An Interview with Peter Gabor

Hydraulic Modeling: Purpose, Potential, and Pay-Off

Peter Gabor is an automation and operational technology consultant focused on modernizing water and wastewater systems through SCADA/DCS upgrades, hydraulic modeling, and real-time analytics. As Principal Consultant at OSEMTEC, he leads development of digital twin solutions like Avaris, helping utilities move from reactive operations to predictive, data-driven decision making. He brings over 20 years of experience in industrial automation, including leadership roles supporting large-scale control system deployments.

1. Rainfall-derived infiltration and inflow (RDII) is a challenge for utilities managing aging sewer systems. From your perspective, how has rainfall–flow modeling improved the industry's ability to identify and quantify where RDII is entering a collection system?

Rainfall–flow modeling has shifted RDII management from reactive guesswork to data-driven decision-making. With a calibrated hydraulic model, utilities can strategically place monitors, establish dry-weather baselines, and compare them to wet-weather conditions—where RDII assessment begins.

This enables more targeted fieldwork. Instead of relying on complaints or convenience, utilities can focus on areas where data indicates issues and determine whether lining, manhole rehab, or green infrastructure is most effective.

RDII reduction is rarely a standalone effort. Its value comes when integrated into asset management and capital planning. Platforms that continuously integrate rainfall and flow data with the hydraulic model can help so that utilities are not recalibrating from scratch each time they want to explore a possible solution.

2. Investigative programs for sewer systems can quickly become expensive if they are not well targeted. How can hydraulic modeling and data monitoring help utilities narrow investigative areas before committing to extensive field inspections?

Given budget constraints, utilities must be selective. A calibrated hydraulic model identifies underperforming sub-sewersheds and bottlenecks before crews are deployed.

Modeling should be paired with asset risk factors such as work history, PACP scores, age, materials, and soil conditions so hydraulic and structural issues are evaluated together.

Flow monitoring validates model predictions and reduces uncertainty before inspections. Combining a live model, risk-based prioritization, and targeted monitoring improves ROI and decision confidence.

3. Utilities often rely heavily on field observations when evaluating RDII. How does hydraulic modeling reveal RDII patterns or system behaviors that might not be obvious from inspections alone?

Field inspections evaluate individual pipes, but modeling reveals system-wide behavior. Used together, they provide a more complete picture.

Modeling uncovers delayed groundwater infiltration, interactions between sub-catchments, and thresholds where systems fail under certain conditions—patterns not visible through inspections alone.

It also enables "what-if" scenarios, helping utilities test repairs or green infrastructure and understand downstream impacts before investing.

4. Budget constraints are a reality for nearly every municipality. How can hydraulic modeling and targeted data help utilities prioritize where rehabilitation, maintenance, or further investigation will produce the greatest operational benefit for the system?

Utilities are managing an inverted investment portfolio—deficiencies either cost money now or will later. Prioritization is a risk management problem.

A defensible approach combines a hydraulic model, GIS, condition data, maintenance history, and asset attributes. The model informs consequence, while condition data informs likelihood, enabling risk-based prioritization over age- or complaint-driven approaches.

Keeping the analytical framework current is critical. Continuously updated models allow utilities to adapt to changing conditions and maintain a defensible strategy.

5. Many utilities now have access to more monitoring data than ever before, including rainfall, flow, and level measurements. What are some challenges with integrating these data sets into hydraulic models for producing reliable insights?

The challenge is less about data quantity and more about quality and usability. Sensor accuracy is critical—miscalibration or fouling can compromise results.

Inaccurate system geometry is another major issue. GIS records are often incomplete or outdated, making verified pipe data essential for reliable models.

Speed is also a challenge. Traditional workflows are too slow to keep up with changing conditions, and by the time insights are applied, they may be outdated.

With continuous data, utilities can move toward near real-time analysis. Combining accurate geometry with live monitoring enables dynamic models that provide a more complete view of system performance.