords in their search. Multiple keywords can be separated by commas in the search bar.



Figure 4.9: Keyword search bar

When a keyword (or keywords) is entered into the search bar in combination with some of the faceted navigation categories selected, the keywords search will act as an additional category with an “AND” criteria. For example, if two keywords are entered in addition to the search conducted in Figure 4.6, then only bridges in which keyword1 and keyword2 are found

somewhere on the bridge summary sheet and with concrete beam materials in rural locations will remain, as shown in Figure 4.10.

ABC Project Database

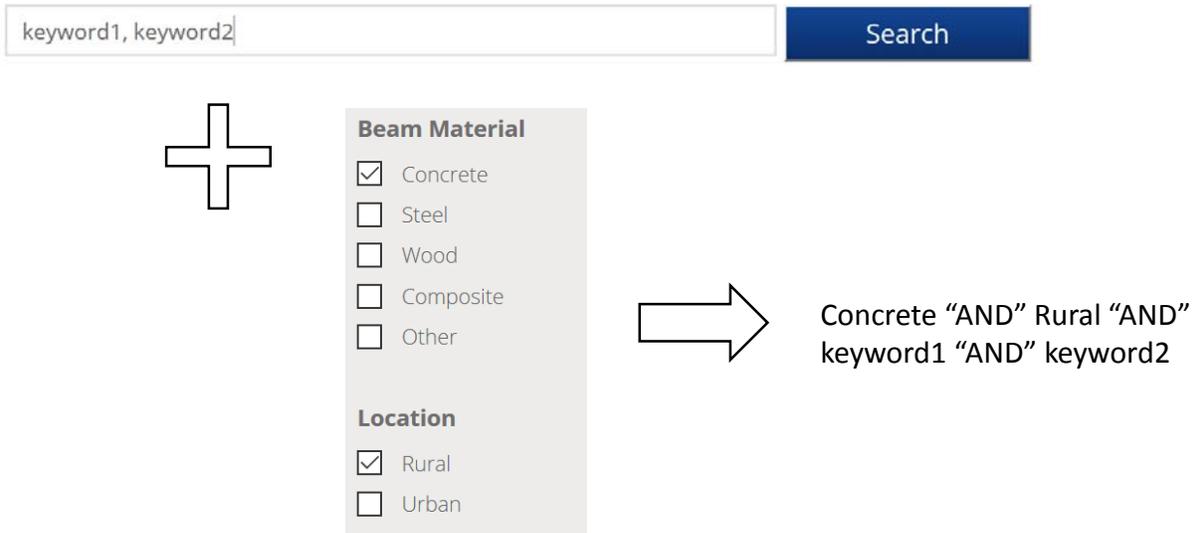


Figure 4.10: Example of keyword search bar in combination with faceted navigation tools

CHAPTER 5: ABC PROJECT DATABASE – USER INPUT

The “Submit Project” interface allows for any user to submit a bridge project for consideration to be included in the ABC Project Database. A two-stage submission and review process was designed to ensure that any user can submit a project, but only projects consistent with the current definition of ABC make it into the final database; this process is shown in Figure 5.1.

