

# UNM CE 410 Students Learn "How-to" Design Structures Under the Bridge

September 22, 2016

UNM civil engineering students visited the Rail Runner train station and its railroad bridge over Central Avenue in the early morning to learn more about railroad engineering design requirements, as part of their class CE 410 "structural design", a class for seniors in engineering. This is a new class offered in UNM since last Fall 2015, taught by **Dr. Fernando Moreu, PE**, Assistant Professor in structural engineering. During this course, students are required to design civil engineering structures in small groups, learning design concepts related to limit states, serviceability, durability, and sustainability. The course includes interactions with stakeholders and consultant engineers, who present the students with the demands of the design industry and also lecture them about special topics including tall buildings, bridges, seismic design, and/or railroad engineering. Guest structural engineers in this course include Rich Payne, SE, PE (President of **ESCA Consultants, Inc.** from Urbana, Illinois) and Arne Halterman, SE, PE (associate principal at **Holmes Culley** from San Francisco, California). This course is also supported by local consultants such as **Dekker/Perich/Sabatini (D/P/S)**.

This semester the first design project consists of designing a pile cap of a railroad bridge. During the first half of the semester students need to submit 25, 50, 75 and 100% deliveries of their solutions as they would do in a consulting firm to their respective clients, the owner being the instructor of the course. In order to inform their design decisions, the class includes visits to structures to better illustrate the mechanics and dynamics involved in the design process.

This morning the students and the professor went "Under the Bridge" on Central Avenue and looked into concrete joints, steel connections, and discussed other related topics related to bridge maintenance and sustainability. Topics covered included loading, impact, track design, cost-effective solutions, and constructability. Students also became exposed to bridge monitoring as a way to improve safety and sustainability while discussing the pros and cons of different materials for bridge design and operations. At the end of the morning, the avid group of designers went to the top of the structure and waited for the rail runner commuters to come to Albuquerque, when both southbound and northbound traffic met at the Alvarado station.

Since 2016 the Department of Civil Engineering at UNM has been an affiliated member of the **National University Rail (NURail) Center**, a consortium of colleges and universities offering an unparalleled combination of strengths in railway transportation engineering research and education in North America.

Caption 1: The UNM CE410 class studying structural design and sustainability at the Central Avenue railroad bridge under the Alvarado station. After visiting the bridge, the lecture moved to the rail station.



Caption 2: The UNM CE410 class at the Rail Runner Alvarado station at the southbound and northbound morning arrival from commuters from the rest of the state to Albuquerque.