

# CE 107: Introduction to Civil and Environmental Engineering

Instructor:

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# Overview

- Instructor information
- History of Civil Engineering
- Course Overview
- Course outline
- Introduction to Civil Engineering

# INSTRUCTOR AUTOBIOGRAPHY

2003	<b>BSc. Engg.</b> (Civil Engineering), BUET (Major in Environmental Engineering)
2003-' 05	Research Officer, ITN-BUET
2005	<b>MSc. Engg.</b> (Environmental Engineering), BUET
2011	<b>PhD.</b> (Environmental Engineering), Department of Civil & Environmental Engineering, Northeastern University, Massachusetts, USA
2012-2013	Assistant Professor, Department of Environmental Science and Management, North South University
Spring 2014 - present	Assistant Professor, Department of Civil Engineering, University of Asia Pacific
Research Interests	Water Quality Assessment and Control, Wastewater treatment and Management, Environment and Ecology

# History of Civil Engineering

- Pre 18<sup>th</sup> Century Civil Engineering : 4000 - 2000 BC – ancient pyramids, great walls of China
- 18<sup>th</sup> – 20<sup>th</sup> Century Engineering : Separate branch in 1819 in Norwich University – ASCE etc. Societies
- Modern Civil Engineering : Design, create and test simulations



# Course Overview

- Objective
- Course outline
- Marks distribution
- Quizzes
- Assignment
- Policies



# Course Outline

- Introduction to Civil Engineering
- Unit conversions
- Water and Environment: Man and Environment,
- Components of Environment,
- Ecosystem, Flow of Matter and Energy Through an Ecosystem,
- Biodiversity,
- Basic Population Dynamics,
- Water resources,
- River system in Bangladesh,
- Wetlands in Bangladesh
- Natural Disasters in Bangladesh
- Water Pollution,
- Urban Air Pollution, Acid Rain, Global Warming, climate change
- Renewable and Non-renewable Energy

# Introduction to Civil Engineering

- What is Civil Engineering?
- Marvels of Civil Engineering
- Branches of Civil Engineering

# What is Civil Engineering ?

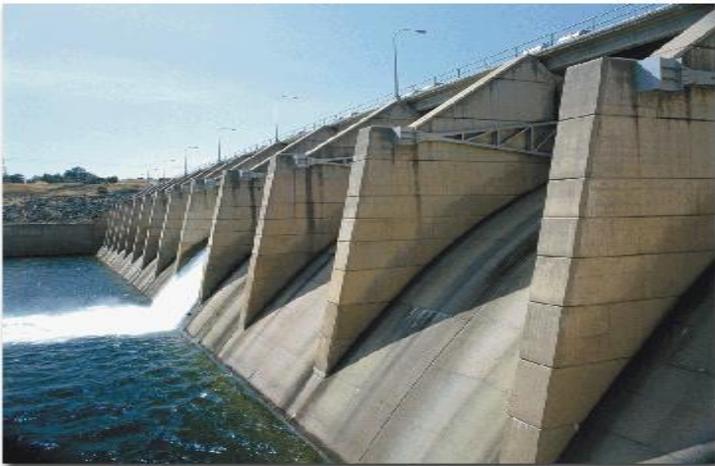
- Civil engineering is the oldest engineering.
- Civil Engineering deals with the design, construction, and maintenance of structures or public works as they are related to earth, water or in space.
- Civil Engineering is also known as the **mother of all engineering**

