BIM for Infrastructure Projects:
Autodesk® Revit®, AutoCAD® Civil 3D®, and Navisworks® for 4D Coordination

**Speaker:** Tristan Randall, Parsons Brinckerhoff  
**Guest Speakers:** Rad Lazic, Parsons Brinckerhoff  
Shane Saltzgiver, Virtual Engineering and Construction (VEC)

**Class ID:** C15783  
**Class Type:** Lecture  
**Length:** 90 minutes

**Course Description:**
Infrastructure projects are complex, multidisciplinary undertakings involving numerous stakeholders. Innovative approaches are required to synthesize design information for successful project delivery. These approaches must incorporate technological solutions into established project management strategies, but the logistics of these approaches are often complicated and difficult to manage. This class will cover 3D design workflows for horizontal and vertical facilities and discuss methods for multidisciplinary coordination using Navisworks that supports integrated project management. We will discuss strategies for 3D model creation, management coordination, and presentation, and also present examples of successful use of BIM for large infrastructure projects. Attendees will gain software-specific knowledge regarding interoperability, information exchange, and multidisciplinary modeling, as well as exposure to relevant case studies and tips and tricks.

**Course Agenda:**
The purpose of this course is to discuss the major components of Building Information Modeling (BIM) for transportation infrastructure projects, and identify applications for innovation and technology across the project lifecycle. The discussion will be broken into three primary learning modules (see Figure 1):

>>> **Reality capture (existing and in-progress)**- Using photo recognition and laser scanning technology to capture and analyze existing conditions  
>>> **3D parametric design**- Applying design parameters and constraints to develop civil and structural designs using Civil3D and Revit  
>>> **Integrated design coordination**- Incorporating scenario analysis, clash detection, and the use of mobile devices to manage the design and construction process effectively

![Figure 1: BIM for Infrastructure across different project phases](image-url)
In addition to the learning modules, this course includes two guest presentations (see Figure 1):

>>> 3D Civil Structures- This presentation will cover the basics of advanced parametric design for civil structures using Civil3D’s Subassembly Composer (SAC) and Solids Extraction tool. This portion of the course will be presented by Rad Lazic of Parsons Brinkerhoff.

>>> Future Field Foreman- The final presentation will be a demonstration of applying Autodesk mobile apps to accomplish field foreman and field engineering activities. This portion of the presentation will be given by Shane Saltzgiver of Virtual Engineering and Construction (VEC).

**Demonstrations:**
The course includes a number of in-product demonstrations and discussions in addition to the focused guest presentations, including the following:

**Module 1: Reality capture (existing and in-progress)**

*Demo 1: Integrating context and design data*- A demonstration of how to integrate 3D point clouds with design data from AutoCAD, Microstation, Revit, and more. Discussion of coordinate systems and the use of Navisworks as a model aggregator

**Module 2: 3D parametric design**

*Demo 2: 3D models for mass distribution*- A demonstration of different methods for disseminating model data for those who do not have the full software suite. Will cover use of 3D PDF, DWF, and NWD.

*Demo 3: Organizing models for field access*- This demonstration will cover the strategies for the use of 3D text and labels that can be accessed directly in the field on mobile devices. Some portions of this demonstration will be using an iPad.

**Module 3: Integrated design coordination**

*Demo 4: Resource-loaded 4D models in Navisworks*- This section will cover resource-loaded 4D models, and how to manipulate Navisworks to do more than just time-based simulations.

*Demo 5: Using multiple schedules in Navisworks to your advantage*- This discussion covers how to use multiple schedules in Navisworks to create more complex simulations.

**Additional Resources:**
2011 speaker webinar entitled “4D Modeling Strategy”, sponsored by Autodesk / Construction Management Association of America (CMAA):

– http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=16860832

– http://cmaanet.org/4d-construction-modeling-project-program-success

2011 speaker journal report entitled “Construction Engineering Requirements for Integrating Laser Scanning Technology and Building Information Modeling”, published by the American Society of Civil Engineers (ASCE):

– http://ascelibrary.org/doi/resource/1/jcemd4/v137/i10/p797_s1?isAuthorized=no

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