Version 7 Infiltration & Inflow Features

Next-Generation Software for Storm and Sanitary Sewer Modeling

The innovative infiltration and inflow features in Hydra® software continue to be unmatched in the industry. The new version of Hydra adds new flexibility for scenario management. Hydra is a stand-alone analytical geodatabase which includes realistic modeling of infiltration and inflow based on conveyance system conditions, as well as traditional assumption-based methods. The power and flexibility of modeling features gives you the ultimate I/I analysis tool for your next system rehabilitation project. Hydra software is the first choice of I/I experts.

The Defects Database

Hydra software includes a Defects Database feature for realistic I/I modeling. Data on the condition of pipes and manholes can be used to calibrate model flow to metered flow from actual storm events. Conditions which generate each component flow (groundwater infiltration, rainfall-derived infiltration, stormwater inflow) are input into the database. There are two general approaches for creating the defects records: maintenance records or metered flows.

Starting from Maintenance Data

If you have a maintenance database or recent inspection information, you can use this data in the Hydra Defects Database. Each pipe or manhole can have none, one, or many defects records, witch each defect record representing one leak source.

Starting from Metered Flows

One defect record can be created for each flow metering location to represent all the defects in the upstream basin. Rainfall-derived or rapid infiltration can be deduced by taking metered flow hydrographs and subtracting out dry weather flow and stormwater inflow from rainfall hyetographs.
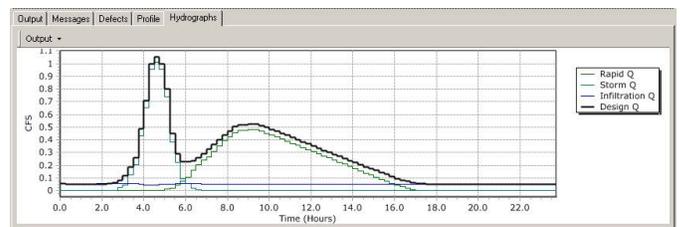
Calibrating the Defect Flows

For calibrating the model to actual rain events, you can use any number of rain gauges, or you can use radar data calibrated to meters on the ground to most realistically test against historic storms. You can purchase radar rainfall data from OneRain in a format ready for input in Hydra. Compare the modeled flow to metered flow, and adjust the relative impact of the defects until the model is calibrated. Hydra's unique ability to track each type of flow separately makes it easy to see what data needs to be adjusted to match metered flows. Temporary adjustment features help you increase or decrease factors related to flow type until the model is calibrated.

The Defects Database

Infiltration & Inflow Hydrograph

Rehabilitation Planning Scenarios

Once you have a calibrated model using the Defects Database, you can use the powerful features of Hydra software to help you determine the most effective plan to restore system capacity lost to infiltration and inflow. You can model different pipeline rehabilitation scenarios to determine the impact on overall flows. You can see how much capacity is restored for different repair criteria, including repair priority, expected repair date, effectiveness of repair. You can also create your own scenarios by grouping records for defect analysis. Try out any number of alternate designs for collection system improvements, and infiltration scenarios for different rain events. Create new scenarios quickly by copying existing scenarios and making necessary modifications.

Traditional Assumption-Based Methods

For a more traditional I/I analysis, you can also use simple assumption-based daily volume for infiltration. The volumes may be calculated from population, area, pipe-length, or pipe diameter to produce a steady flow infiltration hydrograph.