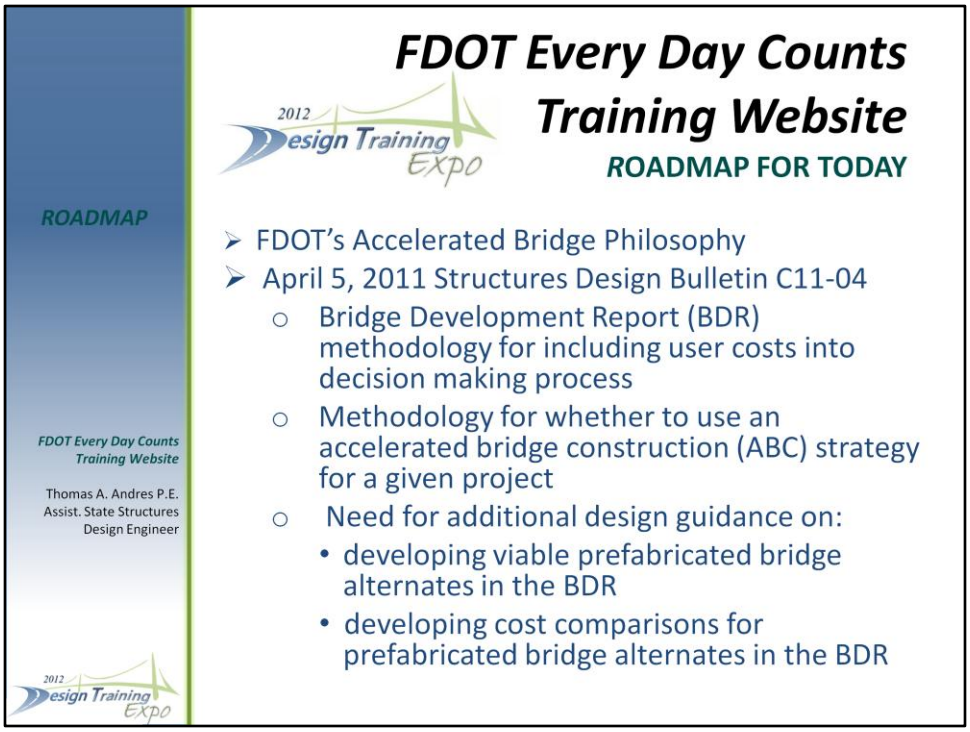


☺☺☺ Good afternoon. Let's go ahead and get started. We have a lot of information to cover in this session. It is a pleasure to be with you today. My name is Tom Andres. I work in the Structures Design Office in Tallahassee where I oversee the Bridge Plans Review Group.

The title of this training session is: "FDOT Every Day Counts Training Website". "Every day counts" or "EDC" for bridges and the term "accelerated bridge construction" or "ABC" are one in the same.

Our roadmap for today is as follows:

☺ First, I am going to talk about the Department's Accelerated Bridge Philosophy

☺ Next, I am going to show you a video outlining the April 5, 2011 Structures Design Bulletin where we introduce user costs in the Bridge Development Report (BDR) bridge assessment.

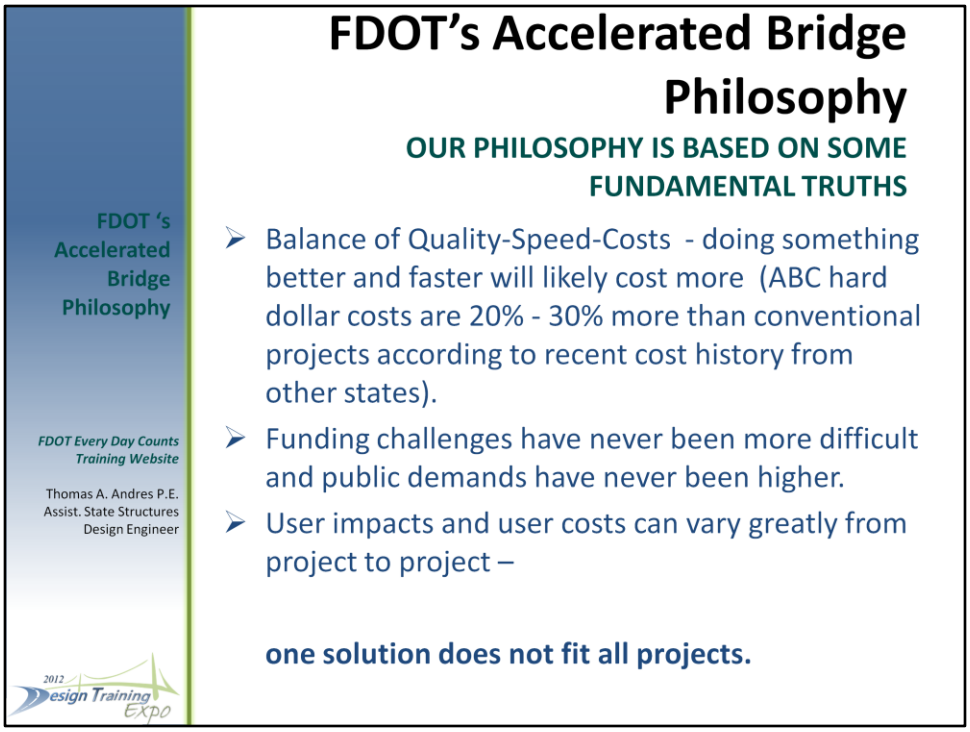
- We also developed a methodology for when to consider accelerated bridge construction (ABC) based on project constraints

- In the Bulletin, we also acknowledged to need for additional future guidance regarding how to estimate costs and develop prefabricated bridge options.

☺ I am next going to talk about the EDC training website – its main intent is to fill in some of the gaps raised by the Bulletin and give designer more guidance. We consider the training website as a work in progress – we have just posted a new case study last week and plan to post another one later this year.

☺ And lastly, I will discuss some current and future work products that will be added to the training website. These will include:

- Development of additional cost comparison case studies
- Development of FDOT prefab connection details
- Development of ABC implementation strategies when the ABC alternate is not the lowest hard dollar cost option. Strategies will cover both design-build and design-bid-build procurement methods



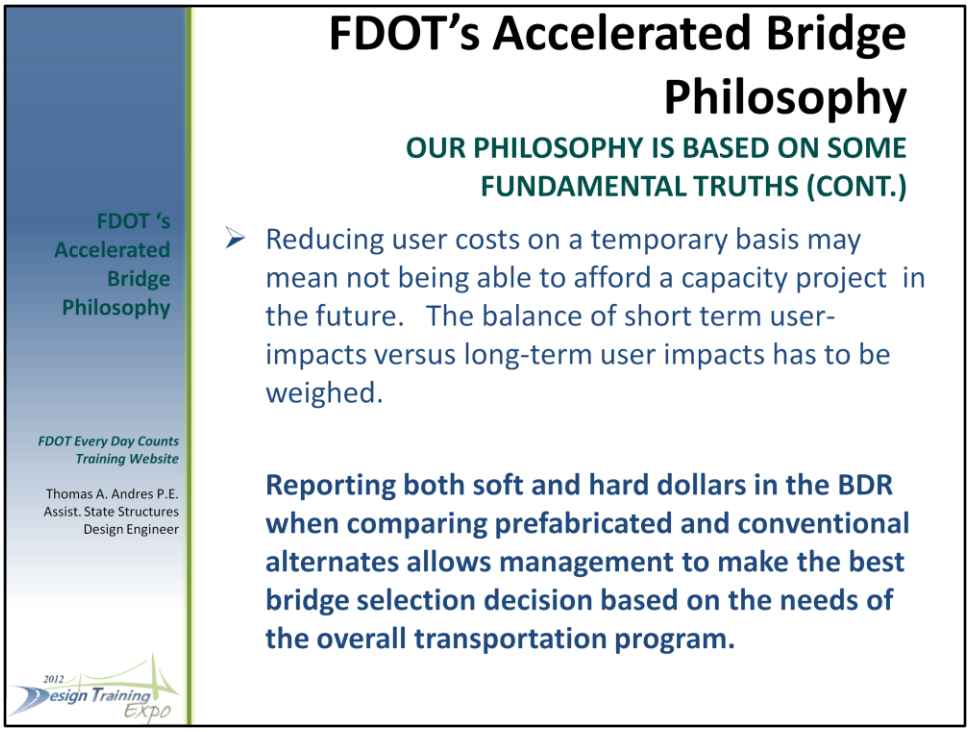
Okay, let's talk about FDOT's accelerated bridge philosophy which is based on some fundamental truths.

☺ Usually doing something faster costs more. Although that is not always the case, ABC hard dollar costs are about 20% - 30% higher than conventional construction based on recent cost history from other states.

☺ Funding challenges have never been more difficult and public demands have never been higher.

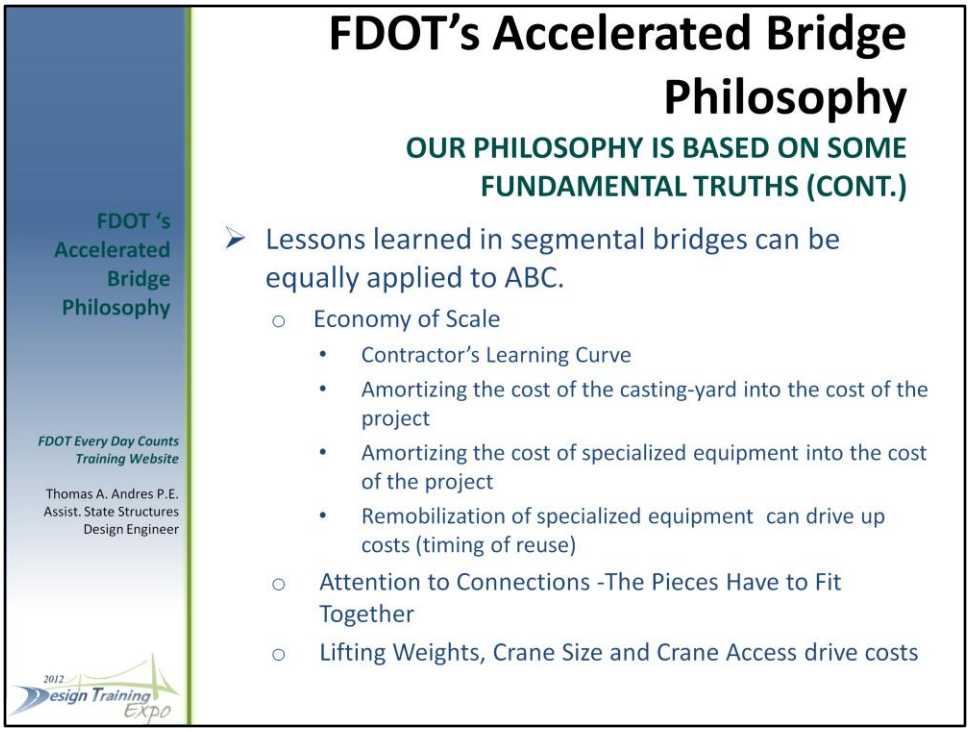
☺ User impacts and user costs can vary greatly from project to project –

☺ **one solution does not fit all projects.**



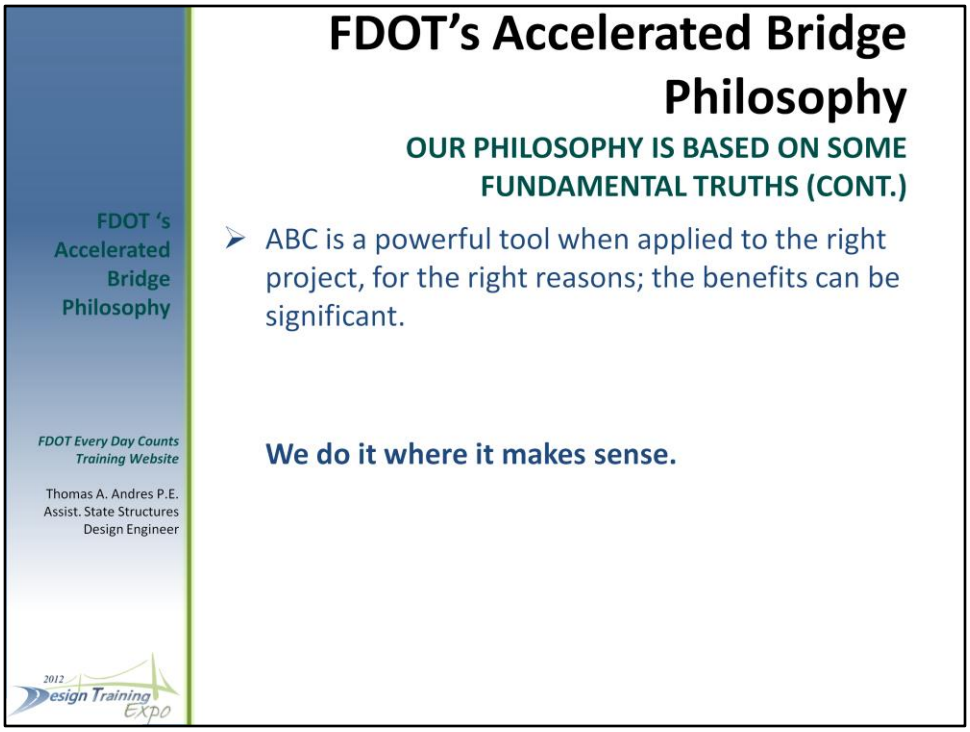
☺ There can also be a lost opportunity cost associated ABC construction - whereby reducing short term user impacts that cost more now may mean not building that capacity project down the road. So the balance of short term user-impacts versus long-term user impacts has to be weighed.

