

Introduction

What is this project about? **Student groups are tasked with developing a summary design, construction, and maintenance plan for a water tower that will store and supply water for a rural village of 500 people in a randomly selected developing country.**

What class has it been implemented in? **Mechanics I: Fundamental Behavior (mostly Statics, Axial components of Mechanics of Solids, and Steel Material)** There are two sections of this course with an enrollment of approximately 30 per section. This course is co-taught, meets three times a week for 50 minutes, and has a 2:50 minute flexible period. Three overarching problems are used to create real world problems that tie the course concepts together. A paper on the benefit of this flexible period and the use of overarching problems is included in section 7, Publications.

Gross, S. P., Dinehart, D. W., Yost, J. R., and Radlinska, A. (2011) "Overarching Problems in Sophomore Mechanics Courses", *Proceedings of the 2011 American Society of Engineering Educators Annual Conference*, Vancouver, BC, Canada, June. Winner of the Mechanics Division Best Paper Award

A KEEN grant allowed for the incorporation of a semester long project, the introduction of the 3 C's, and improvement of overarching problems by the incorporation of the KEEN or "K" sheets. The sheets are presented in the Handouts section. Each sheet asks the students to consider a specific infrastructure project in a specific location and to comment on the technical, economic and societal considerations in regards to the various subdisciplines of civil engineering. The K 3 (1-6) sheets are for the semester long project and provided detailed interim deliverables.

Why is it important? How is it different from current methods of teaching this concept? **We modified existing overarching problems to provide an opportunity to introduce the mindset and allow students to discuss societal and economic factors that impact the problems. Students are given 10 minutes in class to partially fill out a K sheet. They are then given 5 minutes to discuss it with classmates. Finally 10 minutes of class time is spent in faculty-facilitated discussion. Additionally, students are now asked to compare and contrast these factors for projects in the US and the developing world. KEEN funding allowed for adding the semester long project that requires investigating the societal need and economic constraints of a design in the developing world.**

Who should implement this project? **Anyone interested in bringing in real engineering constraints from the developing world should consider the semester long project.**