CEE-01

Potential for Natural Brine as an Anti-Icing/De-Icing Agent

Dr. K. Jahan
(Need CEE and CHE)

- Conduct literature review on the use of salt brine as an anti-icing agent
- Compare and contrast brine usage with conventional snow and ice control means
- Identify states/countries that currently use natural brine as an anti-icing agent
- Collect accurate weather/road condition data available for sites that use natural brine application

CEE-02 Use of Recycled Waste in Construction Materials

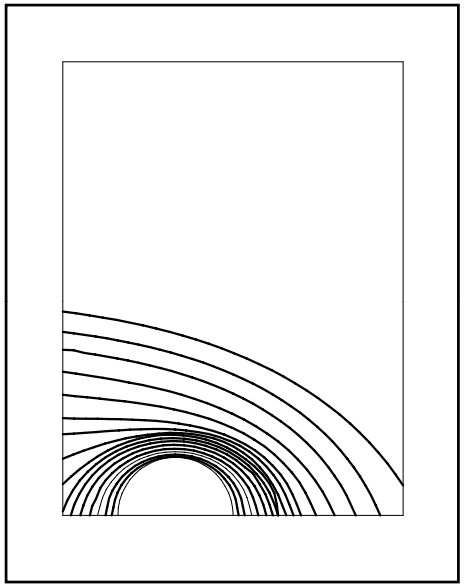
Jahan and Mehta 2 **CEE**

- Evaluate crushed recycled concrete and sewage sludge ash in HMA
- Specimen prepared in Superpave Gyratory Compactor
- Evaluation using Creep compliance, Fracture energy in MTS
- Determine PPA in modified binder.

CEE-03

Crack Shape Evolution

Riddell (Need CEE, and ME)



- Learn about fracture mechanics and fatigue
- Understand how cracks propagate
- Develop laboratory tests
- Quantify observed shapes
- Compare to models in commercial software

CEE-04

NISH National Scholar Award Competition

Riddell (Need CEE, and ME)

- Move starting concept to complete and usable (ergonomic) design
- Learn about adaptive design
- Help people with disabilities work
- Apply for $10,000 national design competition

CEE-05

Wind Power

Riddell, Everett, Bhatia, Jansson (Need CEE, ECE and ME)

- Learn to use SODAR (sonic detection and ranging) to measure wind speeds
- Raise 30 meter tall towers to collect wind data
- Compare SODAR-collected data to anemometer-collected data
- Learn about NJ's progressive energy policy

CEE-06 Wyrick

Dam Removal Modeling

- Analyze morphologic changes in Musconetcong River
- Predict changes in Mantua Creek
- Build flume & model dam removals

3 CEE

survey and construction skills appreciated

MONTCLAIR STATE UNIVERSITY

Dr. Josh Galster

SOME WEEKEND TRAVEL REQUIRED

Detention Basin Retrofits

CEE 07 Wyrick

- **Model detention basins in Mantua watershed**
- **Design retrofits for older basins**