☺ **Therefore our current policy requires that when the project satisfies certain feasibility questions, that both soft and hard dollars be reported in the BDR. This allows management to make the best bridge selection decision based on the needs of the overall transportation program.**



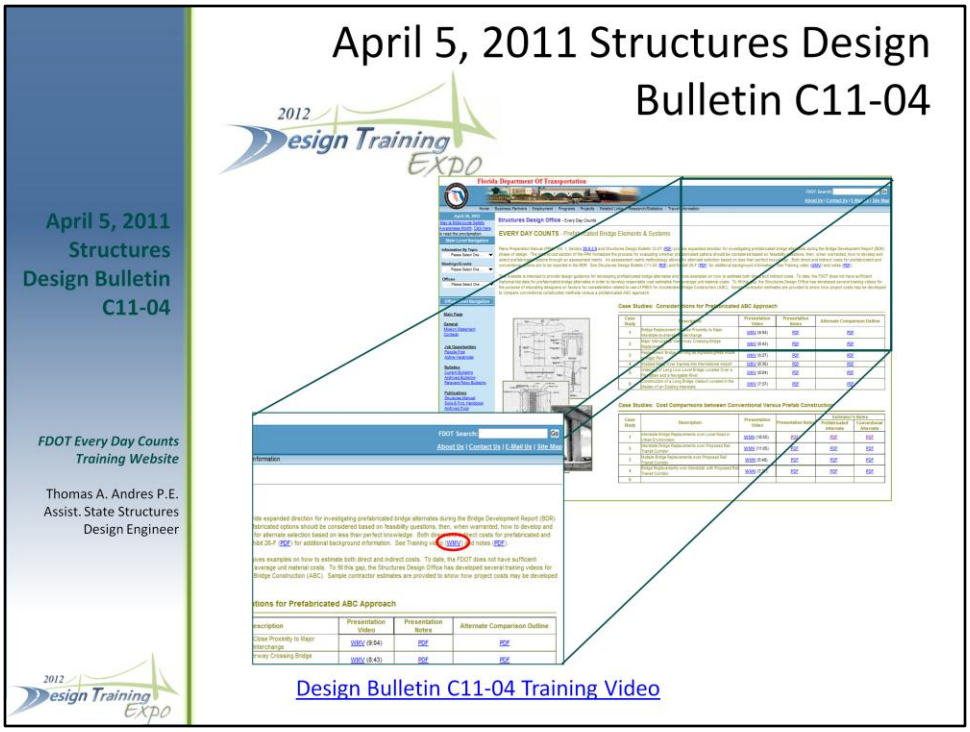
☺ Another fundamental truth is that Lessons learned in segmental construction can equally be applied to ABC.

- Things like the economy of scale of a project.
  - Contractor's learning curve
  - Amortizing the cost of the casting-yard into the cost of the project
  - Amortizing the cost of specialized equipment into the cost of the project
  - Remobilization of specialized equipment can drive up costs (timing of reuse)
- Attention to connections -the devil is in the details. How do the pieces fit together?
- Then you have this huge issue with lifting weights, and crane sizes and what these requirements do to the Contractor's overhead costs. So all of these rules that we have used on segmental projects, splitting pier segments to keep weight manageable, introducing in-situ pours when elements get to large, etc,



☺ ABC is a powerful tool when applied to the right project, for the right reasons; the benefits can be significant. Examples may include a large waterway crossing where insurance and labor rates associated with working from barges are high, where crane access is good, and where you have economy of scale and uniformity within a given project. I will try to give you some specific examples later in the presentation.

☺ **Bottom line is we do it where it makes sense.**

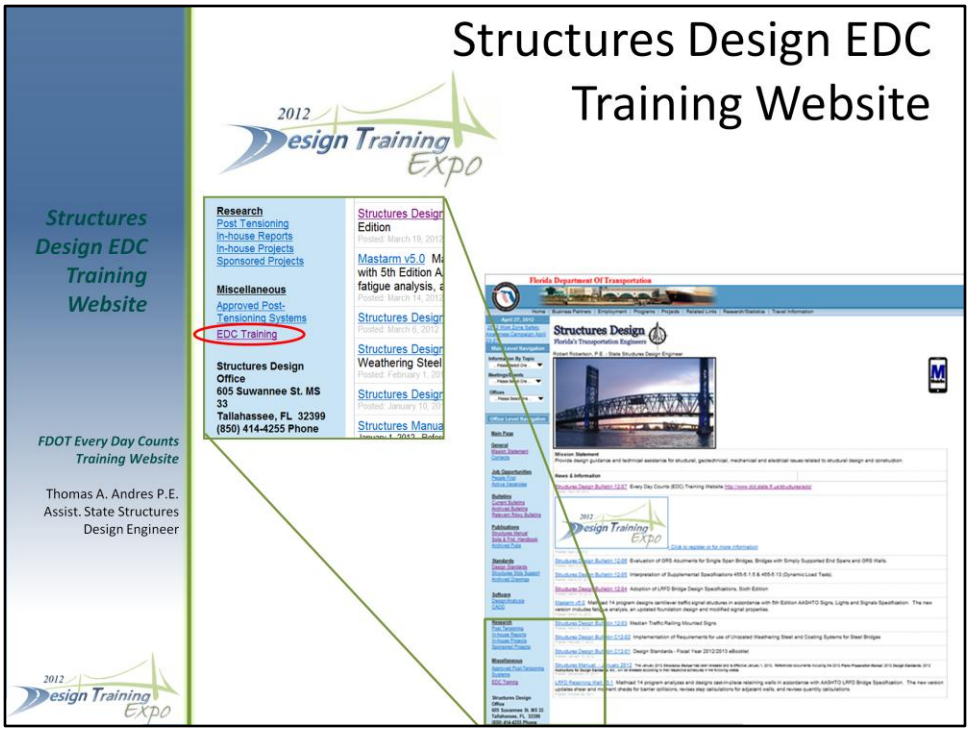


☺ Okay. Let's go ahead and watch this short video on Structures Design Bulletin C11-04 and then we will discuss it.

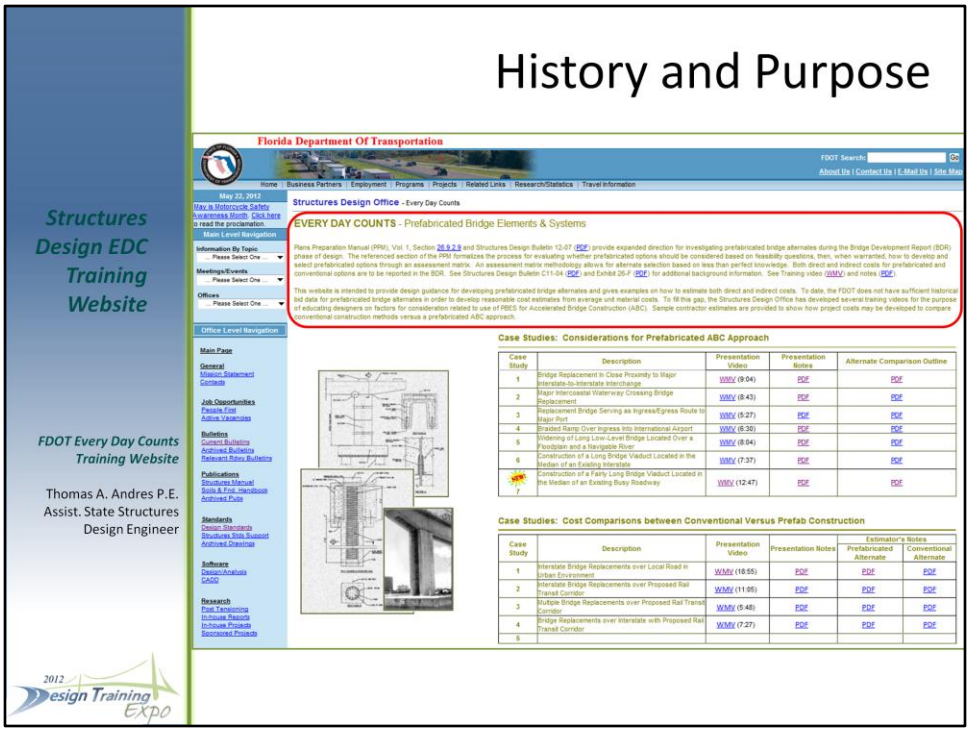
SHOW VIDEO

A few points to note from the video.

- We anticipate that only about 10-15 percent of FDOT bridge projects will warrant a full-blown precast versus conventional option assessment in the BDR based on the responses from the feasibility questions.
- The evaluation matrix selection tool allows for the best decision based on imperfect knowledge. When comparing options, what is most important, is the relative differences.
- The key to estimating user cost accurately is to be able to estimate detour durations which may require specialized knowledge from CEI members of your firm or input from industry.
- The purpose of the EDC training website is to provide guidance in developing and assessing accelerated bridge options per the steps outlined in the design bulletin.

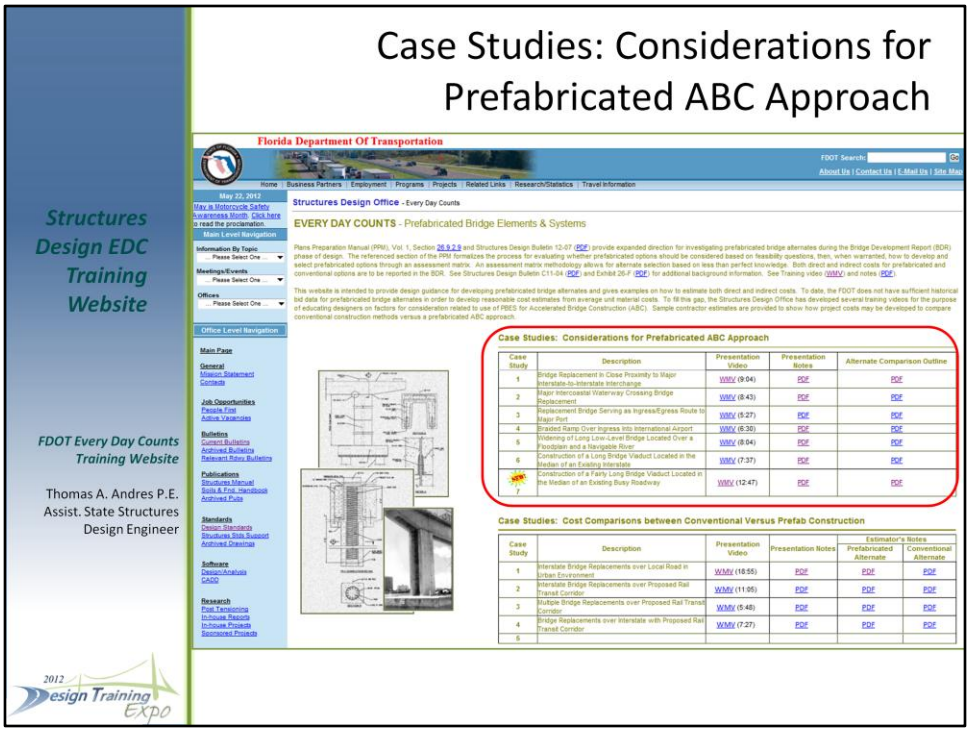


- Okay Now let's talk about the EDC Training Website.
- This slide shows the link from the Structures Design Office main webpage.
- The link is under the Miscellaneous navigation tab circled here in red.