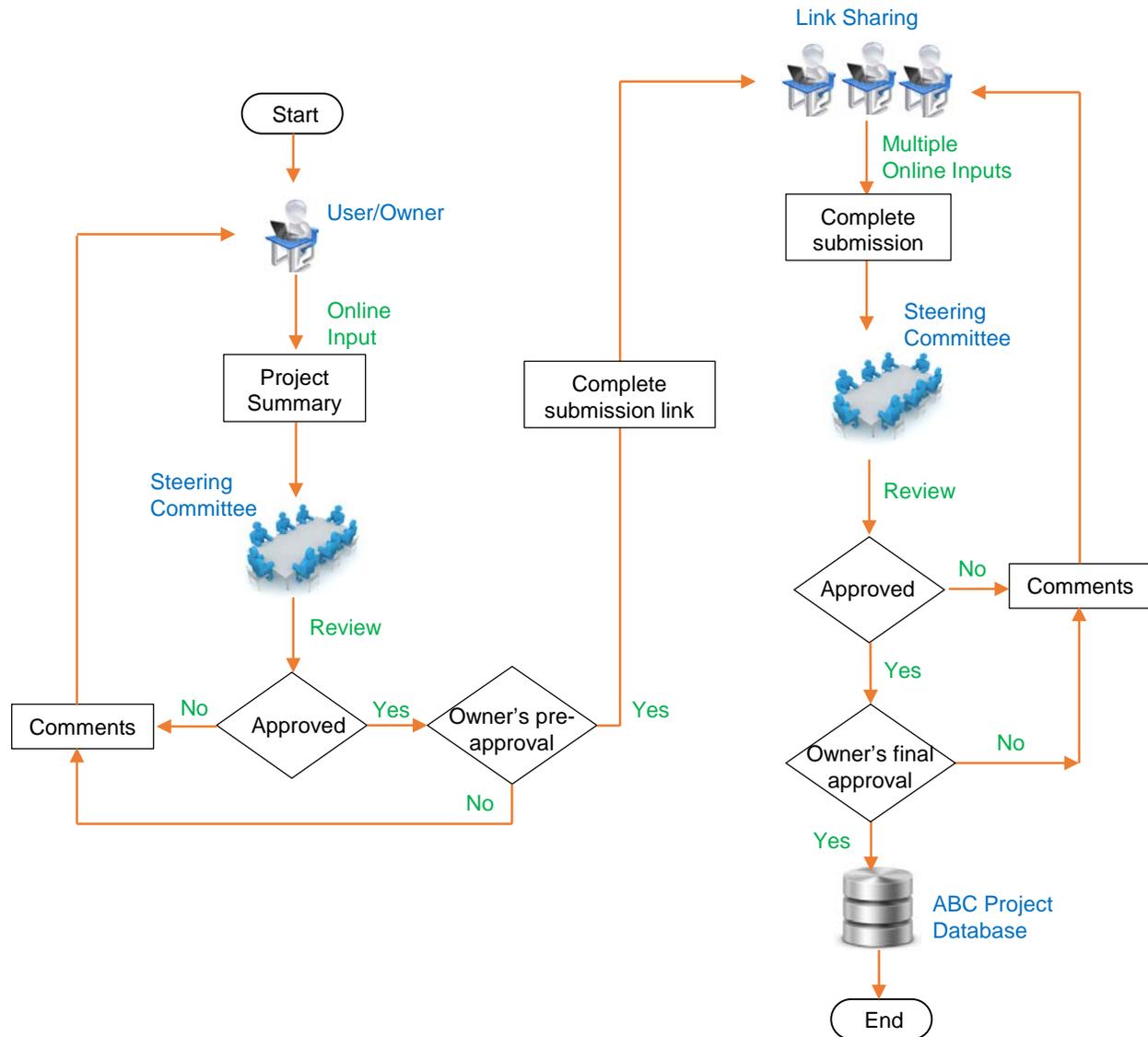


Figure 5.1: Flowchart for user input review process for ABC Project Database

There are two submittal and review stages for submitted projects. The first submission stage can be accessed by anyone (i.e., any user of the website can submit the first stage of the project submission). Stage 1 submission, shown partially in Figure 5.2, can be accessed from the sidebar navigation menu. This **first stage submission** can be **quickly** and **easily** completed as it only

requires information on the submitter, project owner, and basic information on the project (including why it should be considered to be included in the database).

Home
Project Database
Research Database
Submit Project
Submit Search
Update Comments/Assis
Training Files
Overview
Navigation
Searching Project
Keywords
Project Summary Shee
Downloadable Database
Key Search Words

Stage 1 Submission

Recommend a Project

Complete the Following Steps: 1

The information that will be required for full submission can be found in the below MS Word Template. The majority of this information will be gathered in the second stage of the submission process, but this Template can be used to aid in the submission process.

MS Word Template for Submission

Submitters Information:

First Name: [Text Box] Last Name: [Text Box]
Title: [Text Box]
Position: [Text Box] Organization: [Text Box]
Email: [Text Box] Phone: [Text Box]

Your Relationship to ABC Project:

[Text Box: e.g. Bridge Owner, Bridge Designer, etc.]

Project Information

Project Name: [Text Box]

Year ABC Completed: [Dropdown: 2015] County: [Text Box] State: [Dropdown: Alabama] Country: [Dropdown: USA]

State ID #: [Text Box] NBI #: [Text Box]

Location Description: [Text Box: e.g. road designation, name of river crossing, near by tow or city, etc.]

Coordinates: [Text Box: Latitude] [Text Box: Longitude]

Brief Project Summary: [Text Box: In 500 words or less, describe why this project should be added to the database]

I agree that the information provided above is accurate to the best of my knowledge. By submitting this information I give the ABC-UTC the rights to publish the data online and in the ABC-UTC database. The ABC-UTC reserves the right to alter information prior to publication.