# Marvels of Civil Engineering

## Buildings



## Flyovers



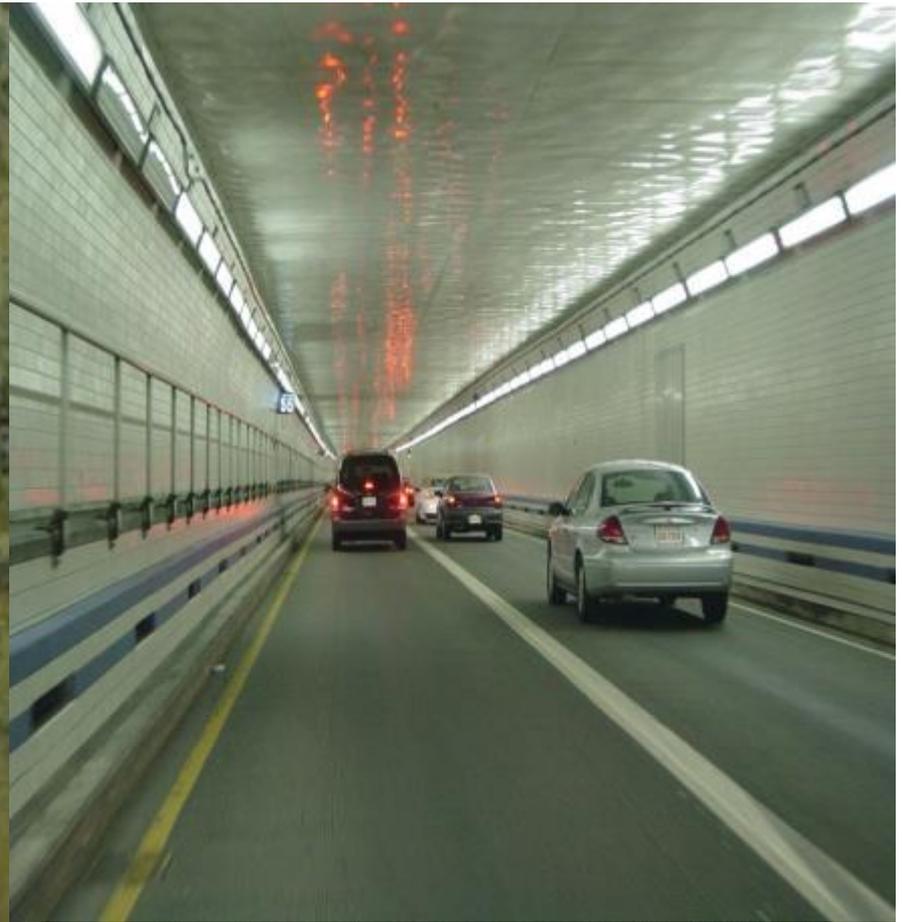
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# Marvels of Civil Engineering

Highways

and



# Marvels of Civil Engineering

## Under Water Tunnels



# Branches of Civil Engineering

- Structural Engineering
- Geotechnical Engineering
- Transportation Engineering
- Environmental Engineering
- Water Resources Engineering

# Structural Engineering

- ❖ Design of new structures
- ❖ Upgrading existing structures
- ❖ Intelligent use of new technologies and materials to control structural behavior
- ❖ Structures include buildings, bridges, offshore platforms, transmission towers, and other specialized facilities



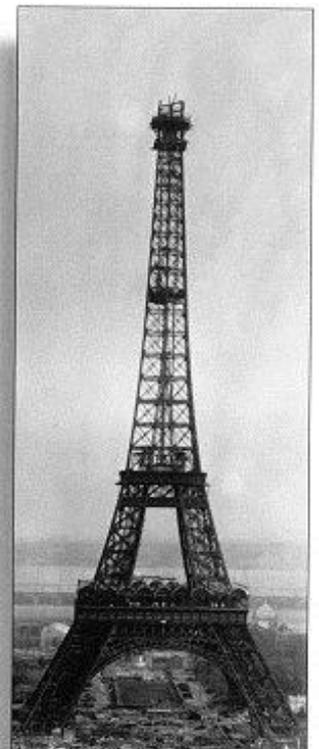
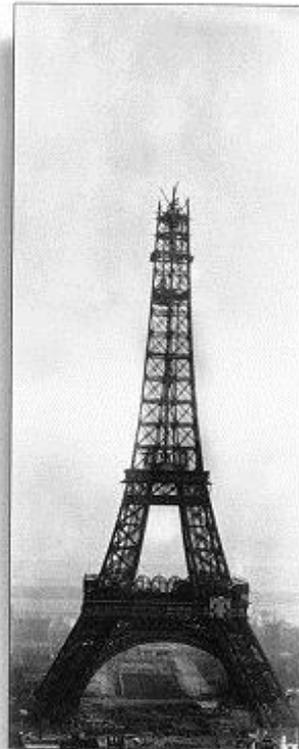
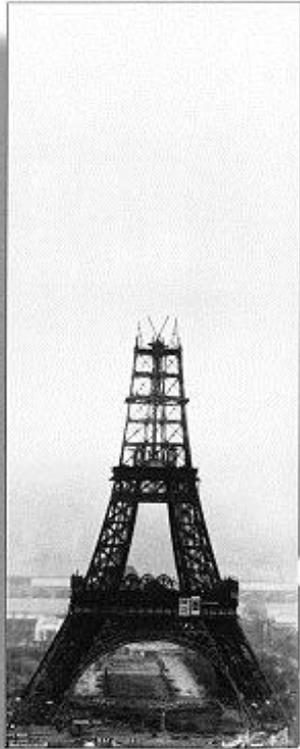
Dubai Towers  
Dubai, United Arab Emirates



