# Article information:

Resilience Assessment of an Urban Rail Transit Network Under Short-Term Operational Disturbances | IEEE Journals & Magazine | IEEE Xplore
<https://ieeexplore.ieee.org/document/9857675>

# Article summary:

1. Short-term operational disturbances (STODs) occur frequently in urban rail transit (URT) systems and negatively affect the operational service level (OSL) of the system.

2. Resilience measures provide a way to assess a URT system's responsiveness to disturbances, and this study proposes a resilience assessment model for URT networks under STODs that considers turn-back operations, STOD occurrence times, and passenger travel experience.

3. The proposed model uses a time-dependent performance indicator called the OSL indicator to measure network performance and assesses resilience based on the ratio of the average loss of the OSL indicator under STODs. The results suggest that ensuring normal operation at transfer stations is vital for enhancing network resilience.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article "Resilience Assessment of an Urban Rail Transit Network Under Short-Term Operational Disturbances" presents a resilience assessment model for urban rail transit (URT) networks under short-term operational disturbances (STODs). The authors argue that STODs occur frequently during daily operation and negatively affect the operational service level (OSL) of URT systems. Therefore, assessing a network's ability to respond to STODs is crucial for improving its OSL.

The article provides a comprehensive review of existing literature on assessing the resilience of URT networks. However, the authors note that most studies have focused on catastrophic disturbances with long durations, while few studies have distinguished between different types of disturbances according to their duration. This study aims to address this gap by proposing a resilience assessment model that considers the impact of STODs on passenger travel experience and turn-back operations provided at stations.

The proposed model consists of three major steps: network construction, OSL indicator formulation, and resilience assessment. The authors assume that passengers select the shortest path, board the first-arriving train when the network is in normal operation, and can obtain real-time operational information for URT and bus systems. They also define STODs as operational disturbances lasting less than or equal to 30 minutes.

The article presents numerical experiments conducted on the Chengdu subway network to demonstrate the effectiveness of the proposed model. The results indicate that ensuring the normal operation of transfer stations is vital for enhancing network resilience. Additionally, turn-back operations at stations have a significant impact on network resilience.

Overall, the article provides valuable insights into assessing URT network resilience under STODs. However, some limitations should be noted. For example, the proposed model assumes that passengers always select the shortest path and board the first-arriving train when the network is in normal operation. In reality, passengers may choose alternative paths based on factors such as travel time and convenience.

Additionally, while the article acknowledges that few stations are equipped with turn-back tracks for real operation, it does not explore potential solutions to address this issue or assess their feasibility. Moreover, although sensitivity analysis is conducted to identify parameters that significantly affect network resilience, it does not consider potential trade-offs between these parameters or their interactions.

In conclusion, while there are some limitations in this study's proposed model and experimental design, it provides valuable insights into assessing URT network resilience under STODs. Future research could explore potential solutions to address issues such as limited turn-back tracks and consider trade-offs between different parameters affecting network resilience.

# Topics for further research:

* Alternative path selection in urban rail transit networks
* Turn-back track solutions for urban rail transit networks
* Passenger behavior during short-term operational disturbances in urban rail transit networks
* Trade-offs between parameters affecting urban rail transit network resilience
* Real-time operational information for urban rail transit and bus systems
* Impact of transfer station operation on urban rail transit network resilience

# Report location:

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