Agree

Submit

Figure 5.2: Stage 1 submission page – partial view (1 page in length)

Upon completion of the project the user is shown confirmation of the submission, shown in Figure 5.3, and an email is sent to the ABC Project Database Committee chair. The chair then reviews the Stage 1 submission and discusses it with the ABC Project Database Committee as needed. If the project is deemed appropriate by the committee and the owner gives approval for the project to be included in the ABC Project Database, then a Stage 2 Project Submission link is sent to the point of contact. If it is decided that the project is not an ABC project or the owner does not give approval, then the submitter is contacted and no further submittal steps are taken.

Project Submission Complete

Thank you for submitting this preliminary entry for your project. If your project is approved, an email will be sent to the submitter to finish the database submission.

Please send any additional questions to Mary Lou Ralls Newman at ralls-newman@sbcglobal.net

Thank you!

Figure 5.3: Confirmation that Stage 1 of the submittal process is complete

The second stage of the submission process is more detailed and involves four steps (four pages to be completed). A sample of some of the data required for one of the steps is shown in Figure 5.4. The goal of Stage 2 is to collect all of the remaining data required for the project summary page and any relevant documents. The data required for Stage 2 includes:

- General Project Information
 - Spans
 - Dimensions
 - Traffic management alternative, if constructed conventionally
 - Existing bridge description
 - Replacement or new bridge description
 - Construction methods
 - Lessons learned or stakeholder feedback
- ABC Benefits
 - Mobility impact time (ABC versus conventional construction)
 - Impact category
 - Primary drivers (ABC benefits)
- General Bridge Information
 - Bridge length
 - Max span length
 - Primary beam material
 - Location type
 - Average daily traffic count
 - High performance materials
- Project Planning
 - Decision-making tools

- Site procurement
- Project delivery
- Contracting
- Geotechnical Solutions
 - Foundations and walls
 - Rapid embankment
- Structural Solutions
 - Prefabricated bridge elements
 - Prefabricated bridge systems
 - Miscellaneous prefabricated
 - Construction equipment description
- Cost and Funding Information
 - Cost description
 - Funding source
 - Incentive programs
- Contact Information
 - Primary designer
 - Primary contractor
 - Sub-contractors
 - Fabricators
 - Suppliers

There are several resources that are also collected during the Stage 2 submittal process, to the extent they are available and approved for posting by the owner. These include:

- Contract Plans
- Specifications
- Bid Tabs
- Construction Schedule
- Photos
- Other Related Documents
- Other Related URLs

The Stage 2 submission process is accessed via a URL link that is only connected to one project.

This unique link will allow multiple users to work on the submission by link sharing.

Information on each page can be saved in a temporary database by clicking the “Next” button at the bottom of the page, shown in Figure 5.4. Saved data will reappear when the page is reopened.

The project submission will only complete once the “Submit” button is pressed on the page of the final step.

Recommend a Project

Stage 2 Submission

Complete the Following Steps: 1 2 3 4 5

ABC Benefits:

Hitting the “Next” button will save the information stored on the current page. If the submitter would like to go to the previous page after hitting next, please use the back button on your browser.

Thank you for your submission! Please send any further questions to David Garber at dgarber@flu.edu.

Project Information

Spans: One-span

Dimensions: Describe in detail the dimensions of the bridge. e.g. ‘Two adjacent four-span modular-beam-with-deck bridges, each 207-ft long and 54.33-ft wide (34 ft - 66 ft - 66 ft - 41 ft); 46° skew’

Replacement or New Bridge Description: Describe in detail the replacement (or new) bridge (with an emphasis on the ABC related components of the project).

Construction Methods: Describe the construction methods used on the project (with an emphasis on ABC related construction methods).

Lessons Learned and Stakeholder Feedback: Describe any lessons learned on the project that may be useful for future engineers.

Other Notes: Use this section to add any additional notes or comments on the project.

Mobility Impact Time: Compare the time for construction using ABC methods versus what the expected time using conventional construction methods

Impact Category: Tier 1 (within 1 day)

Primary Drivers and ABC Benefits: List the Primary Drivers or the main reasons for ABC being selected for this project

Bridge Length and Other Information:

Bridge Length (ft.): 2222.98

Max Span Length (ft.): 230.55

Beam Material Type: Concrete

Location Types: Rural

Average Daily Traffic Count: 1233

High Performance Materials: List of high performance materials utilized for project

Next

Figure 5.4: Sample of some information required for Stage 2 project submission

The user can also access an MS Word template of the project submittal sheet to ease with the submission process. This template can be accessed by anyone by clicking on the “Submit Project” link on the navigation pane and then on the “MS Word Template for Submission,” as shown in Figure 5.5.