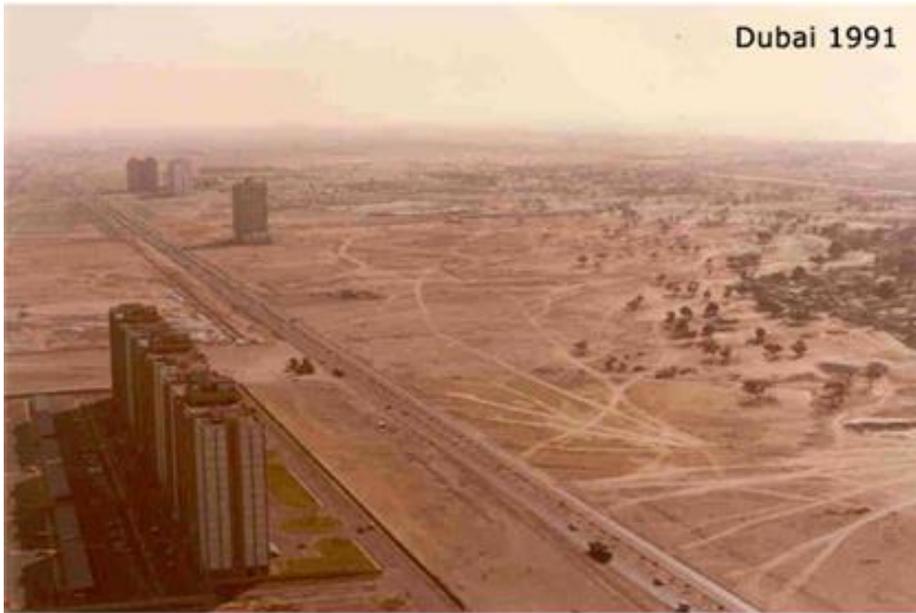
Burg al Arab  
Dubai, United Arab Emirates  
A self proclaimed 7-star hotel



Nebraska State Capital  
Lincoln, Nebraska



Eiffel Tower  
Paris, France



Dubai's expansion from  
1991 to 2005



# Geotechnical Engineering

- Geotechnical Engineering is concerned with engineering behavior of earth materials
- Geotechnical engineers:
  - Investigate existing subsurface conditions (tunnels excavations, pipelines)
  - Determine physical and chemical properties relevant to project considered
  - Assess risks posed by site conditions
  - Design earthworks and structural foundations
  - Monitor earthwork and foundation construction



## Tunnels



Photo courtesy of MWRA



## Foundations

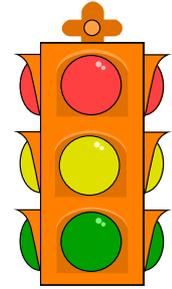


# Transportation Engineering

- ❖ Planning, Design, Operation and Maintenance of safe and efficient transportation systems
- ❖ Incorporating new technologies to improve system performance
- ❖ Intelligent Transportation Systems



## Traffic Signals and Signs



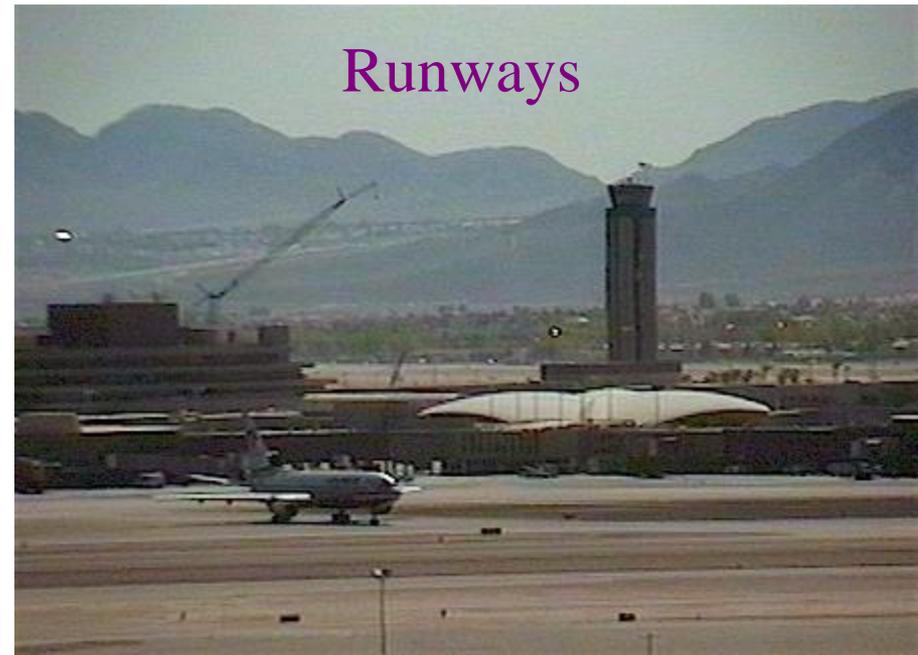
## Highways



## Train and Subway Lines



## Runways



# Environmental Engineering

- ❖ Protect & improve environmental quality
  - ❖ natural systems
  - ❖ engineered systems
- ❖ Protect human health & well-being
  - ❖ provide safe drinking water
  - ❖ waste water treatment systems
  - ❖ hazardous waste site clean-ups