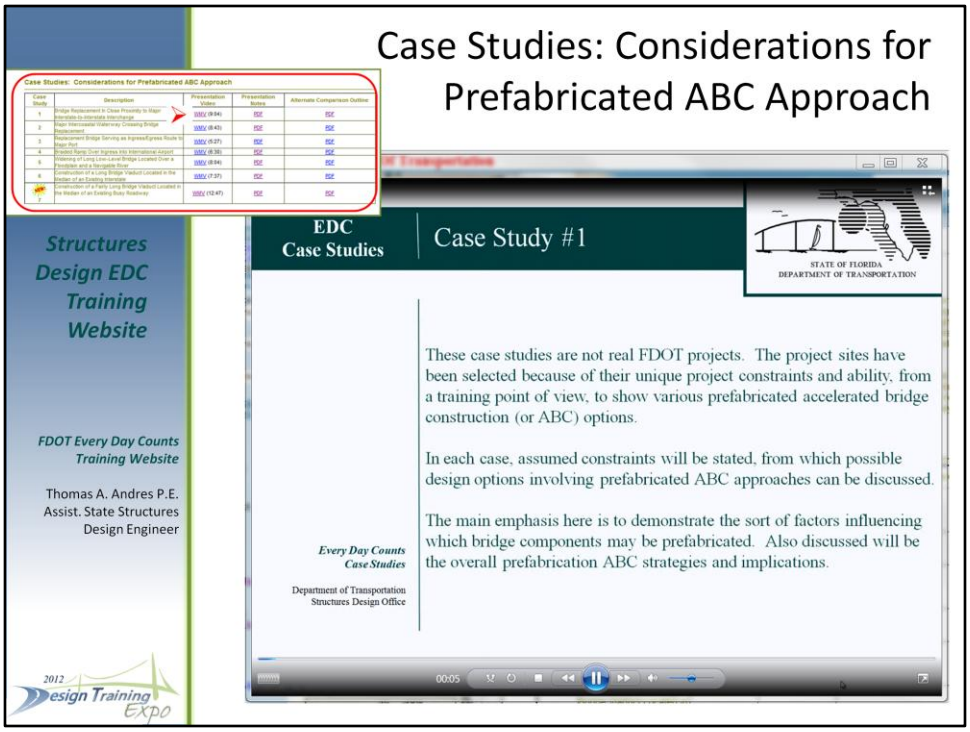


- The introductory paragraph at the top gives a brief history and purpose of the website.
- This website is intended to provide design guidance for developing prefabricated bridge alternates and gives examples on how to estimate both direct and indirect costs.
- Sample contractor estimates are provided to show how project costs may be developed to compare conventional construction methods versus a prefabricated ABC approach.

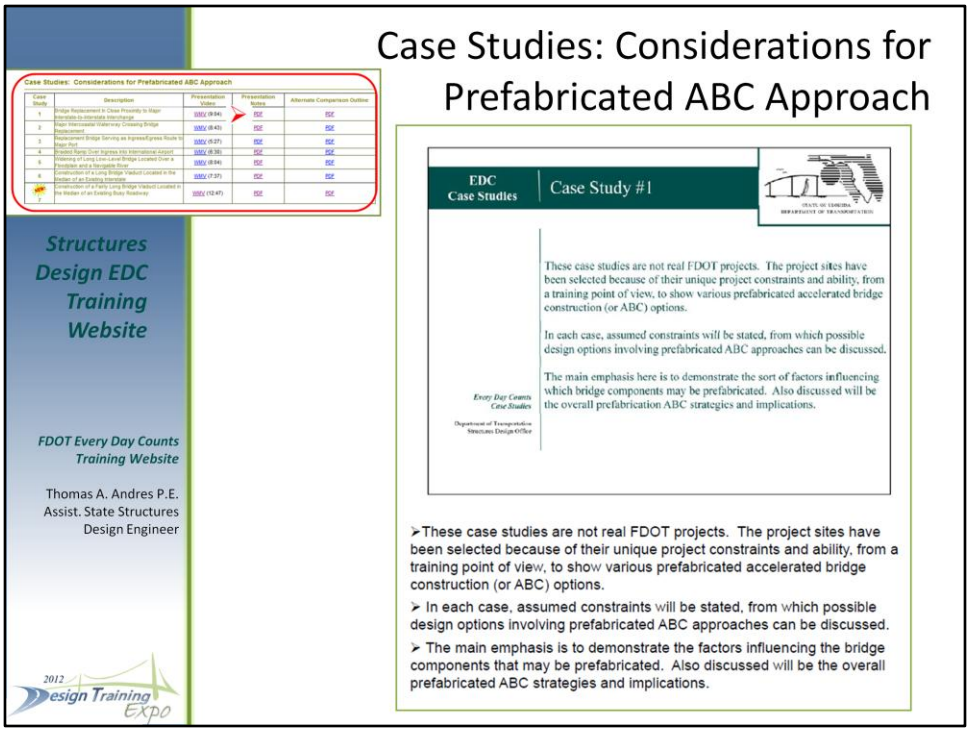
Case Studies: Considerations for Prefabricated ABC Approach



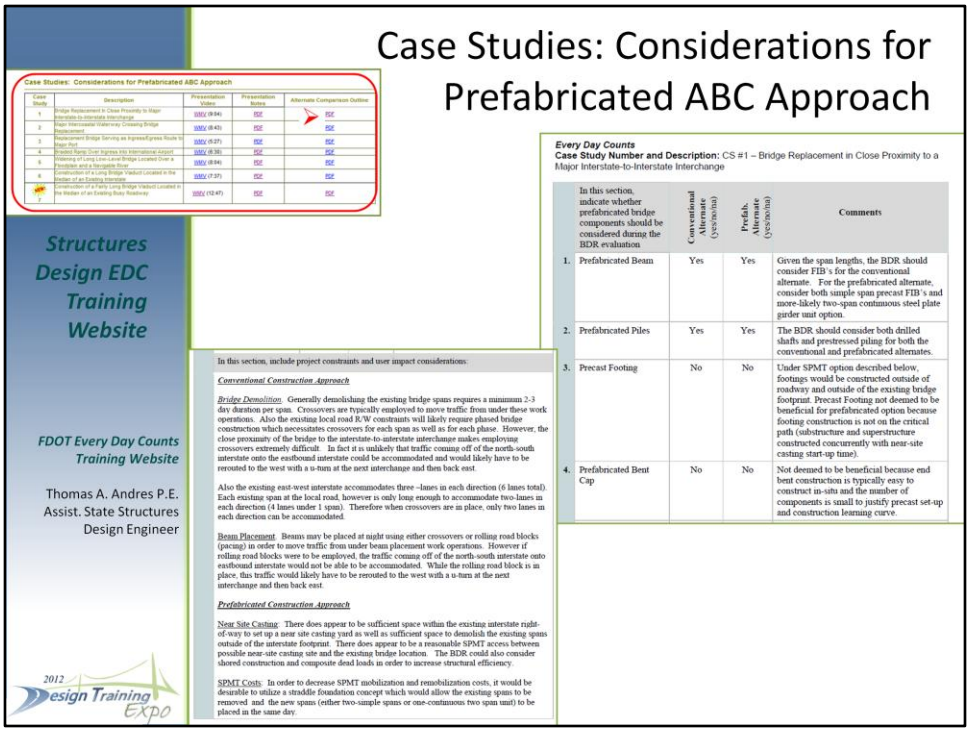
- The group of case studies in the top table are intended to show considerations for prefabricated ABC approach based on specific project constraints.
- These case studies are not real FDOT projects. The project sites have been selected because of their unique project constraints and ability, from a training point of view, to show various prefabricated accelerated bridge construction options.
- In each case, assumed constraints will be stated, from which possible design options involving prefabricated ABC approaches can be discussed.
- The main emphasis is to demonstrate the factors influencing the bridge components that could be prefabricated. Also discussed will be the overall prefabricated ABC strategies and implications.



- You will notice in the table that three columns with links appear.
- The first column link is to the presentation video for the case study.

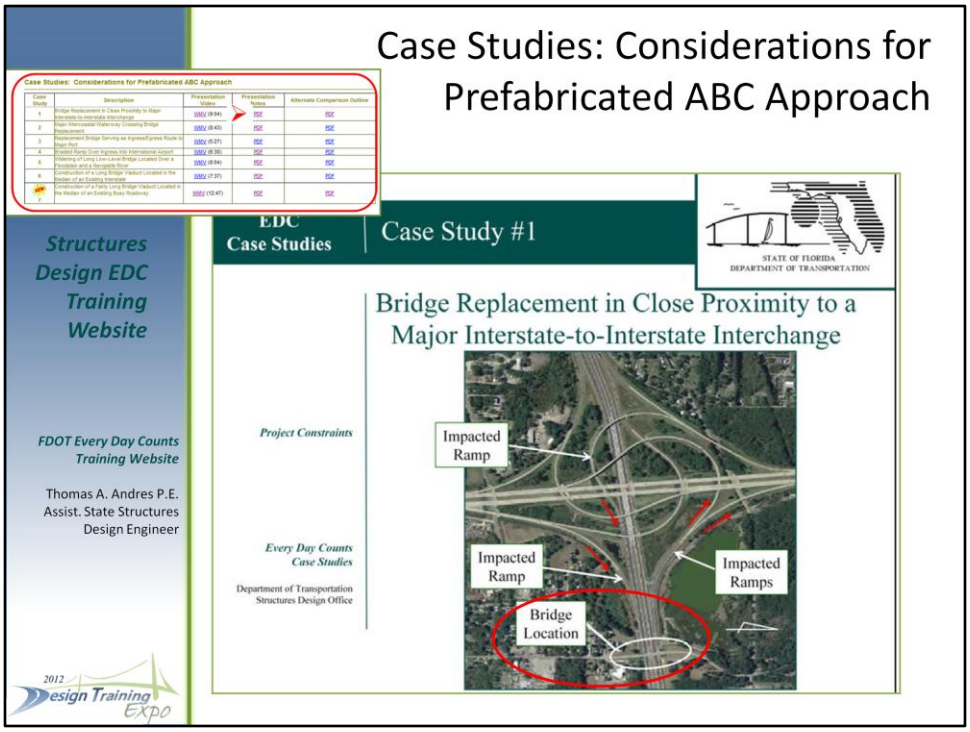


- The second column link is to a PDf of the notes pages for that presentation.

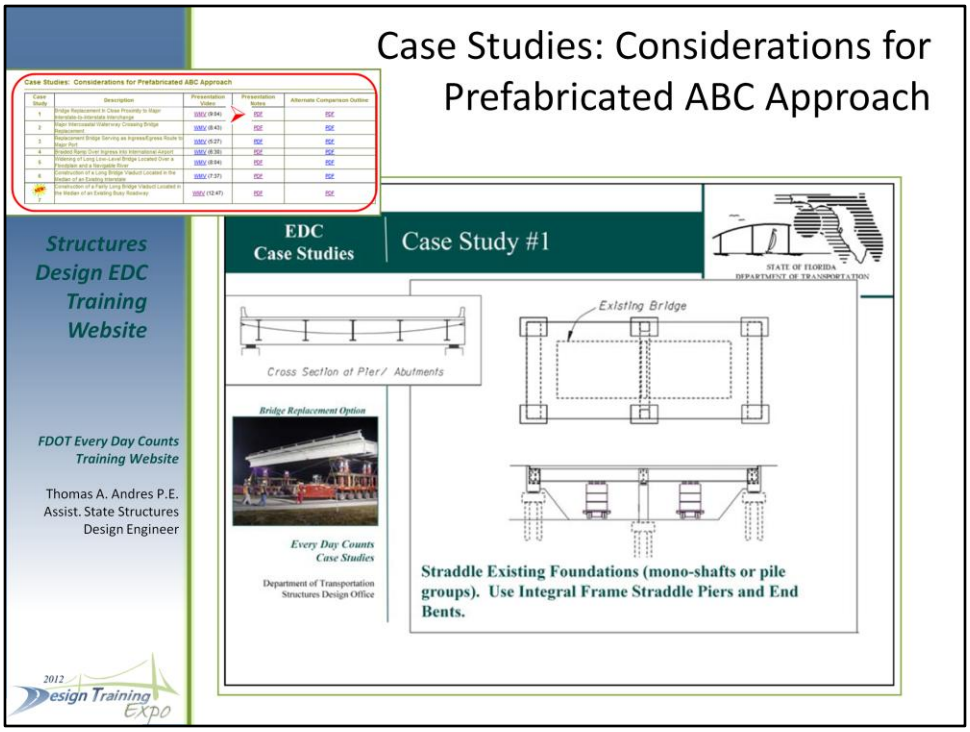


	In this section, indicate whether prefabricated bridge components should be considered during the BDR evaluation	Conventional Alternate (yes/no/na)	Prefab. Alternate (yes/no/na)	Comments
1.	Prefabricated Beam	Yes	Yes	Given the span lengths, the BDR should consider FIB 's for the conventional alternate. For the prefabricated alternate, consider both simple span precast FIB 's and more-likely two-span continuous steel plate girder unit option.
2.	Prefabricated Piles	Yes	Yes	The BDR should consider both drilled shafts and prestressed piling for both the conventional and prefabricated alternates.
3.	Precast Footing	No	No	Under SPMT option described below, footings would be constructed outside of roadway and outside of the existing bridge footprint. Precast Footing not deemed to be beneficial for prefabricated option because footing construction is not on the critical path (substructure and superstructure constructed concurrently with near-site casting start-up time).
4.	Prefabricated Bent Cap	No	No	Not deemed to be beneficial because end bent construction is typically easy to construct in-situ and the number of components is small to justify precast set-up and construction learning curve.

- Then lastly, the third column link is to a PDf that briefly describes the project specific constraints for each case study and a summary of which bridge components would likely benefit from prefabrication.