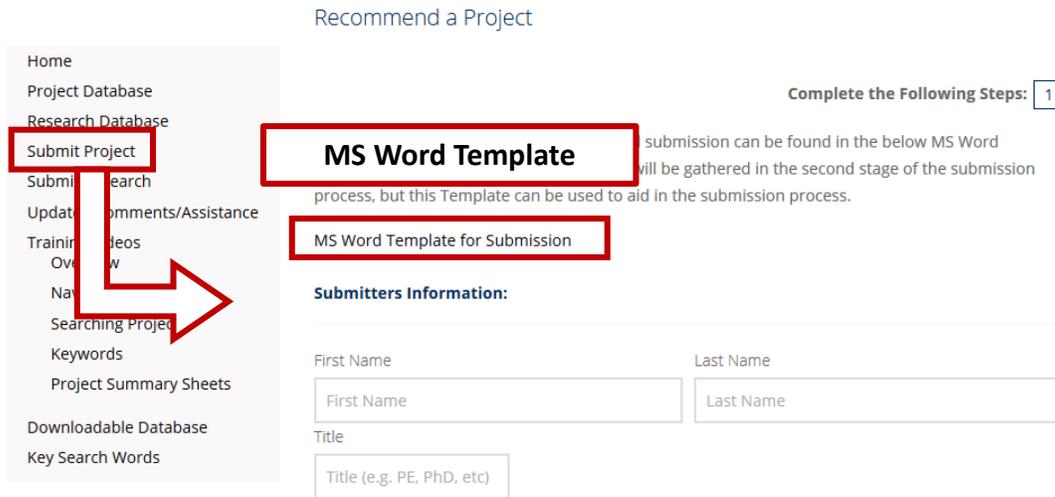


Figure 5.5: Access to MS Word version of the project submission needed information

When Stage 2 of the project is submitted, users will be directed to a confirmation page, shown in Figure 5.5, and an email will be sent to the ABC Project Database Committee chair. Similar to Stage 1, the chair will then review the final submission and discuss with the committee its appropriateness for being included in the ABC Project Database. Any minor edits will be made by the committee and major edits will be completed by the submitter. Both the subcommittee and the bridge owner need to agree on the final version of the submitted project information.

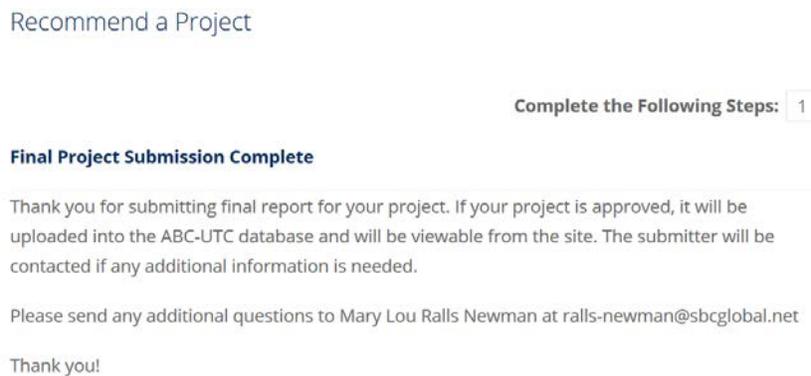


Figure 5.6: Confirmation that Stage 2 of the submittal process is complete

When all of the Stage 2 data has been reviewed and the owner has given final approval, the project is then included into the ABC Project Database. The process described above was designed to ensure that only ABC projects with owner approval and well-written project summaries are included into the ABC Project Database. This process will allow for the expansion of the database while ensuring its integrity is maintained.

CHAPTER 6: KEYWORDS AND DEFINITIONS

The FHWA and AASHTO T-4 Committee developed a list of keywords that have been used to classify and describe each ABC project. These keywords can be used for searching the ABC Project Database, as described in Chapter 4, and should be used for the submission process, described in Chapter 5.

6.1. Funding Type

The funding type category describes the primary source of the funds for the bridge project. The types of funding are shown in Table 3.1.