3 CEE

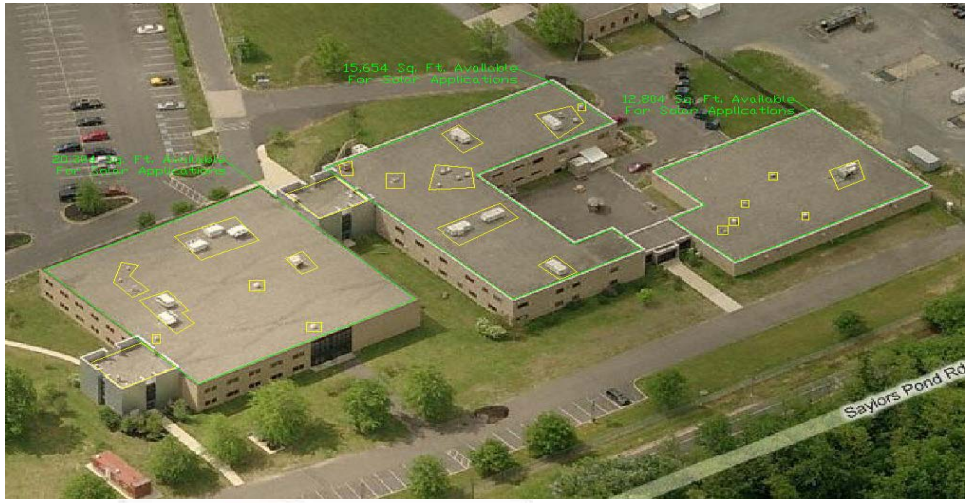
AutoCAD experience

CEE-08

Energy audits, solar and microhydro assessments

Everett, Riddell, Wyrick, Bhatia, Jansson (Need CEE and ME)

- Audit energy use in buildings and farms
  - Identify ways to conserve energy
- Evaluate sites for potential solar and micro-hydro energy production



Engineers Without Borders: El Salvador

- CEE 09
  - Profs. Everett, Wyrick & Mehta
- Bring Clean Water to La Ceiba, El Salvador & other communities
  - Save a child's life!

All Majors can apply

CEE-10

Hands on an Aquarium

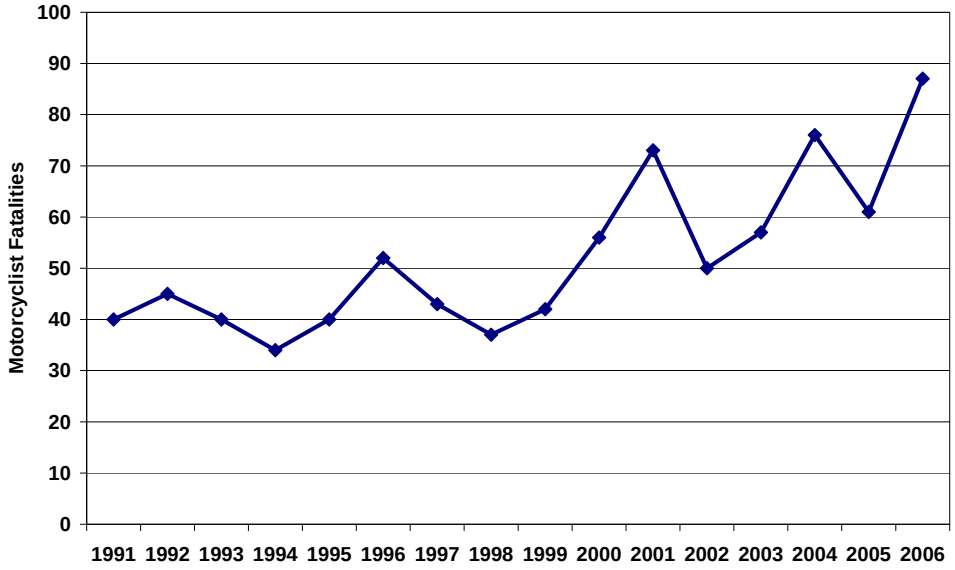
Everett, Jansen (Need all majors)

- Develop sustainability experiments
- Create ethics module
- Help Create Video-Cam website for Adventure Aquarium in Camden




CEE 11 NJ Motorcycle Fatality Rates Dr. Mehta/Dr. Gabler (Need 2 students)

- In 2006, the most recent year of statistics available, there were 87 motorcyclist fatalities in New Jersey.
- Nationally, as motorcycles become increasingly popular, motorcycle deaths have increased dramatically in the U.S
- In New Jersey, motorcyclist fatalities have more than doubled since 1991
- **The goal of this project is to develop a strategic plan for the reduction of New Jersey motorcycle accident rates in both fatal and non-fatal crashes. .**



