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RESEARCHERS HELP CITIES BETTER MANAGE SEWER SYSTEMS

Research to be Presented at Annual Geological Society of America Meeting

(9-25-06) BOSTON, Mass. – Northeastern University professor Ferdi Hellweger and PhD student Indrani Ghosh are the co-authors of a paper titled “Simulating Urban Hydrology Using Artificial Sewer Networks” that suggest a novel method for engineers and scientists to better understand how a city’s sewer systems will react to various storms. The research will be presented by Hellweger at the 118th annual meeting of the Geological Society of America, October 22-25 at the Pennsylvania Convention Center in Philadelphia. Approximately 6,200 geoscientists are expected to attend.

In the paper, Hellweger and Ghosh develop algorithms to generate artificial sewer networks that can be used for hydrologic simulations in place of the actual network. This is of particular value in older, large cities where maps, if they exist, are often difficult to decipher because of age and/or inaccuracies, making it extremely time-consuming and sometimes impossible to identify each and every pipe. Simulated networks can also be used to predict how new, not-yet-built systems where there is no actual network, would react to various scenarios. This paper presents their first model results and includes examples of a number of artificial networks developed for the highly-urbanized Faneuil Brook sub-basin in Boston.

“In a perfect world with unlimited man-power and time, each city would map out every inch of its sewer network,” said Ferdi Hellweger, Assistant Professor of Civil and Environmental Engineering and Associate Director of the Center for Urban Environmental Studies at Northeastern University. “However, when time and money are factors, artificial networks can be quite useful. We believe that the amazing technology that makes video games fun to play, can make urban hydrologic models more realistic and powerful and thus can help engineers and scientists better understand urban hydrology and manage our urban environment.”

The artificial networks were created using the Artificial Network Generator (ANGel) which uses the dendritic and space-filling “Tokunaga” fractal tree geometry. Actual and artificial networks were used as input to the SWMM model and comparisons of the various sewer networks are based on the flood hydrograph and various other parameters.

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