

Bi-Monthly Progress Report:

Project Number and Title: 3.7 Development of general guidelines on the effects of bridge span range and skew angle range on integral abutment bridges (IAB's)

Research Area: Trust 3: New systems for longevity and constructability

PI: Susan Faraji University of Massachusetts Lowell

Reporting Period: 4/1/2019-5/31/2019

Date: 5/31/2019

Overview:

Overview and summary of the activities performed during the reporting period:

- Recruited 2 students, one graduate RA and one-undergraduate RA, to work on the project.
- Continued ongoing telephone calls and email exchanges with the project's champion, Mr. James Lacroix, Vermont Agency of Transportation, to select the bridges needed for this study. So far VTrans has provided drawings of the following five bridge for this study:

One IAB bridge with steel girders in the town of Bethel, Vermont

One IAB solid slab bridge with short piles, in the town of Fairfield, Vermont

One IAB solid slab bridge with long piles in the town of Fairfield, Vermont

One skewed IAB Bridge with concrete girders in the town of Burke, Vermont

One skewed IAB Bridge with steel girders in the town of Dover, Vermont

- Three different finite element software packages for the study's 3-D modeling of the sample bridges have been selected:

GTSTRUDL
SAP2000
ADAPT-ABI

- A full 3-D finite element model of a sample three span IAB bridge (Bridge #38 in the town of Bethel, Vermont) has been constructed using SAP2000.

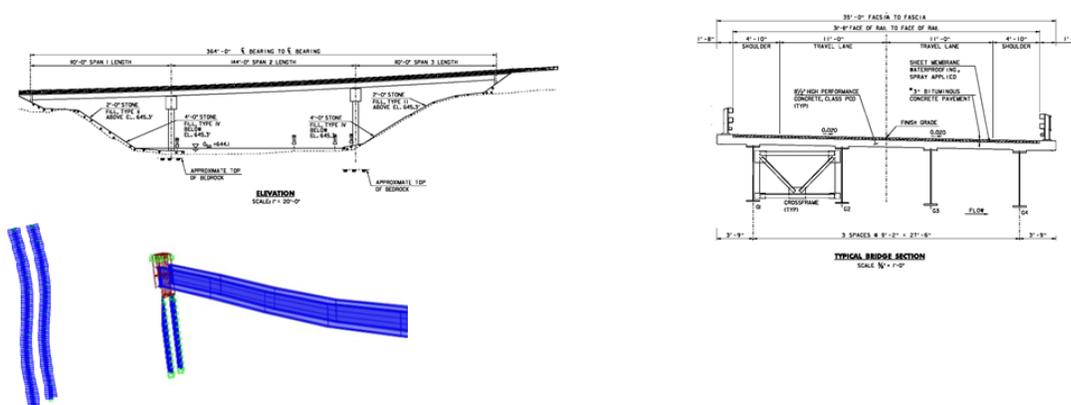


Fig.1 Sample Bridge (Bridge #38 Bethel Vermont)

Participant and Collaborators:

During the reporting period, the following participants have worked on the project:

- Dr. Susan Faraji, Professor, Civil and Environmental Engineering, UML – PI, bridge design and analysis
- Mr. Hamed Abshari, graduate RA, Doctoral candidate, Civil and Environmental Engineering, UML-computer modeling and data analysis (started May 2019)
- Sina Razzaghi, undergraduate RA, Masters candidate, Civil and Environmental Engineering, UML- Computer modeling (started May 2019)

Collaborators during the reporting period:

- Vermont Agency of Transportation.
- The other collaborators and contacts that have been involved in the project include the ADAPT Corporation of Redwood City, California, and the Intergraph Corporation of Madison, Alabama.

Changes:

Do not anticipate any problem or change at this stage of the project.

Planned Activities:

In the next reporting period, the following tasks will be conducted:

Task 1. Additional full 3-D finite element models of the two skew IAB bridges that have been provided by VTrans will be generated to study the impact of the roadway profile grade effects combined with skew on the performances of skewed IAB's.

Task2. Modified p-y curves will be generated to take into consideration the roadway profile grade effects (ranges 0-10%) on the substructure of non-skew IAB's.

Task 3. Modified p-y curves will be generated to take into consideration the roadway profile grade effects (ranges 0-10%) on the substructure of skewed IAB's.