## Water Treatment Plant Processes

## Underground Storage Tank Excavations



Photo courtesy of Black & Veatch



Photo courtesy of Black & Veatch

## Wastewater Treatment Plant Processes

## Pipelines



Photo courtesy of Black & Veatch



Photo courtesy of Black & Veatch

## Hazardous Waste Remediation

# Water Resources Engineering

- ❖ Physical control of water
  - ❖ public water supply
  - ❖ flood control
  - ❖ irrigation, navigation etc.
- ❖ Computer modeling of water flow
- ❖ Performance requirements for lock and dam structures



Reservoirs

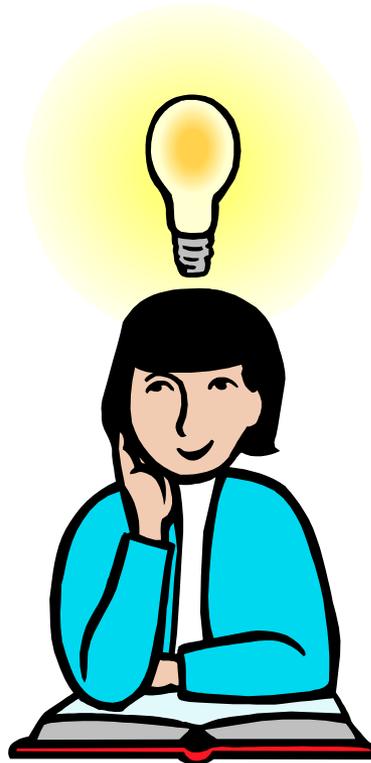
Dams