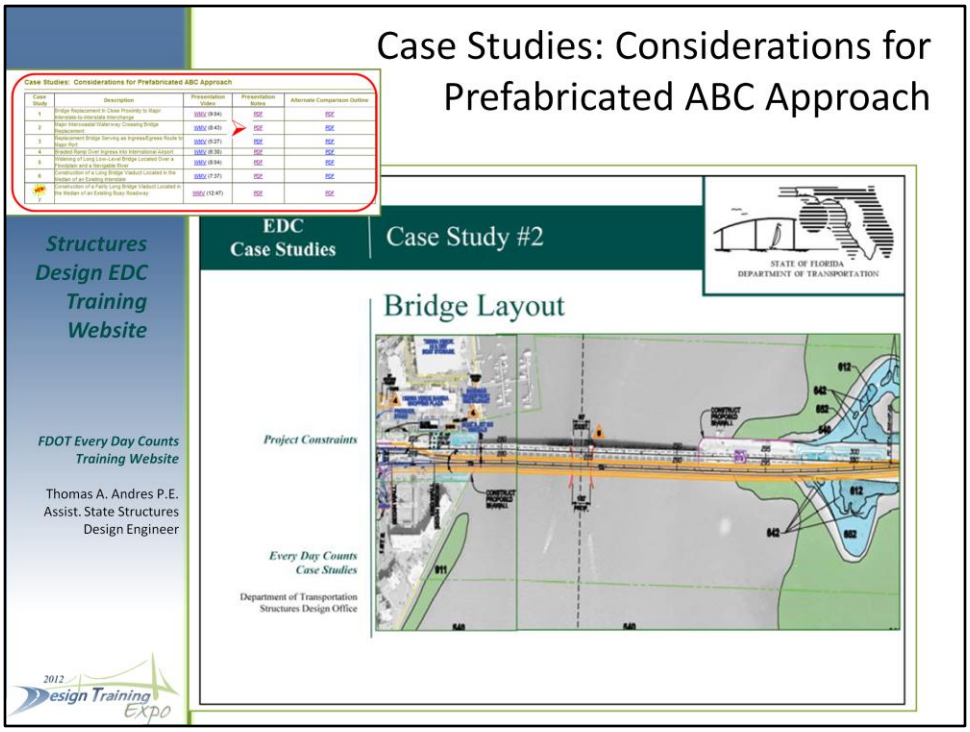


- Okay, let's talk about some of the representative case studies presented on the site.
- Case Study #1 for instance, is a bridge replacement close to a major interstate-to interstate interchange.
- See the existing bridge location circled in red.
- The challenge outlined in this case study is how to replace the bridge without affecting the interchange-to-interchange connection ramps noted by the red arrows.
- The case study attempts to answer questions such as:
  - How will traffic movements be accommodated during bridge demolition?
  - What about during beam placement?
  - How long do these sorts of construction operations take?
  - What are the likely detour routes?
  - What are some possible ABC solutions to reduce user impacts?

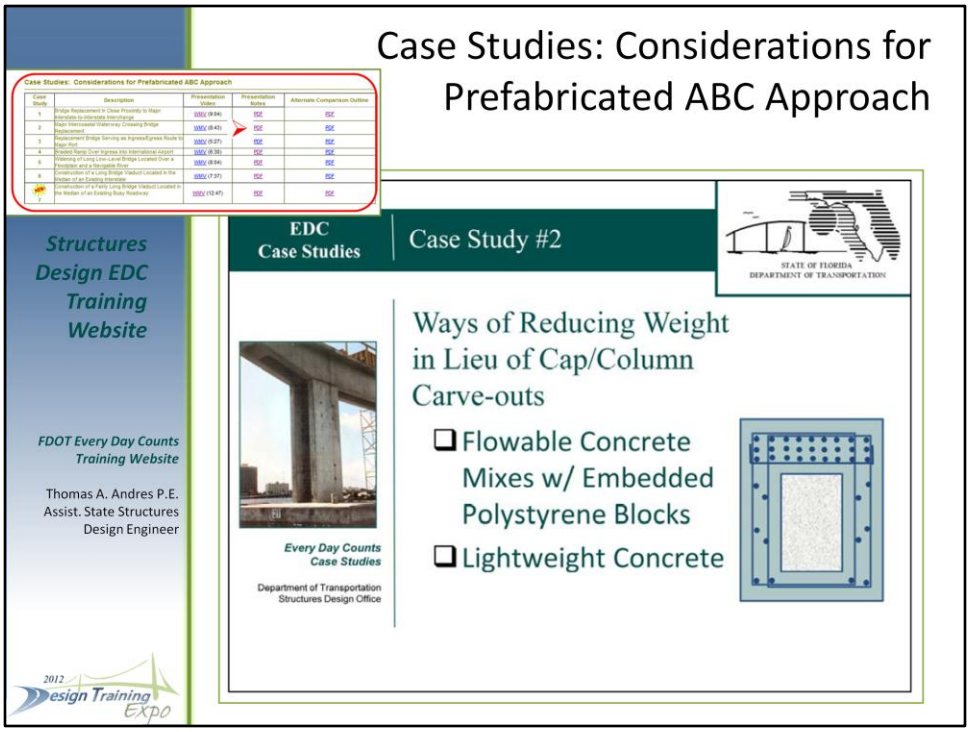


- In this case, the use of full superstructure near-site casting ABC solution and self-propelled modular transporters (SPMTs) is discussed.

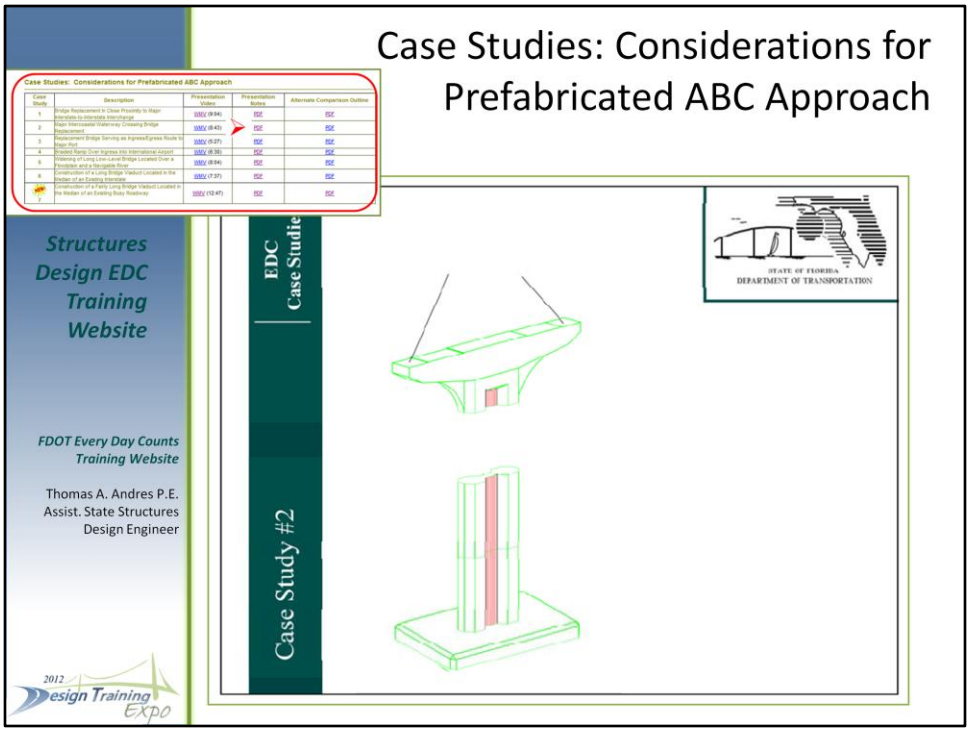
- Some of the questions addressed by this case study include:
  - What are the costs associated with SPMT remobilization?
  - What are design details and ABC strategies that could eliminate/reduce SPMT remobilization?
  - Whether the designer could take advantage of shored construction? Making all of the dead loads composite.



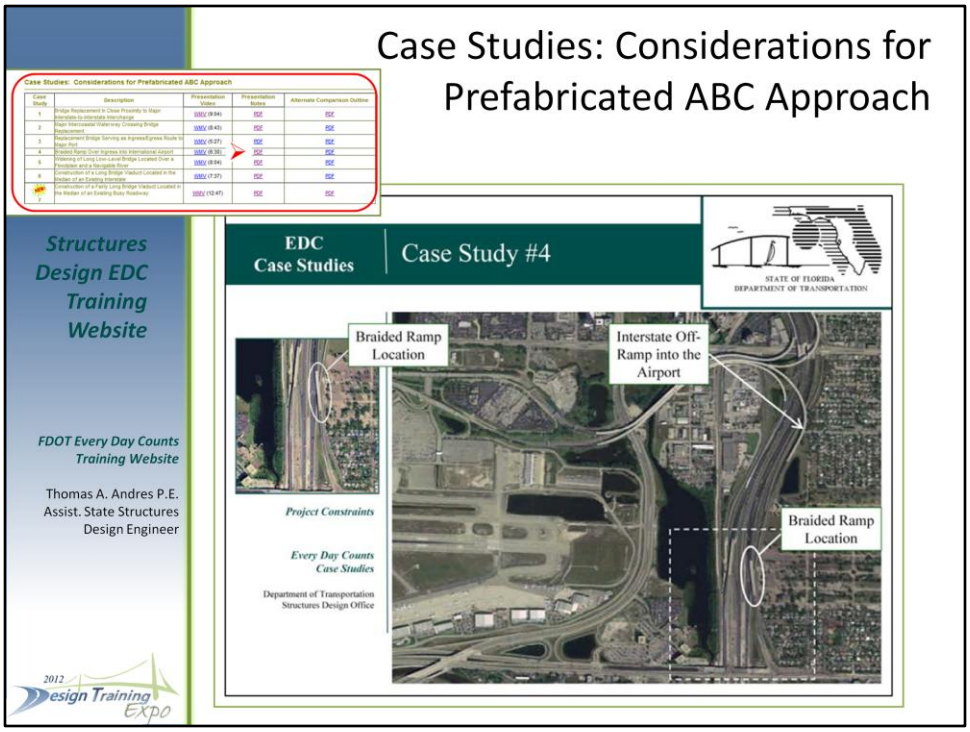
- Case Study #2 is an example of major intracoastal waterway crossing bridge replacement.
- Where:
    - Project is large enough to benefit from economy of scale
    - Labor and Insurance rates of working on the water, from barges are high
    - The proposed bridge is fairly uniform
    - Water depths allow for good water access throughout



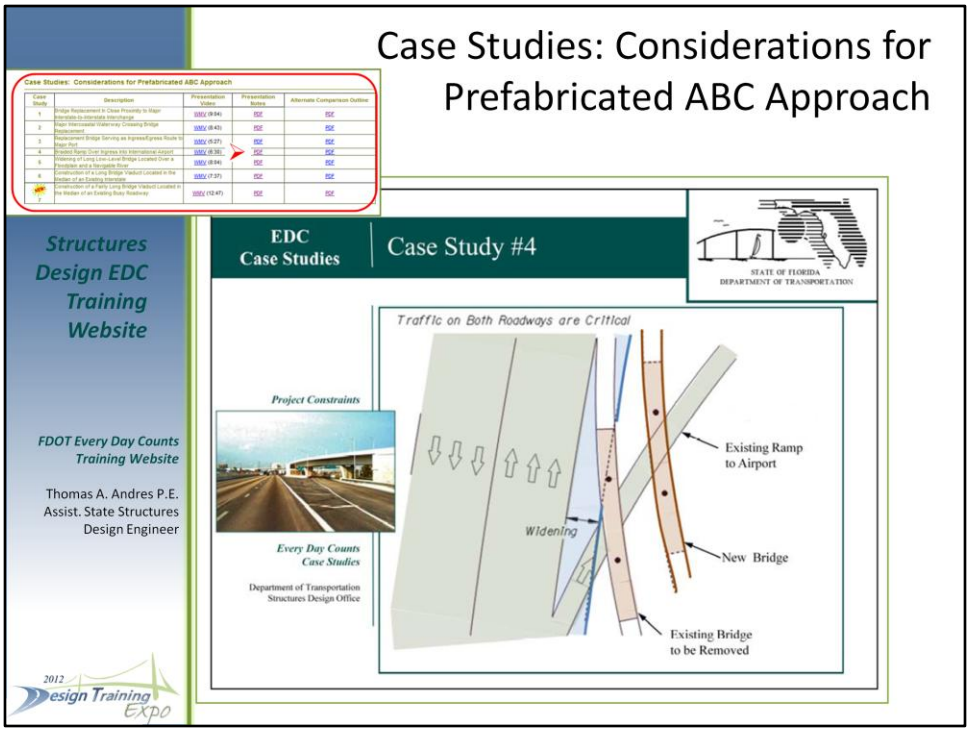
- This case study attempts to answer the following questions :
  - What bridge components should be prefabricated in order to reduce the Contractor's time on the water?
  - How do lifting weights and crane sizes influence the preferred ABC solution? What substructure elements to precast based on project constraints?
  - What are some strategies for reducing lifting weights?



- This case study also attempts to answer the following questions :
  - What are some strategies for addressing pier aesthetic demands?
  - How is component-to-component fit-up ensured? Especially when prefabricated elements are to be connected to cast-in-place components where match-casting is not possible or where locating grouted coupler to ensure fit-up is more difficult.

