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Editorial

Transport

Editorial: Integrated view of the transport system

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The growth of the world population has led to an increasing need for passenger and freight mobility, crossing national borders through several means of individual and collective transport. Increasing infrastructure capacity is a general concern and must be combined with safety in order to enhance the impact of the transport network on daily life through social and economic effects.

This issue of ICE – *Transport Journal* presents several papers focused on transport systems and means of transport, offering innovative contributions relevant to the planning and growth of the mobility of people and goods. The topics addressed aim to open space for debate and provide a context for future scientific developments.

In the first paper, it is highlighted the need to integrate sustainable solutions, such as cycling, with urban public transport to facilitate alternative forms of mobility and addressing climate change concerns. Campisi *et al.* (2024) analyse the perceptions of citizens, technicians, and commuters to develop effective design strategies using the Best-Worst Method (BWM). Bases for future research on urban cycling infrastructure are established.

Infrastructure planning is inherently linked to its capacity, which impacts travel times, and efforts should be made to minimize these to consequently increase the efficiency of movements. Zagardi *et al.* (2024) implemented a genetic algorithm (GA) to improve machine learning (ML) processes applied to travel time prediction. This approach provides powerful tools that can be extrapolated to other fields of Engineering.

The third paper presents an analysis of the reliability of capacity estimate for an electronic toll, which can impact travel times. Bari *et al.* (2024) collect videographic traffic data, and Monte Carlo simulations allowed deriving capacity values at different reliability levels. The results offered a practical framework for infrastructure planning and operational improvements.

The safety of the transportation system is essential for efficient movements, fully exploiting the capacity of the infrastructure and its social and economic influence. Li and Zhang (2024) studied the impact of landscape characteristics on road safety, using multi-level grey correlation analysis to quantify different effects. The findings provide a theoretical basis for establishing roadside landscapes along secondary roads and highlight the necessity of tailored landscape settings for complex road sections.

In the fifth paper, the safety of the infrastructure was evaluated from the perspective of public transport. Zhu *et al.* (2024) address fire evacuation simulations by developing a model that integrates fire-smoke diffusion with pedestrian movement using the lattice Boltzmann method and an agent-based evacuation approach, which better reflects fire-pedestrian interactions. The study demonstrates that the movements of evacuees can disturbed smoke diffusion and that evacuees can regulate their evacuation routes based on their psychological states.

The increase in movements will require more durable infrastructures. Sukhija *et al.* (2024) examine the impact of moisture on asphalt mixtures prepared with different warm-mix asphalt (WMA) additives and aggregates, comparing these to the base asphalt binder. The results showed that WMA binders imparted similar or even higher bond strength than the base asphalt binder, regardless of the aggregate source and moisture exposure (wet or dry). This outcome open perspectives for developments focused on materials engineering.

The contributions of all the papers foster a comprehensive analysis of topics related to the transport system. Environmental concerns may dominate research trends in collective transport, requiring innovation efforts focused in infrastructure management and rolling stock. In the first case, infrastructure management tools need improvement to predict life cycles, prioritizing the maximization of material capacity and strengthening strategies with recycled or recyclable materials. Nevertheless, these efforts should be combined with innovative rolling stock design, which should be studied to produce more durable and energy-efficient vehicles.

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