Table 3.1: Funding related keywords

Funding
Federal only
State only
Federal and state
Local
Other

6.2. Incentive Programs

The incentive program category contains information on federal incentive programs that were utilized by the project. A list of the current incentive programs that have been used by ABC projects in the database to date is shown in Table 3.2.

Table 3.2: Incentive program related keywords

Incentive Programs	
HfL	Highways for LIFE
IBRD	Innovative Bridge Research and Deployment Program
SHRP 2	Strategic Highway Research Program
ARRA	American Recovery and Reinvestment Act
Other	

The Highways for LIFE (HfL) program was created by the FHWA with the purpose “to advance Longer-lasting highway infrastructure using Innovations to accomplish the Fast construction of Efficient and safe highways and bridges” [1]. The Innovative Bridge Research and Deployment Program (IBRD) was created to provide funds for the promotion of innovative designs, materials, and construction methods in construction, repair, and rehabilitation of bridges and other highway structures[2]. The Strategic Highway Research Program (SHRP2) provided funding for more than 100 research programs and led to development of a toolkit for use by bridge engineers[3]. The final incentive program that has been utilized by bridge engineers to date is the American Recovery and Reinvestment Act (ARRA). The ARRA was authored by President Obama in 2009 and led to \$26.6 billion being invested into more than 12,000 bridge projects across the country and 51 TIGER grants awarded to creative bridge projects representing the future of the diversity of our infrastructure[4].

Additional incentive programs will be added to the keywords as they are created and utilized.

6.3. Impact Category

The impact categories describe the total amount of time traffic flow is negatively impacted due to the construction of a bridge. Impact category definitions were initially developed by FHWA. Definitions were recently updated by the AASHTO T-4 Committee. A list of the impact categories and updated list of definitions is included in Table 3.3.

Table 3.3: Impact categories

Impact Categories	
Tier 1	Traffic impacts within 1 day
Tier 2	Traffic impacts within 3 days
Tier 3	Traffic impacts within 2 weeks
Tier 4	Traffic impacts within 1 month
Tier 5	Traffic impacts within 3 months
Tier 6	Overall project schedule is significantly reduced by months to years

6.4. Project Planning

There are four different aspects of the project planning process that can be modified to accommodate or encourage ABC. These subcategories along with a list of ABC related project planning techniques or tools are shown in the below list.

- Decision-Making Tools
 - FHWA process
 - State process
 - TPF-5(221) (ABC decision making model developed by pooled fund study)
 - Benefit/cost methods
 - Other
- Site Procurement
 - Programmatic agreements
 - Right-of-way acquisition
 - Relocation incentives
 - Flexibility in utilities
 - Early environmental clearance and permitting
 - Electronic shop drawing submittal and approval process
 - Fabrication drawings prior to bid
 - Material procurement prior to contract award
 - Other
- Project Delivery
 - Design-Bid-Build
 - Design-Build
 - Design-Build by in-house forces
 - CMGC (construction manager / general contractor)
 - Alternative technical concept
 - Alternative ton (foundation)
 - Other
- Contracting
 - A+B bidding
 - A+B+C bidding
 - Full lane closure
 - Warranties
 - Lane rental
 - I/D clauses (incentive/disincentive clauses)
 - No-excuse bonus

- Lump sum bonus
- Contractor option
- Contractor revision
- VE (value engineering)
- VE with partnering
- Formalized partnering
- Best value award
- Performance contracting
- Emergency contract
- Accelerated bid process
- Other

6.5. Foundations and Walls

There are several types of foundation and wall systems that are currently considered an ABC technique or technology. These systems are shown in Table 3.4.

Table 3.4: Foundation and wall element keywords

Foundation and Wall Elements
Continuous flight auger piles
Micropiles
High-capacity piles
GRS integrated bridge system
CIP substr under traffic
Reused subst units
Pre-grouted voids
Other

6.6. Rapid Embankment Construction

There are several types of rapid embankment construction techniques that are currently utilized in ABC. These systems are shown in Table 3.5.