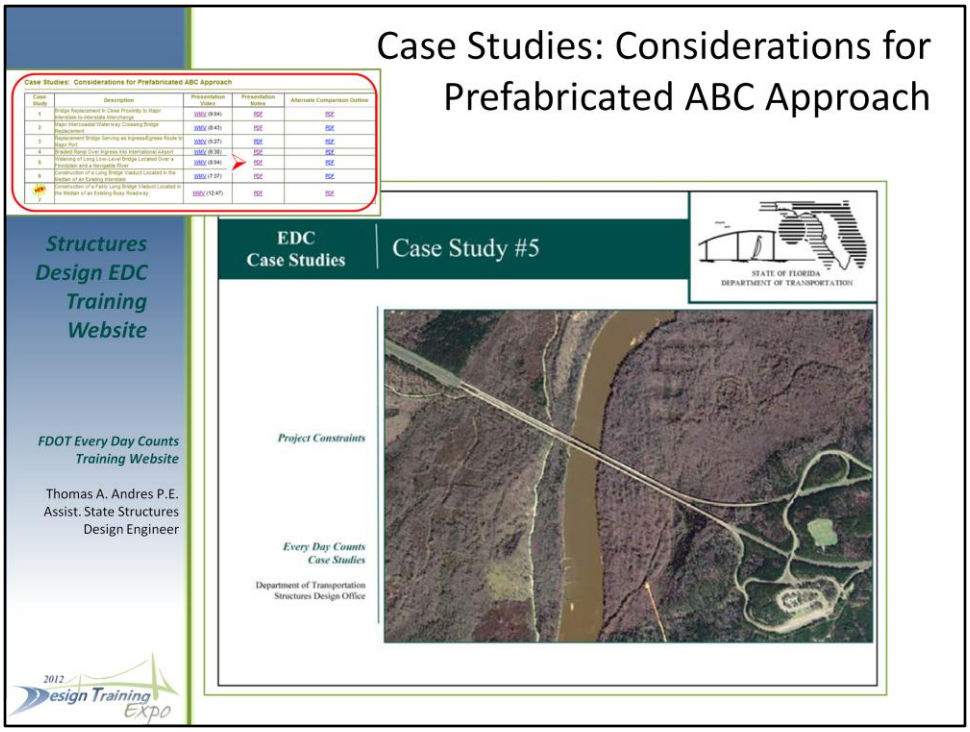


- Case Study #4 involves widening the interstate which will impact a braided ramp.
- The braided ramp goes over the major interstate off-ramp into the airport, any disruption to the route must be minimized to allow for regular flow of traffic into the airport.
- The braided ramp is fairly new and could be relocated rather than demolished.

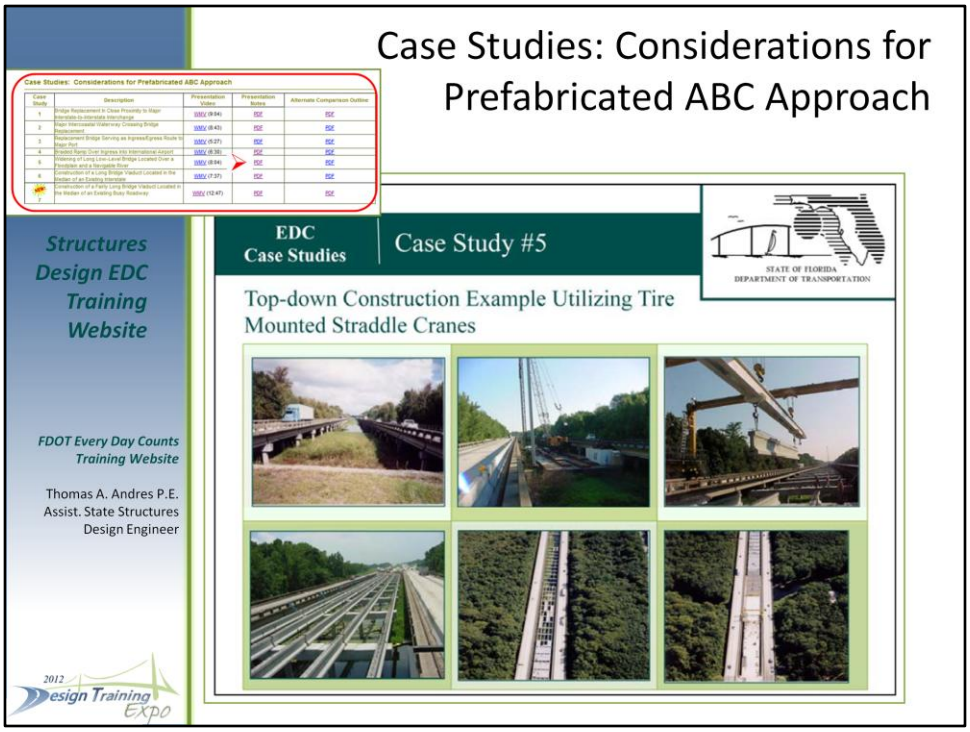


- Here is an overview showing the interstate widening and the relocated ramp.

- Some of the questions addressed by this case study include:
  - What are the user impacts associated with constructing a new braided ramp over an active on-ramp leading into a busy international airport?
  - What are the user impacts associated with demolishing the braided ramp?
  - What are the costs savings associated with relocating the braided ramp superstructure using SPMT technology?
  - What are the user impacts associated with a single roll-in approach?
  - What are other applications for using SPMT technology for reusing existing bridges by simply moving them to a nearby location?

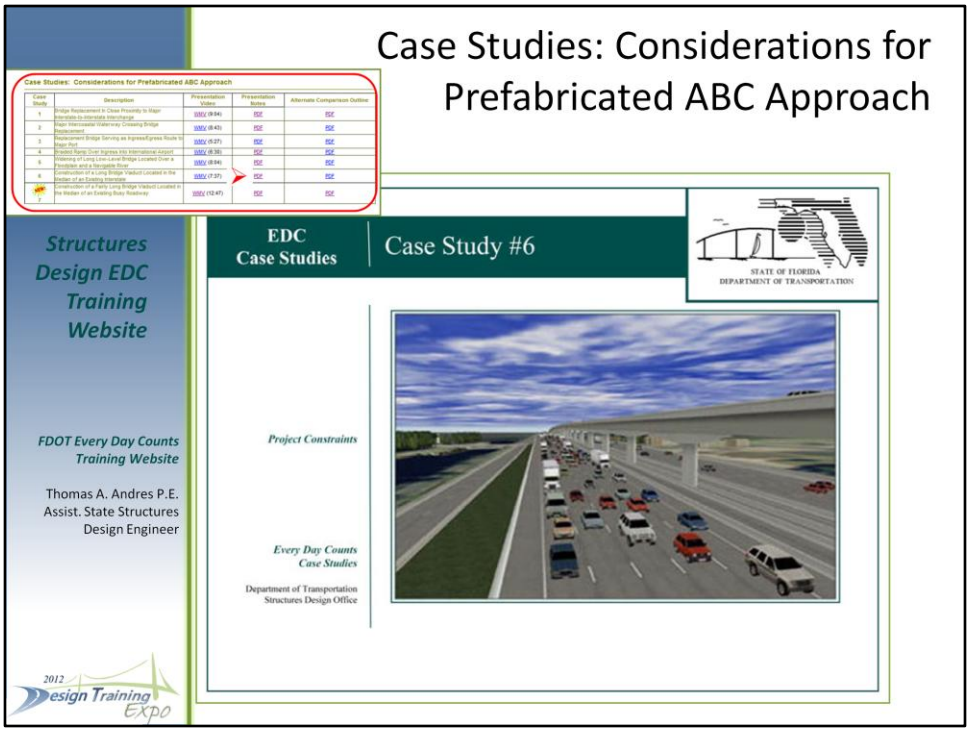


- Here is another example.
- This case study involves the widening of a long low-level bridge “viaduct” located over a floodplain and a navigable river.
- Project Constraints are as follows:
    - Project is large enough to benefit from economy of scale
    - The proposed bridge widening is fairly uniform
    - Impacts due to flood events introduce construction access risks
    - Potential environmental impacts are high

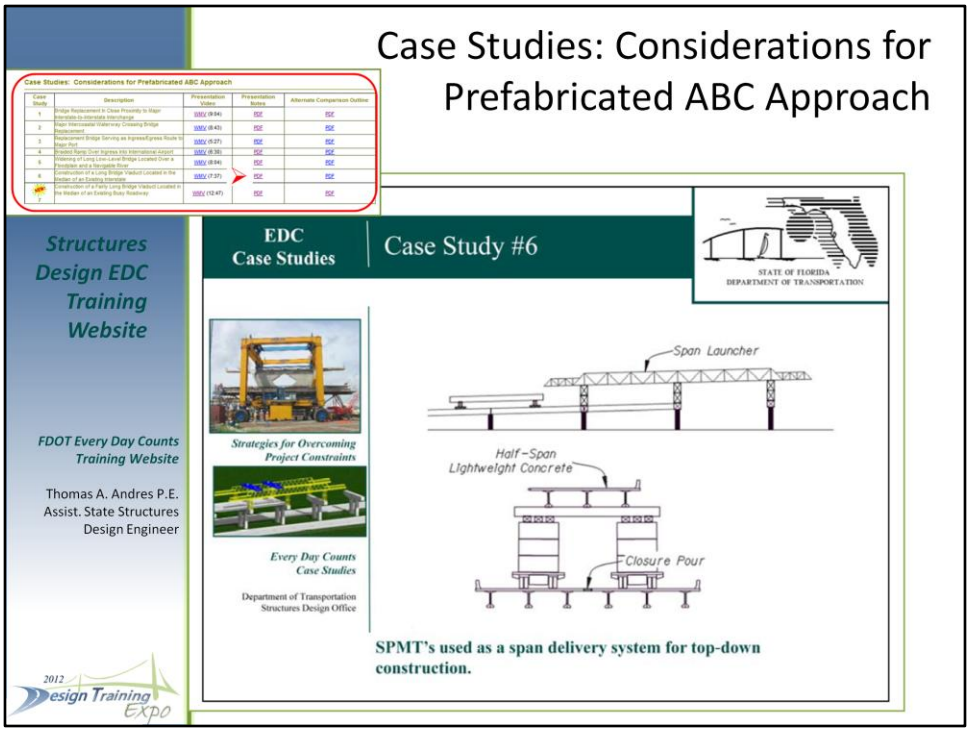


This case study also attempts to answer the following questions :

- How the cost of specialized equipment can be amortized into the cost of a large project?
- How specialized equipment can be efficiently utilized in the delivery of all materials and prefabricated bridge components?
- How leap-frogged substructure construction methods can reduce environmental impacts?
- How top-down superstructure construction methods can reduce environmental impacts?

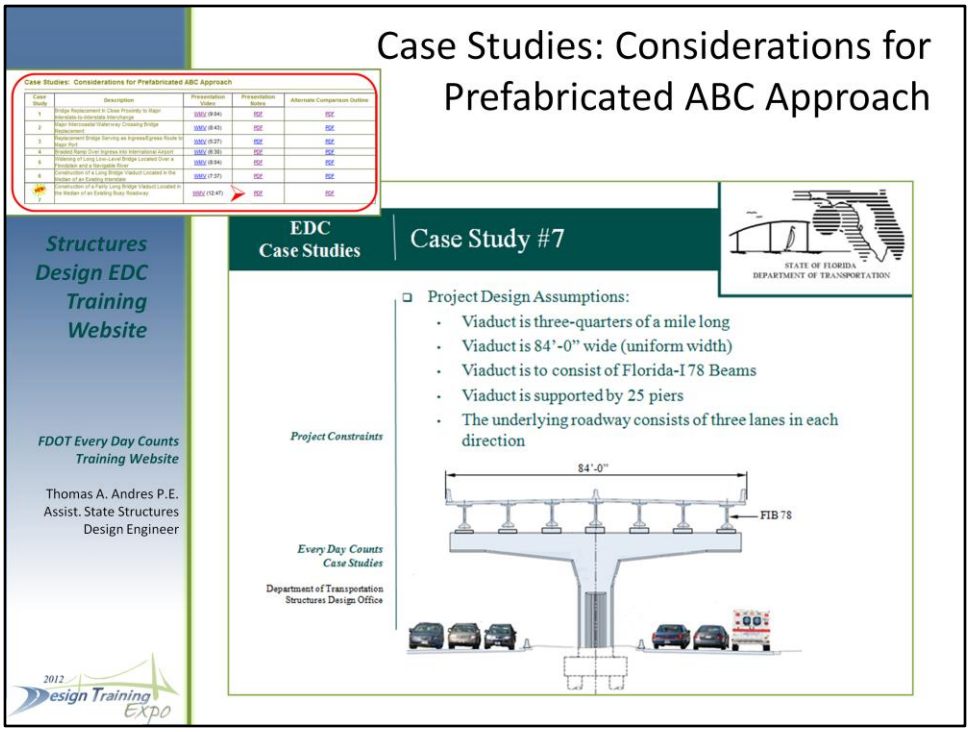


- This case study features construction of a long bridge viaduct located in the median of an existing interstate.
- Project Constraints are as follows:
    - Project is large enough to benefit from economy of scale
    - The proposed bridge viaduct is fairly uniform
    - The potential impacts to adjacent interstate traffic is high
- The challenge of this project is to determine how to construct the long viaduct while minimizing the traffic impacts on the existing at-grade facility.

