



Storm Sewer System Design, Street Hydraulics and Inlet Selection

- When:** February 5 and 6, 2009 from 8:30 a.m. to 5:00 p.m. each day
(Please arrive 15 to 30 minutes early first day to register and install software)
- Where:** Aurora Room, City of Aurora Municipal Building,
15151 E. Alameda Parkway, Aurora.
- Cost:** \$595.00 (includes class notes, and software)
- Faculty:** James C.Y. Guo, Ph.D., P.E., and Ken A. MacKenzie, P.E.
- CEU's:** You will be eligible to receive 1.6 CEU's or 16 PDH's for this course

WHY take this class?

Proper design of street drainage and storm sewer systems requires understanding of fundamental hydrology and hydraulics. This intense two-day workshop seminar will provide you with this knowledge and how to properly use computer software to help you with the analysis and design of inlets, street drainage and storm sewers. **Neo-UDSEWER** and **UD-INLET** are very practical software packages that have undergone considerable testing and debugging over the years.

Hands-on design examples will be used to size storm sewers, locate inlets along streets and size a variety of inlets under various street flow conditions with circular, rectangular, or elliptical pipes.

What Will You Learn?

You will learn how to design and analyze an urban storm drainage system consisting of street drainage, storm sewers, and inlets. You will also learn how use two spreadsheet models, UDINLET and UDSTREET, to estimate street capacities and to size different types of inlets.

To help you with the task of storm sewer system design and/or analysis, you will learn how to properly use and apply Neo-UDSEWER. This software package will help you size and analyze the hydraulic performance of storm sewers of different types and shapes. This is a very sophisticated program that helps the user analyze existing and new sewers with positive, flat, or negative slopes under flow conditions including: open channel, surcharged pipes, and pipes under pressure. You will learn how to use the software to calculate hydraulic and energy grade lines while accounting for friction losses, bend losses, hydraulic jump losses, and manhole losses.

This Course Will Cover:

- Urban drainage System - Minor and Major systems,
- Rational Method and Design Rainfall statistics,
- Introduction to **UD-STREET**, **Neo-UDSEWER** and **UD-INLET** spreadsheets,
- Street hydraulic capacity and reduction factors,
- Inlet hydraulics and clogging factors,
- Grate inlets and Curb-opening inlets on a grade and in a sump,
- Combination inlets and Slotted inlets,
- Storm sewer system design and analysis,
- Introduction to Neo-UDSEWER software,
- Model sewer system design constraints,
- Storm sewer pipe sizing,
- Storm sewer flow friction and manhole losses,

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- Hydraulic and Energy Grade Lines, and
- Excavated earth volumes.

Instructors:

Dr. James C.Y. Guo, PhD, P.E. is a professor at University of Colorado at Denver. In addition to teaching engineering hydrology and hydraulics since 1982, he is active in applied research and is a practicing engineer. Dr. Guo's research work has been referenced in number of City and County drainage manuals in United States and refereed journals and he also brings to the class cutting edge technology in street hydraulics and storm sewer design.

Ken MacKenzie, P.E. is the Manager of the Master Planning Program at Urban Drainage & Flood Control District. He is the author of the UD-INLET and UD-SREET spreadsheet models. Currently he is directing the research project on inlet capacities sponsored by the Urban Drainage and Flood Control District that is being performed by Colorado State University and has many years of experience in street drainage design and construction of such projects.

Software Installed on Your Laptop

A limited number of computers will be available in the classroom. You are encouraged to bring your own Laptop and software will be installed on your computer to take home. Indicate on the registration form if you will bring a laptop with you.

Colorado is a great place to visit in February:

This class will be held at the peak of the ski season in Colorado. If you are a skier/snowboarder or would like to learn either of these, this is the time to be in Colorado. February usually has the best combination of weather and snow conditions. However, Mother Nature can be fickle and we cannot guarantee that you will find the best conditions when you are here. Regardless, when it is not the best, it is still great.

To register, click on [Enroll Now!](#)

Class sizes are limited, so we recommend you register early.

The size of the classroom will be limited to provide more direct contact with the instructors. To assure a space, fill out the enrollment form and send it to the address on the form as early as possible. For more information, call us at 720-873-0172, or e-mail us at enrollment@urbanwatersheds.org.