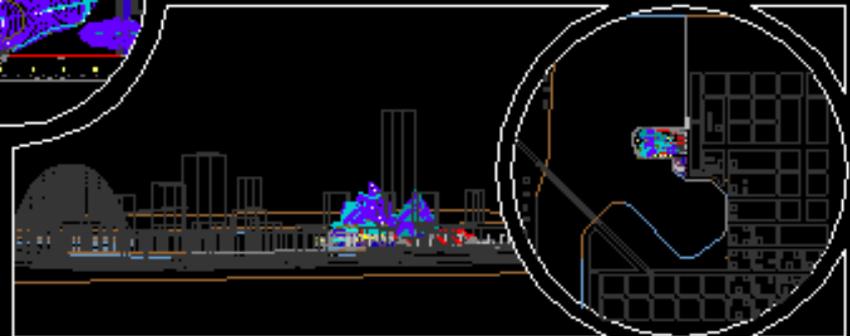
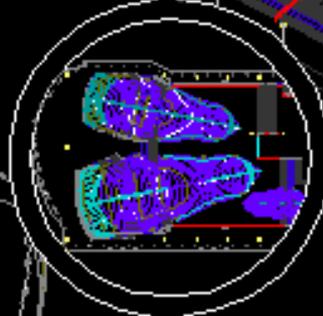
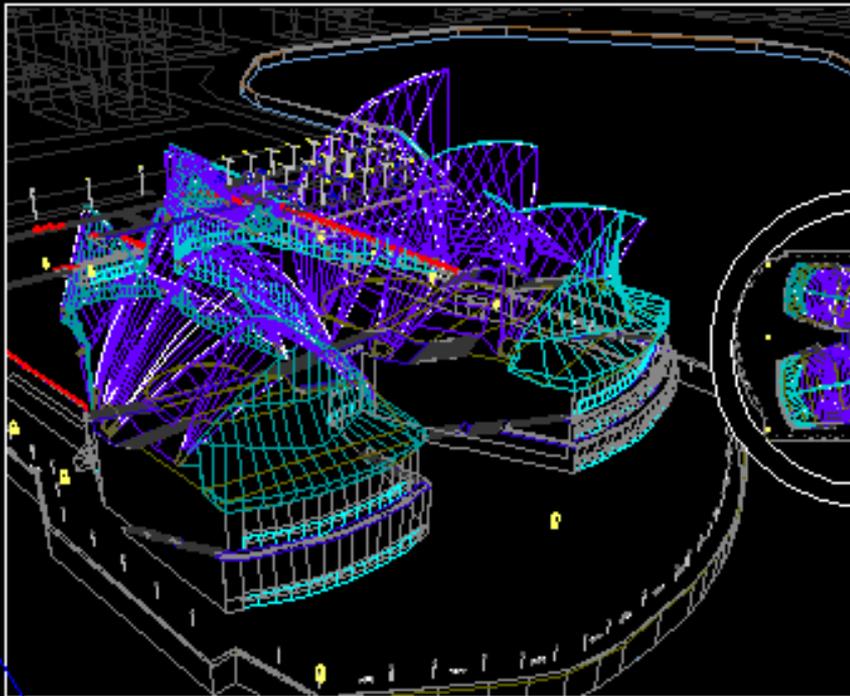
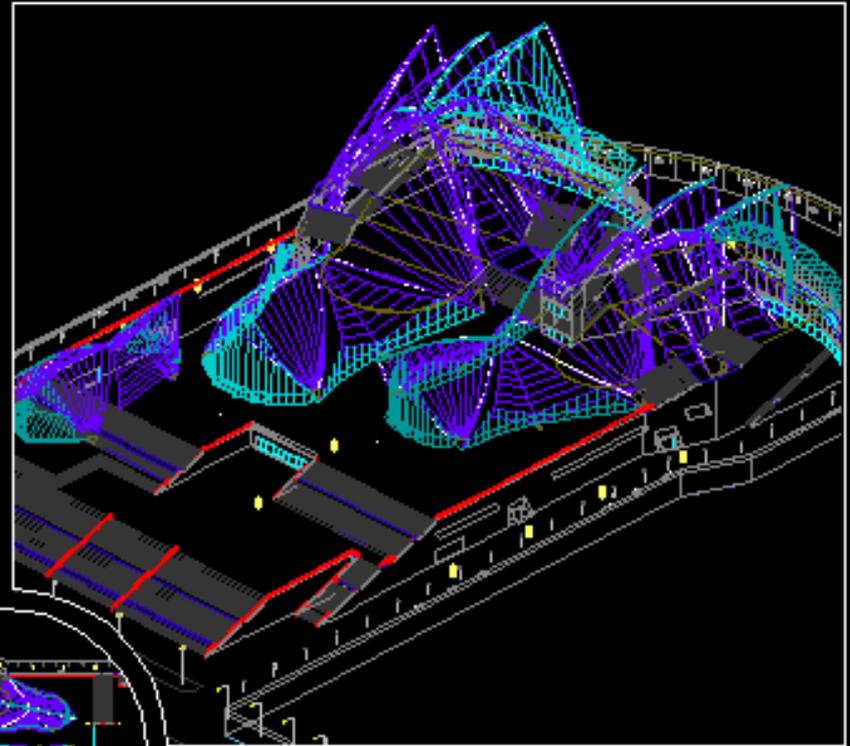
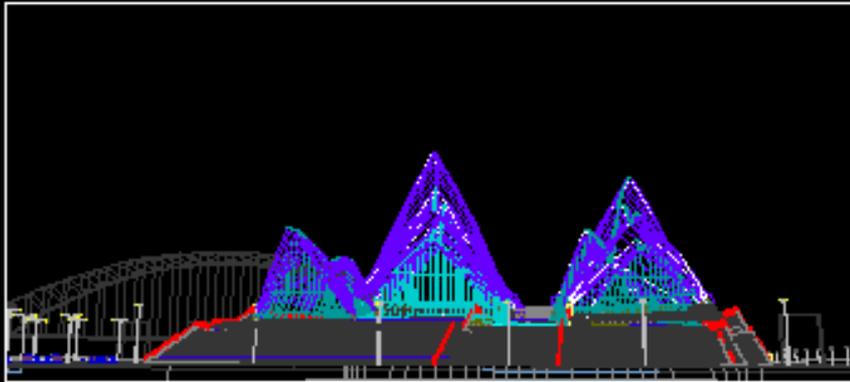
Photo courtesy of Black & Veatch

# HOW DO CIVIL ENGINEERS DESIGN THESE STRUCTURES?

- First They have an idea



Then they use computer programs to illustrate their idea...



SYDNEY OPERA HOUSE. AUSTRALIA.

*And finally the idea turns into a reality!*



# A Computer Design of a Wastewater Treatment Plant



# An Actual Wastewater Treatment Plant



# Reference

- [www.slideshare.net](http://www.slideshare.net)