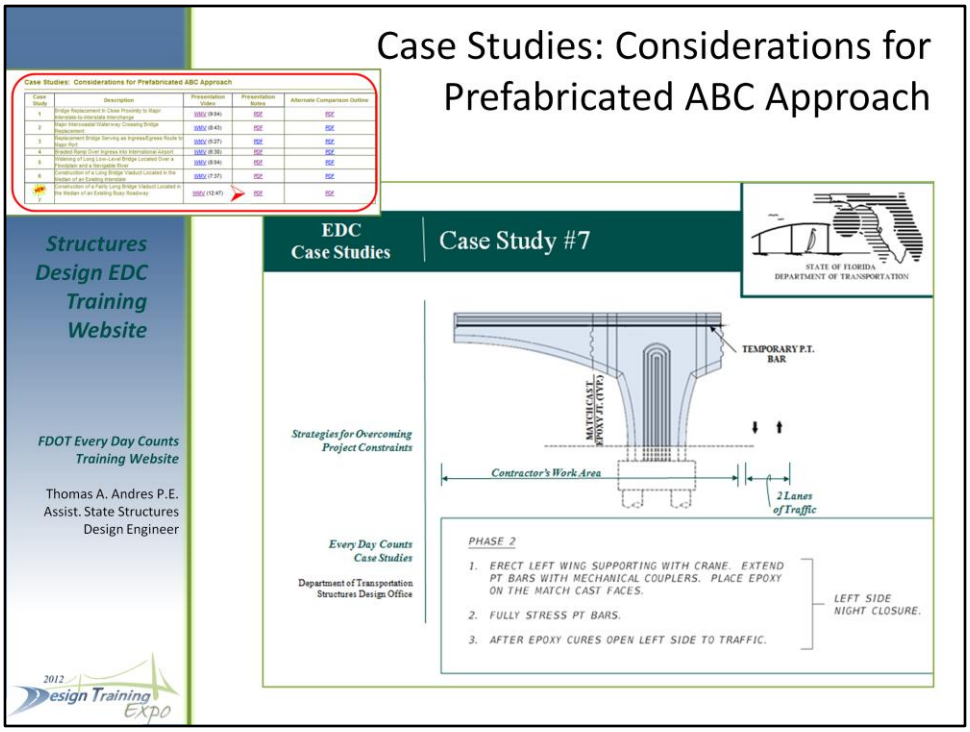


This case study also attempts to answer the following questions :

- How the cost of specialized equipment can be amortized into the cost of a large project?
- How specialized equipment can be efficiently utilized in the launching of completed superstructure spans?
- How top-down construction technique can greatly reduce impacts on the traffic below?
- How such a concept could be lightning fast - approximately 2 spans per day or up to 1 mile of bridge per month?

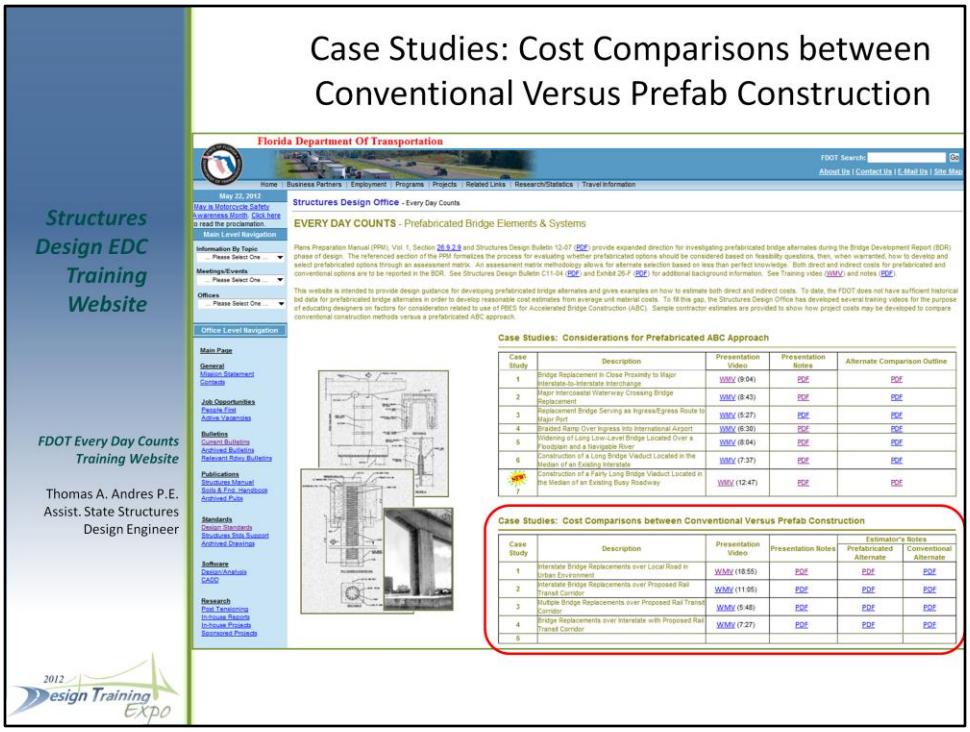


- This case study features the construction of a fairly long bridge viaduct located in the median of an existing busy roadway.
- Of particular interest in this case study is the importance of minimizing traffic disruptions during daytime hours.
- Project Constraints are as follows:
    - Project is large enough to benefit from economy of scale
    - The proposed bridge viaduct is fairly uniform
    - The potential impacts to the underlying roadway traffic is high



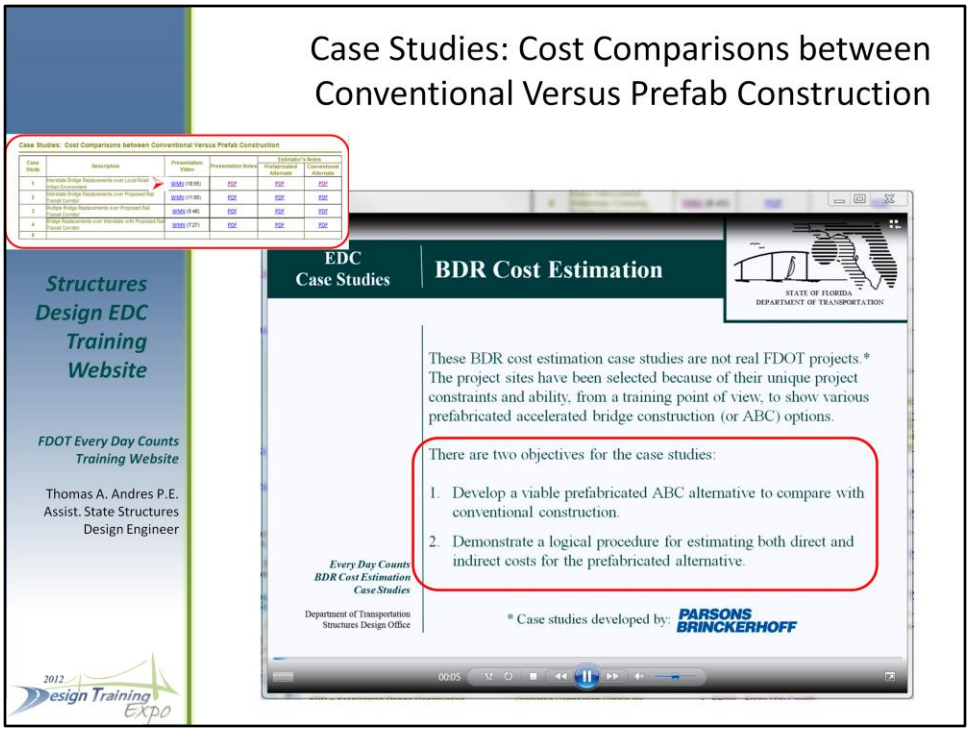
This case study also attempts to answer the following questions :

- How segmental construction techniques and details can be used for conventional bridge ABC applications?
- Why a hybrid precast solution may be preferred when component lifting weights, traffic restrictions, and Contractor production rates are considered?
- How an ABC prefabricated pier wing concept can greatly reduce impacts on the traffic below?
- How this hybrid precast substructure concept could be used with the top-down superstructure concept outlined in Case Study #6?

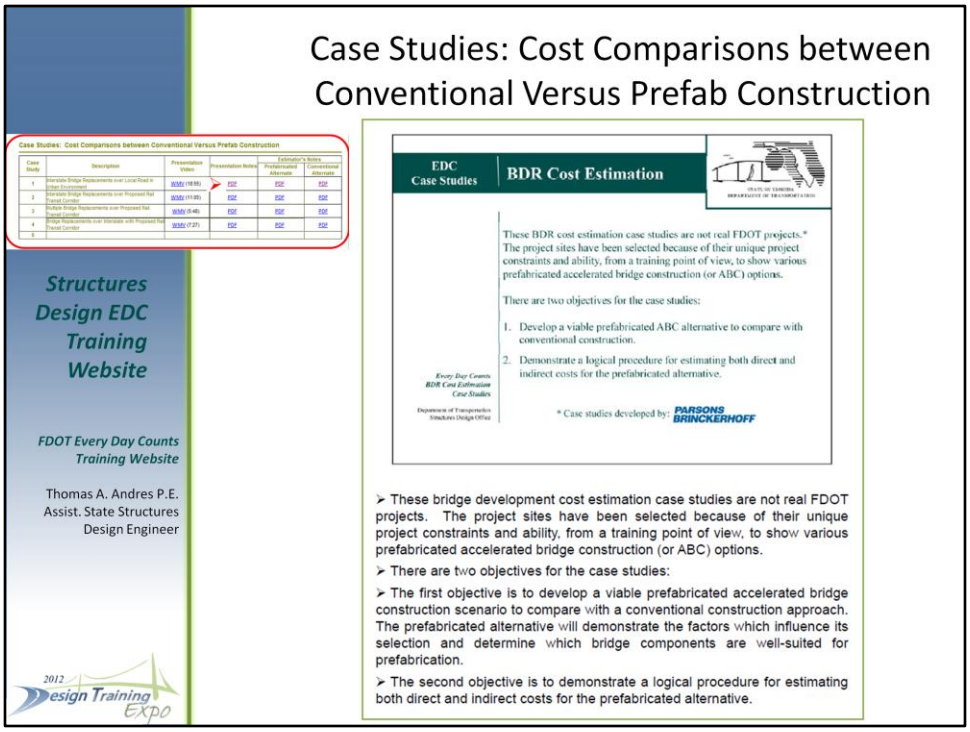


The next group of case studies located in the bottom table of the website are intended to provide two main objectives as follows:

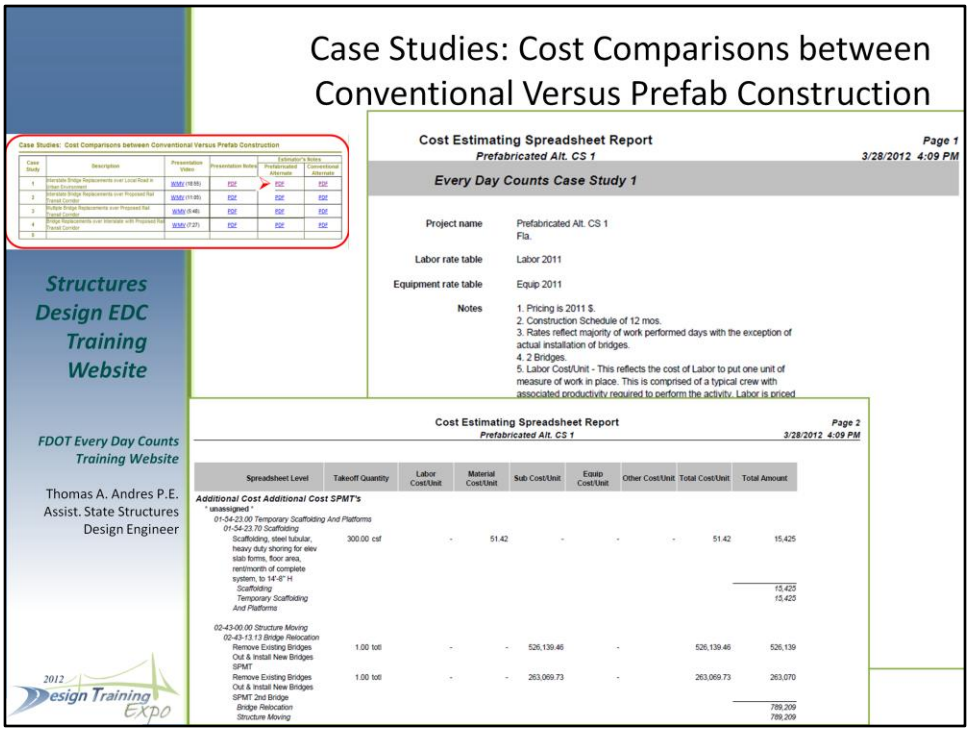
- The first objective is to develop a viable prefabricated accelerated bridge construction scenario to compare with a conventional construction approach.
- The second objective is to demonstrate a logical procedure for estimating both direct and indirect costs for the prefabricated alternative.



