CIVE 571 Pipe System Engineering and Hydraulics

Spring Semester 2009: MWF 1:00 pm, Engineering D 102

America's aging infrastructure includes vast quantities of buried capital assets in water distribution and wastewater collection systems. The course equips students for work in consulting firms, utilities, regulatory agencies, and vendors of equipment for pipe systems. The course covers design and analysis issues involved in hydraulics, water quality in pipe systems, planning, and engineering. Source material is drawn from the principles of closed conduit hydraulics, network models, water quality in closed systems, internal and external corrosion of buried pipelines, and management systems. Students in hydraulics, environmental, civil infrastructure, geotechnical, and structures may find topics of interest in the course.

Topics

- Types of pipe and their functions
- Pipe system engineering (structural, construction, jointing)
- Flow and hydraulic principles of closed conduit hydraulics
- Network models for water flow and quality
- Hydraulic machinery and controls
- Hydroelectric energy systems
- Flow perturbations: water hammer, air pockets, intrusions, cross connections, I&I
- Chemistry and biology of fluid flows: emphasis on potable water
- Corrosion of pipelines: internal and external corrosion
- Asset management systems
- Assessment of pipe condition and performance
- Maintenance, renewal and repair, in-situ and trenchless technologies
- Failure modes and diagnosis
- Emergency management
- Aging, deterioration, and tuberculation
- Economics and planning of pipe systems
- Pipe industry organization
- Case studies and policy issues

Instructor: Neil S. Grigg, Department of Civil and Environmental Engineering. Textbook material will be drawn from instructor notes and recent research reports and web-based material from the American Water Works Association Research Foundation and other pipe research organizations.