Table 3.5: Rapid embankment construction

Rapid Embankment Construction
EPS geoform
Self-compacting backfill
Smart compaction
Fully-contained flooded backfill
Embankment surcharge
Lightweight fill
Other

6.7. Prefabricated Bridge Elements and Systems

Numerous prefabricated bridge elements and systems are currently utilized in accelerated bridge construction. These elements and systems are grouped into categories related to the portion of the structure that is prefabricated, extent of prefabrication, type of prefabricated element, or type of connection detail used. A list of these keywords divided by sub-category is presented below:

- Deck Elements
 - Partial-depth precast deck panels
 - Full-depth precast deck w/PT
 - Full-depth precast deck w/o PT
 - FRP deck panels
 - Exodermic deck
 - Steel grid (open)
 - Steel grid (concrete filled)
 - Aluminum
 - Orthotropic deck
 - UHPC waffle deck
 - Other
- Deck Beam Elements
 - Adjacent deck bulb tee beams
 - Adjacent tee beams
 - Adjacent inverted tee beams

- Adjacent box beams
- Adjacent slab beams
- Adjacent slab beams w/ backwalls
- Modular Decked Beams (MDcBs) [concrete deck on steel beams]
- Modular Decked Beams (MDcBc) [concrete deck on concrete beams]
- PT concrete through-girder
- Other decked beam
- Full-Width Beam Elements
 - Truss span without deck
 - Arch span without deck
 - Precast segmental
 - Steel segmental
 - Other full-width beam element w/o deck
- Pier Elements
 - Precast pile caps
 - Steel pile caps
 - Precast cap shells
 - Prefab caisson caps
 - Precast footings
 - Precast footing shells
 - Steel columns
 - Precast columns
 - Steel column caps
 - Precast column caps
 - Steel caps and columns
 - Precast caps and columns
 - Other
- Abutment and Wall Elements
 - Precast abutment caps
 - Precast backwalls
 - Precast abt cap w/ backwall
 - Precast abutment stems
 - Precast wing walls
 - Precast cheek walls
 - Precast footings
 - Steel sheet piling
 - Precast sheet piling

- Precast lagging panels
- Precast full-height wall panels
- Precast retaining walls
- MSE walls
- Modular block walls
- GRS abutments
- Proprietary walls
- Precast 3-sided culvert
- Other
- Closure Joints
 - CIP reinf closure joints
 - Grouted keys
 - Grouted blockouts w/shear connectors
 - Bars in splice couplers
 - PT ducts, grouted
 - PT ducts, not grouted
 - Match casting
 - Grouted ducts in precast substructure
 - CIP pockets in precast substructure
 - High-early-strength low-shrinkage concrete joints (HESt-LSh)
 - UHPC closure joints
 - Epoxy joints
 - Other
- Overlays
 - Standard concrete
 - HPC
 - High-density concrete
 - Asphalt w/ membrane
 - Asphalt w/o membrane
 - Latex-modified
 - Micro-silica
 - Thin-bonded epoxy
 - Polymer concrete
 - Rapid set
 - Asphalt chip seal, no membrane
 - Other
- Other

- Precast approach slab
- Prefab parapets
- Precast curbs
- Steel diaphragms
- Precast diaphragms
- LWC deck
- LWC beams
- LWC substructure
- Other
- Superstructure Systems
 - Full-width decked beam unit (FDcBs) [concrete deck on steel beams]
 - Full-width decked beam unit (FDcBc) [concrete deck on concrete beams]
 - Through-girder span w/deck
 - Truss span with deck
 - Arch span with deck
 - Steel orthotropic box girder span
 - PS multi-cell box girder span
 - Metal panel deck span
 - Reused decked beam span (RDcBs)
 - Reused decked beam span (RDcBc)
 - Other
- Superstructure / Pier Systems
 - Rigid frames w/deck & parapets
 - Other
- Total Bridge Systems
 - Rolled/launched/slid/lifted
 - Other

6.8. Construction

The final group of keywords used in the bridge project descriptions is related to the construction methods, techniques or technology used in the ABC project. These are broken down into the five different sub-categories shown below:

- Self-Propelled Modular Transporters (SPMTs) Moves
 - SPMTs
 - SPMTs with gantry system
 - SPMTs on barge
 - Other

- Longitudinal Launching
 - Longitudinal launch (Skids)
 - Longitudinal launch (Rollers)
- Lateral Slide (Slide-in Bridge Construction)
 - Lateral Slide (Rollers)
 - Lateral Slide (Skids)
- High-Capacity Crane
 - High-capacity crane
 - High-capacity crane on barge
- Other
 - Strand jacks
 - Towed modular transporters
 - Float in
 - Gantry system
 - Multi-axle flatbed trailers

There are instances in which conventional construction equipment is used in accelerate bridge construction. Conventional construction equipment is commonly used with prefabricated elements to offer similar erection costs and convenience.