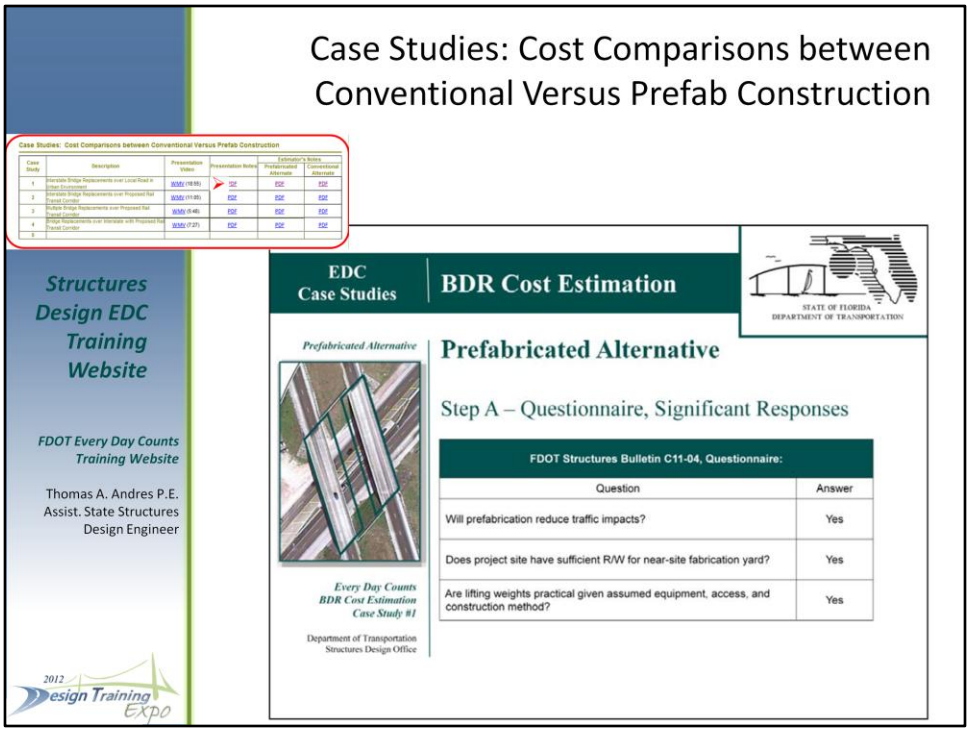
- You will notice in the table that four columns with links appear.
- The first column link is to the presentation video for the case study.



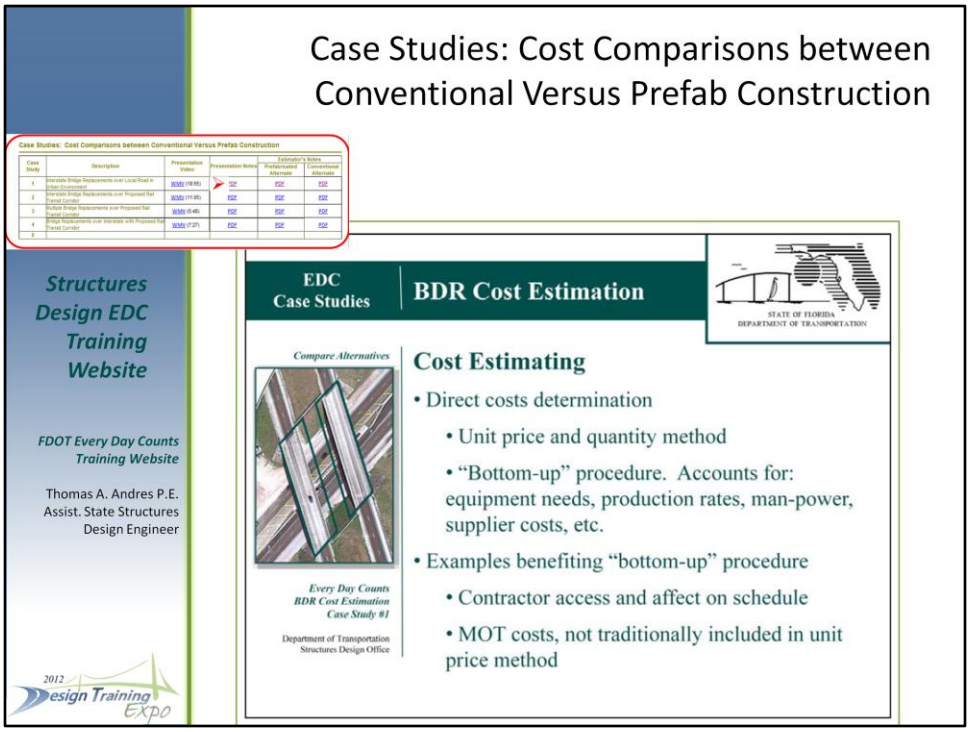
- The second column link is to a PDf of the notes page for the presentation.



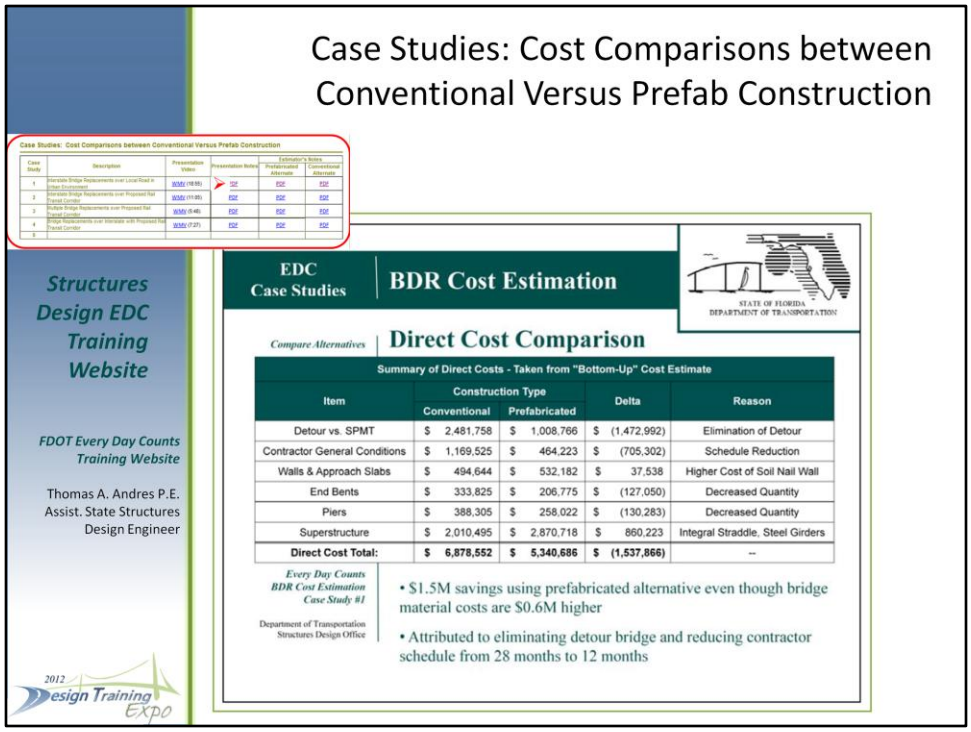
- The third and fourth columns are links is to the estimator's notes for the precast alternate and the conventional alternate, respectively for each case study.
- The first page of the estimator's notes gives the estimator's assumptions used in the case study.
- The rest of the pages give a breakdown of direct costs for each alternate broken down by task item. The breakdown of equipment costs, labor costs, and material costs associated with each task item is given.



- Each Case Study in this section shows how the feasibility questions would be answered based on the project constraints.
- All of the sample case studies in this section warrant the development of a precast alternate in the BDR based on affirmative answers to the feasibility questions.

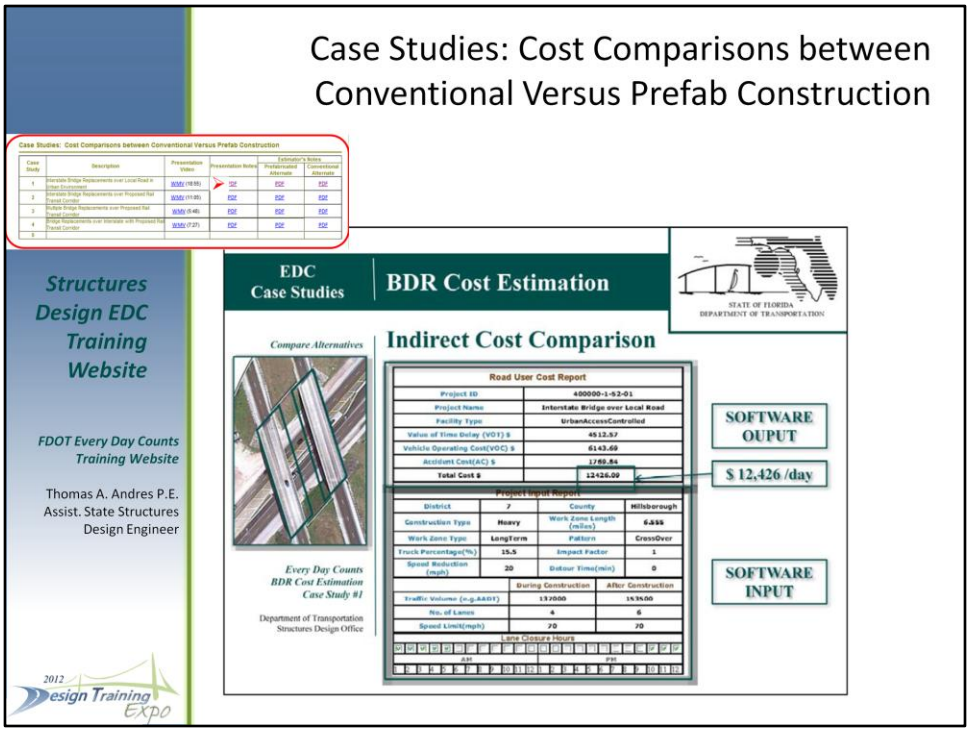


- Each case study also attempts to answer the following questions :
- How a bottoms-up estimate for labor, equipment and materials would be performed for both precast and conventional options?



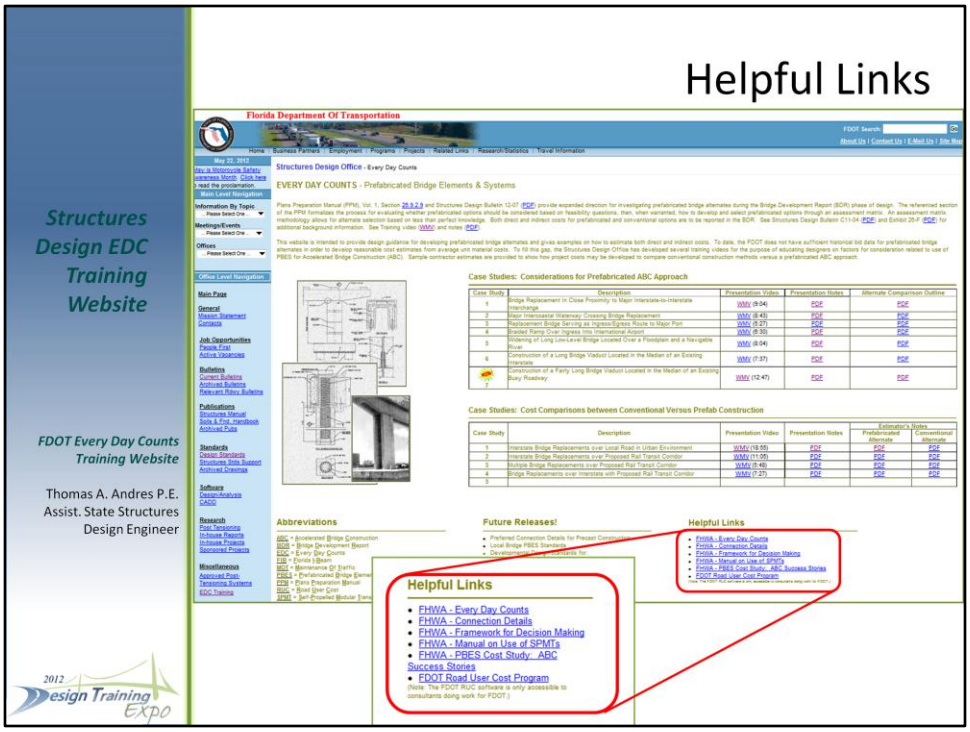
Each case study will also answer the following questions :

- How Economy of Scale of a project effects direct costs? Amortizing Costs, Contractor's Learning Curve
- The costs associated with special equipment?
- How remobilization of special equipment can affect direct costs of a project?
- How production rates are affected by performing work outside the limits of the roadway?
- How equipment and labor costs are affected by time duration?

