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Identifying the Needs for Renewal of Urban Water Infrastructure Systems: Analysis of Material, Age, Types and Areas: Case Study of Linköping in Sweden

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Abstract : Urban water infrastructure is crucial for efficient and reliable water supply in growing cities. With the growth of cities, the need for maintenance and renewal of these systems increases but often goes unfulfilled due to a variety of reasons, such as limited funding, political priorities, or lack of public awareness. Neglecting the renewal needs of these systems can lead to frequent malfunctions and reduced quality and reliability of water supply, as well as increased costs and health and environmental hazards. It is important for cities to prioritize investment in water infrastructure and develop long-term plans to address renewal needs. Drawing general conclusions about the rate of renewal of urban water infrastructure systems at an international or national level can be challenging due to the influence of local management decisions. In many countries, the responsibility for water infrastructure management lies with the municipal authorities, who are responsible for making decisions about the allocation of resources for repair, maintenance, and renewal. These decisions can vary widely based on factors such as local finances, political priorities, and public perception of the importance of water infrastructure. As a result, it is difficult to make generalizations about the rate of renewal across different countries or regions. In Sweden, the situation is not different, and the information from Svenskt Vatten indicates that the rate of renewal varies across municipalities and can be insufficient, leading to a buildup of maintenance and renewal needs. This study aims to examine the adequacy of the rate of renewal of urban water infrastructure in Linköping case city in Sweden. Using a case study framework, the study will assess the current status of the urban water system and the need for renewal. The study will also consider the role of factors such as proper identification processes, limited funding, competing for political priorities, and local management decisions in contributing to insufficient renewal. The study investigates the following questions: (1) What is the current status of water and sewerage networks in terms of length, age distribution, and material composition, estimated total water leakage in the network per year, damages, leaks, and outages occur per year, both overall and by district? (2) What are the main causes of these damages, leaks, and interruptions, and how are they related to lack of maintenance and renewal? (3) What is the current status of renewal work for the water and sewerage networks, including the renewal rate and changes over time, recent renewal material composition, and the budget allocation for renewal and emergency repairs? (4) What factors influence the need for renewal and what conditions should be considered in the assessment? The findings of the study provide insights into the challenges facing urban water infrastructure and identify strategies for improving the rate of renewal to ensure a reliable and sustainable water supply.

Keywords : case study, infrastructure, management, renewal need, Sweden
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