

**Course Module: Seismic Connections**

**Quarterly Progress Report  
For the period ending November 30, 2020**

Submitted by:  
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**ACCELERATED BRIDGE CONSTRUCTION  
UNIVERSITY TRANSPORTATION CENTER**

Submitted to:  
ABC-UTC  
Florida International University  
Miami, FL

## **1. Background and Introduction**

The objective of this course is to provide an overview of the principles underlying design of bridges for seismic loads and the connections suitable for joining the bridge elements in ABC bridges. Various aspects of decision-making, construction methods, available elements and systems, performance and inspection, design, detailing and connections.

It is envisioned that the course will be developed in several modules. Each module will consist of lectures lasting about 20 to 40 minutes each, with a small number of sessions devoted to participant activities. A tentative list of the topics/modules for this course is as follows;

- Module 1- Introduction to seismic design for ABC bridges.
- Module 2- Approaches to ABC, with advantages and drawbacks of each.
- Module 3- Types of elements and subsystems
- Module 4- Joints and connections
- Module 5- Construction methods
- Module 6- Inspection and performance
- Module 7- Decision making process
- Module 8- New developments
- Module 9- Quiz after completion of the course

The subject of this research is preparation of Module 4, on seismic connections.

## **2. Problem Statement**

Connections are key to successful ABC seismic structures. The largest actions (moments, shears, etc.) tend to occur at connections, because the connections are most conveniently located at the intersections of line members, such as beams and columns, where the moments are typically maximal. Thus, the connections need to have, simultaneously, construction benefits such as ease of assembly and generous tolerance, and seismic resilience, typified by strength and ductility. These two sets of criteria are often in conflict. As a result, many connections have been devised that are quick to erect but have poor seismic properties, and vice versa. The number that satisfy both conditions is much smaller.

## **3. Objectives and Research Approach**

The goal of this research is to prepare a course module on Seismic Connections. It should explain the principles on which such connections should be developed, the classifications of the various types, and provide examples of good and bad connection details.

## **4. Description of Research Project Tasks**

The following is a description of tasks carried out to date.

### **Task 1 – Obtain template from UTC**

Obtain from the UTC a format template that will common to all course modules.

Description of work performed up to this period.

- *The template has not yet been received.*

### **Task 2 – Plan Course Module**

An outline for the course module will be prepared, with a “budget” for numbers of pages, figures etc. in each section.

Description of work performed up to this period.

- *In progress.*

### **Task 3 - Share Module Plan with Center and other module developers. Get Feedback.**

We will send the Module Plan to the Center and to others working on the course modules, to facilitate consistent among the different modules.

Description of work performed up to this period.

- *None*

### **Task 4 - Generate descriptions and images for Module**

In this task, we will fill in the details in the various sections of the module.

Description of work performed up to this period.

- *None*

### **Task 5 – Circulate Module to other developers**

We will send the Module Plan to the Center and to others working on the course modules, to be sure that the different modules together provide complete coverage of the topic.

Description of work performed up to this period.

- *None*

### **Task 6 – Modify Module as needed. Submit to UTC.**

Modify the Module contents as needed for consistency and completeness.

Description of work performed up to this period.

- *None*

## 5. Expected Results and Specific Deliverables

The research will generate a course module ready for presentation to an audience of engineers.

## 6. Schedule

Progress of tasks in this project is shown in the table below.

Task	Description	Year	2020					2021									
			Mo.	S	O	N	D	J	F	M	A	M	J	J	A		
1	Obtain Template from UTC																
2	Plan course module																
3	Feedback on module plan																
4	Populate module in detail																
5	Circuate module for feedback																
6	Final modifications																
	Task proposed																
	Task in progress																
	Task complete																

## 7. References

None