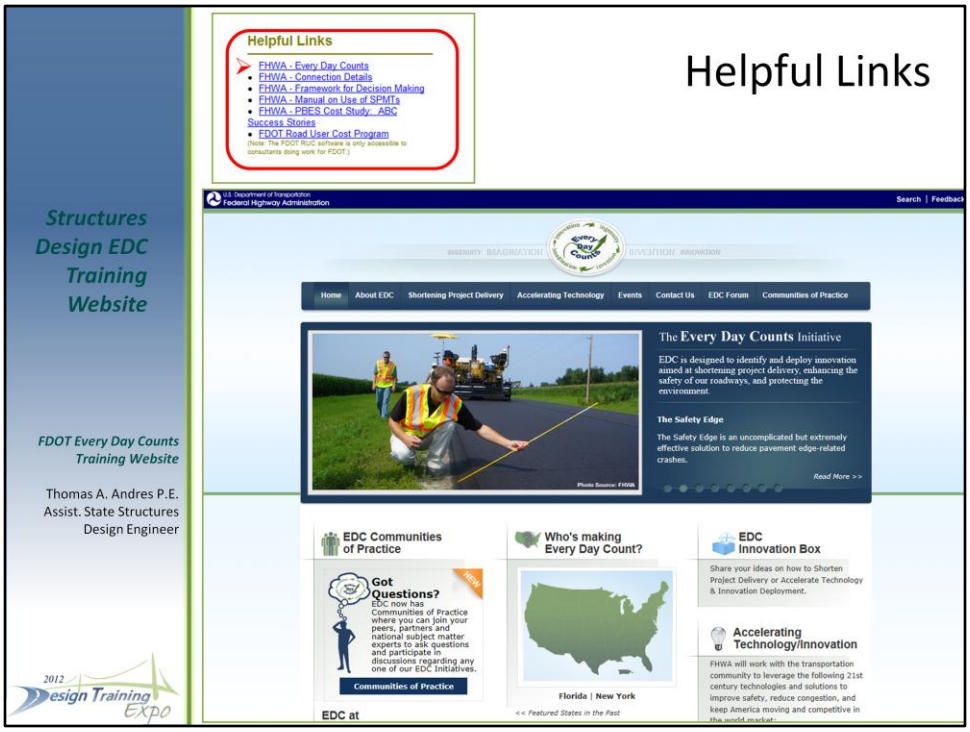


Each case study will also answer the following questions :

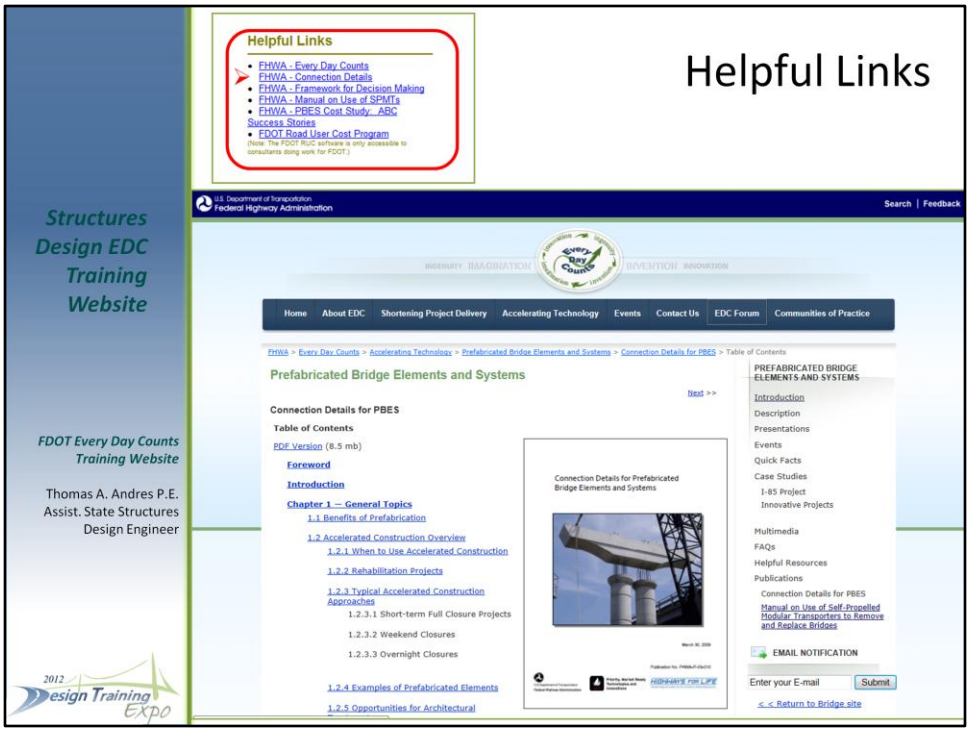
- How the Department's Software can be utilized to determine user costs?
- How the duration of the lane closure or traffic detour influences user costs?
- How traffic volumes and detour lengths influence user costs?



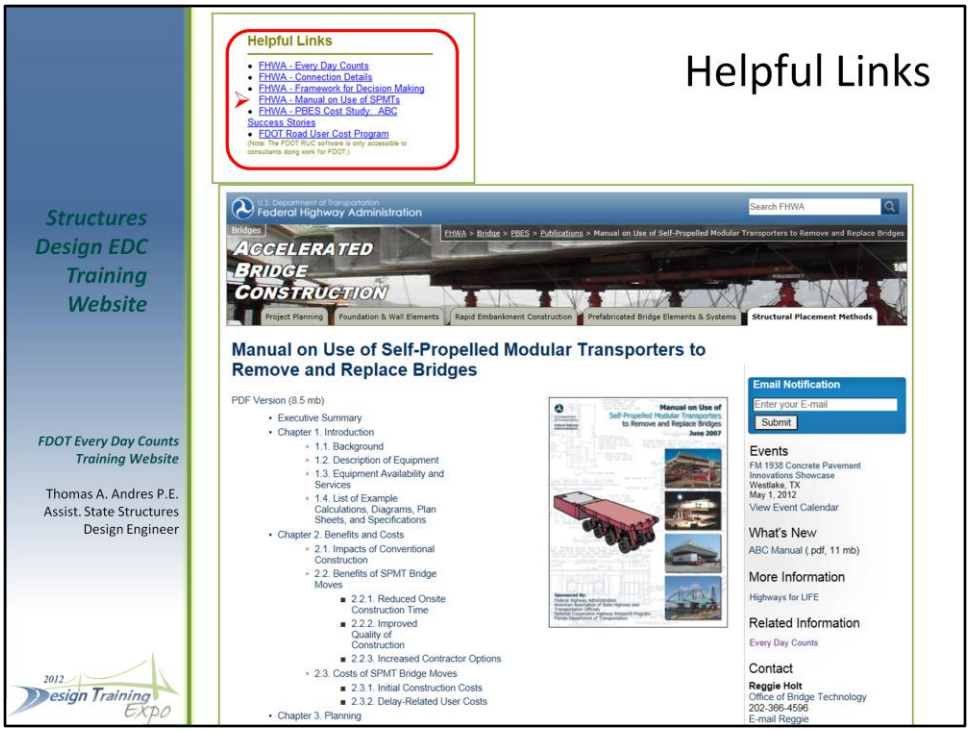
The website also gives reference links to many of FHWA's websites related to accelerated bridge construction.



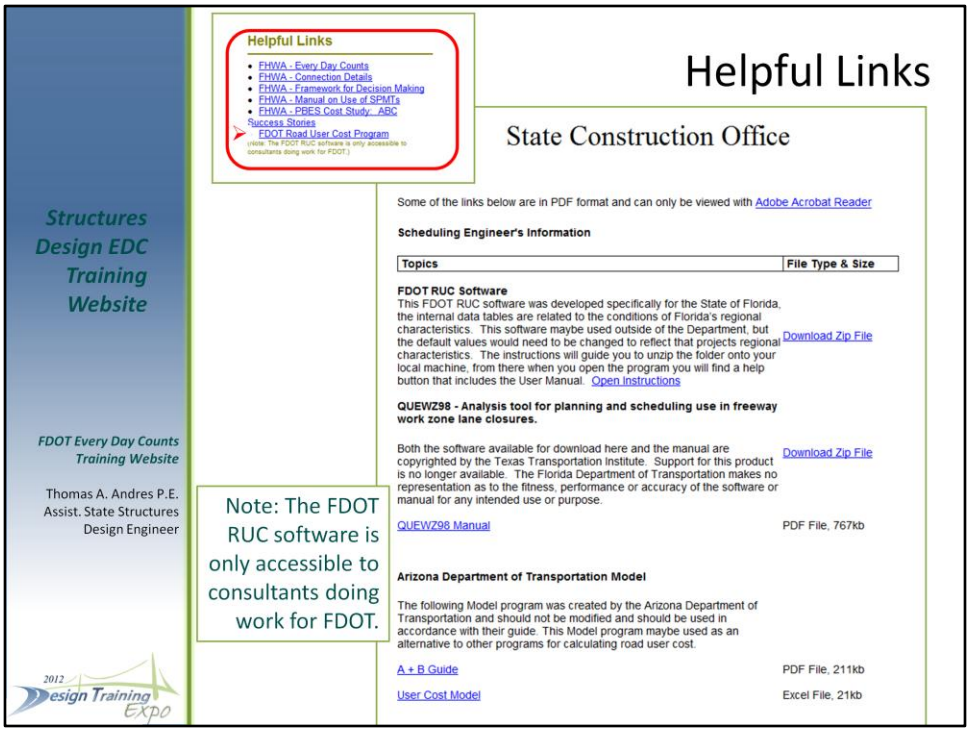
Here is the home page of the FHWA Everyday Count site.



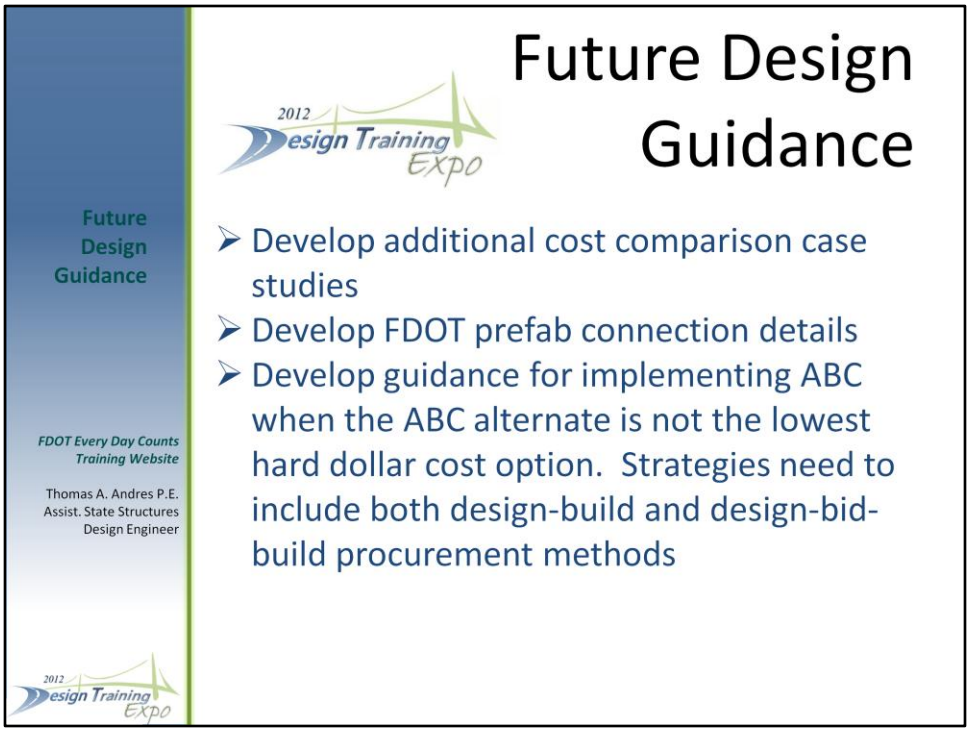
Here is the home page of the FHWA Connection Details for the Prefabricated Bridge Elements and Systems Manual.



Here is the home page of the FHWA Self-Propelled Modular Transporters (SPMT) Manual.



Here is link to the FDOT Road Users Cost (RUC) software. Note this software is only available to you if you have an infonet connection.



- Some Future Possible additions to the EDC website include:
  - ☺ Develop additional cost comparison case studies
  - ☺ Develop FDOT prefab connection details
  - ☺ Develop guidance for implementing ABC when the ABC alternate is not the lowest hard dollar cost option. Strategies need to include both design-build and design-bid-build procurement methods

I want to extend a special thanks for this presentation and the website content to:

- Balfour Beatty Construction
- Parsons Brinkerhoff
- Dianne Perkins of the State Production Support Office
- Matt Sexton, CADD Applications Support Specialist
- Brad Bradley, Assist. Area Engineer SDO
- Ashleigh Smith, Webmaster SDO

- So in summary,
  - we have outline the FDOT accelerated bridge philosophy,
  - we have reviewed Design Bulletin C11-04,
  - we have spent some time reviewing the EDC training website,
  - and we have discussed a few current and future work products to be included on the site.
- Thank you for your attention.