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Urban water supply risks assessment under tropical climate
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Abstract
The urban water supply system in tropical countries faces various physical risks, including pipe failures due to aging, material type, soil conditions, flooding, extreme weather events, and traffic loads. This study focuses on urban water supply risks for eight zones of Brunei-Muara district. A risk assessment using a data-driven matrix reveals Zones D2 and D6 as very high-risk areas, experiencing monthly average leaks of 880 and 471, respectively. These zones, characterized by low elevation and susceptibility to flooding during heavy rainfall, pose significant threats to water quality and public health due to the potential contamination of drinking water. Analysis of pipe data highlights that pipes with a diameter of 100 mm are more prone to leaks, with ductile iron pipes being particularly susceptible to failures. Brunei is actively exploring the implementation of digitalization and advanced technologies such as the application of GIS, deploying real-time water quality sensors, and real-time pressure monitoring integrated with SCADA systems to mitigate these risks. © The Author(s) 2025.

Author Keywords
Failure; Leaks; Physical risk; Pipe network; Water supply

Index Keywords
iron; aging, article, Brunei Darussalam, controlled study, digitalization, drinking water, extreme weather, flooding, geographic information system, human, rain, risk assessment, time pressure, tropic climate, water quality, water supply

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