a. Completed surveys – 40,000 10% response rate

Analysis of survey data

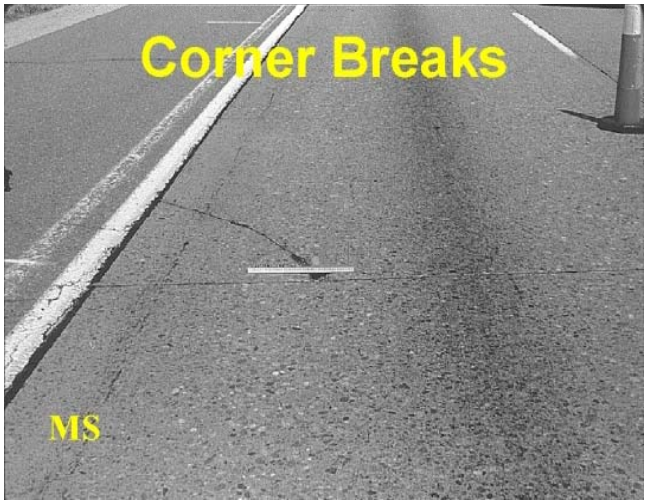
b. Field Inspection of Fatal Motorcycle Crash Sites.

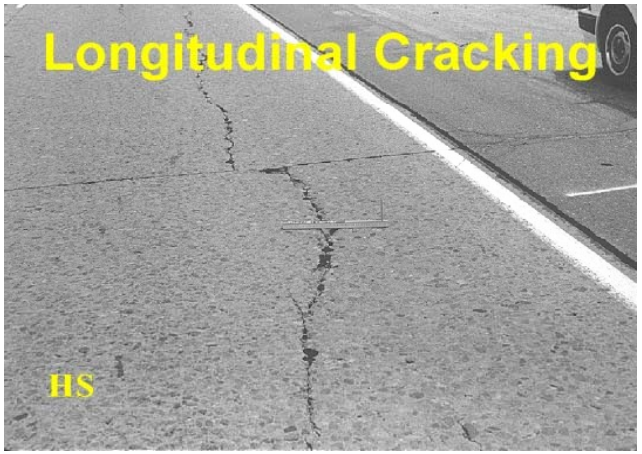
CEE – 12 An Analysis of Cracking of Concrete Pavements at the NAPTF

3-4 CEE students

Dr. Mehta, Dr. Cleary and Dr. Sukumaran

- Evaluate load transfer efficiency
- Determine the appropriate procedures to minimize negative impact of joints on PCC pavement performance
- Collect and understand the traffic, material, mechanical response and performance data from FAA.



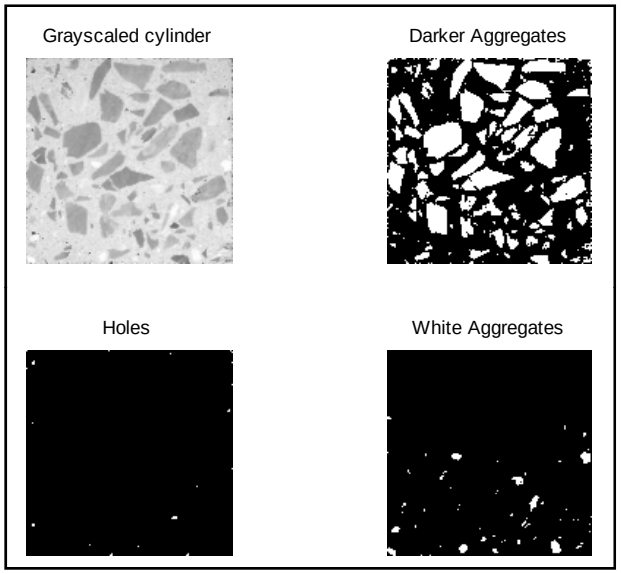


Self-Consolidating Concrete

CEE-13 Dr. Cleary

Try to break concrete instead of test equipment

- Develop and perform an experimental study in reinforced concrete
  - Literature review
  - Test program
  - Construction
  - Testing
  - Revision
  - Analysis and report of results



CEE-14 Assessment of Airport Structures

Dr. Dusseau

Current Work:

- Field measurement of building dimensions
- Development of line drawings of structures

Future Work:

- Computer modeling of airport structures
- Assessment of airport structures

CEE-15 – Transit and School Bus Safety

Dr. Dusseau

Current Work:

- Review of transit and school bus accidents
- Review of transit and school bus analyses/testing

Future Work:

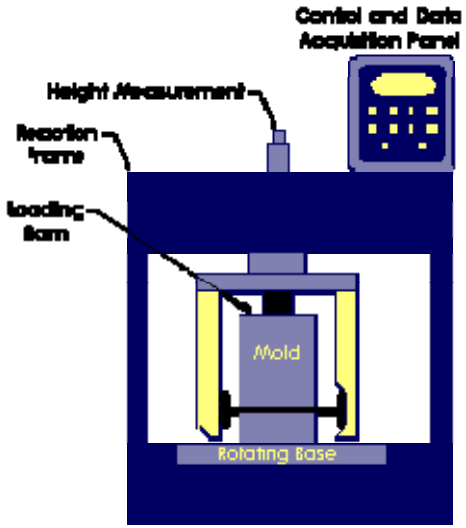
- Computer modeling of transit and school buses
- Assessment of transit and school bus safety

CEE 16 - Flexible Airport Pavement Analysis

Graduate Student: Kevin McGarvey

Dr. Sukumaran & Dr. Mehta

2-3 CEE, 1 ECE students



- Determine if the SGC can be used to predict pavement behavior during trafficking
- Understand and download data from the materials database available from the NAPTF
- Compare full-scale pavement data and gyratory data
- Understand airport pavement performance during trafficking of B-777, B-747, A-380 and other aircrafts

CEE-17 Appropriate technologies for the Developing world

Graduate Student: Kevin McGarvey

Dr. Sukumaran, Dr. Bhatia, Dr. Mehta, Dr. Everett

Need CEE, ME

- Complete manufacturing 4 grain crushers for the pilot study
- Improve the design of the grain crusher as the need arises
- Begin work on the next device, which will be a human powered soil tiller

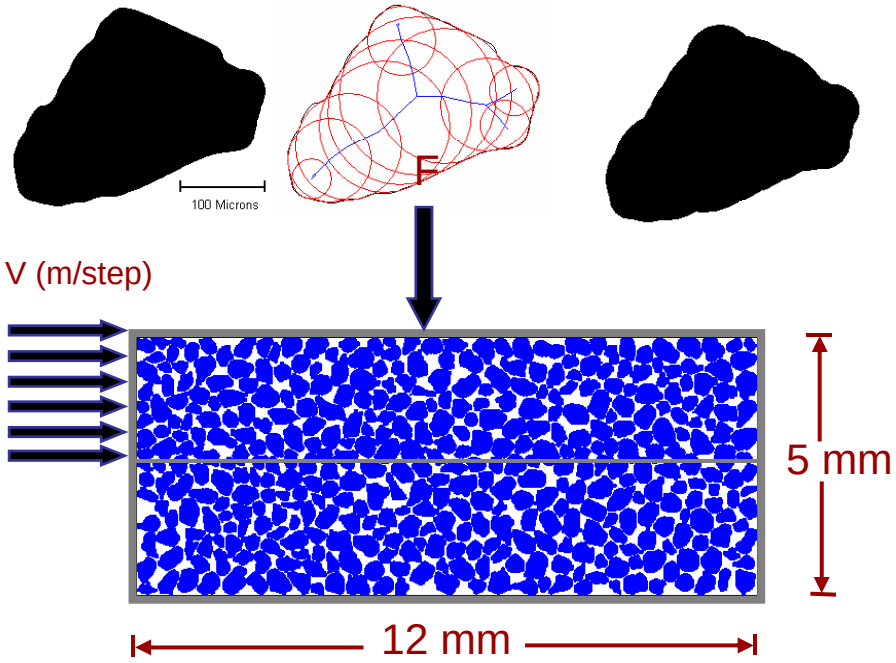
CEE-18 Discrete Element Modeling of Granular Media

Need CEE, ECE

Dr. Sukumaran and Dr. Mandayam

The goals of the project are:

- Develop familiarity with the online database of sand images from XCT and OT analysis
- Learn PFC^{3D} program
- Develop discrete element models of the various sand particles
- Run Discrete Element Model simulations of various sands



Tools to be used:

- XCT
- OT microscope
- PFC^{3D} program