

# Study the Factors Causing the Sound Pollution from High-Speed Railways in Urban Areas

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## Introduction

The impact of noise pollution on surrounding communities becomes more pronounced as the speed of trains continues to increase. It is crucial to re-research the various factors that influence sound pollution to develop effective mitigation strategies. Addressing this issue is vital for the sustainable development of railway transport, ensuring that advancements in speed and efficiency do not come at the cost of public health and comfort.

## Background

- High-Speed Ground Transportation Noise and Vibration Impact Assessment was developed by FRA.
- Models for noise assessment in different conditions were created using the FRA guideline.

## Methodology

Modeling based on the FRA methodology and multi-body simulation methods.



Figure 1. Multi-body model of high-speed train (TGV)

## Analysis and Results

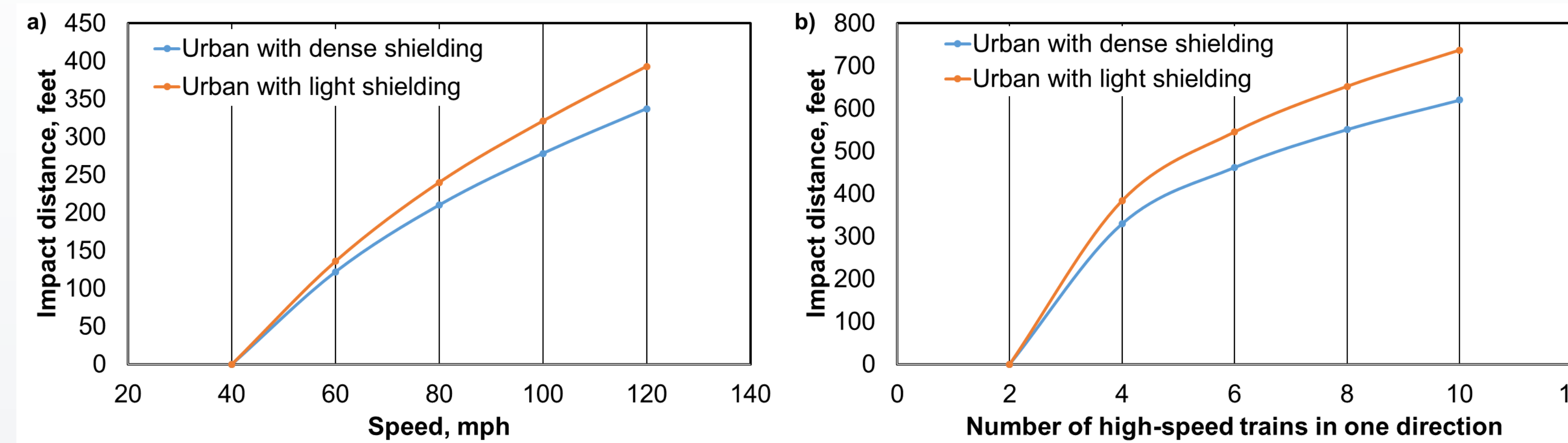


Figure 2. Impact of speed (a) and number of high-speed trains in one direction (b) on distance of sound from high-speed trains

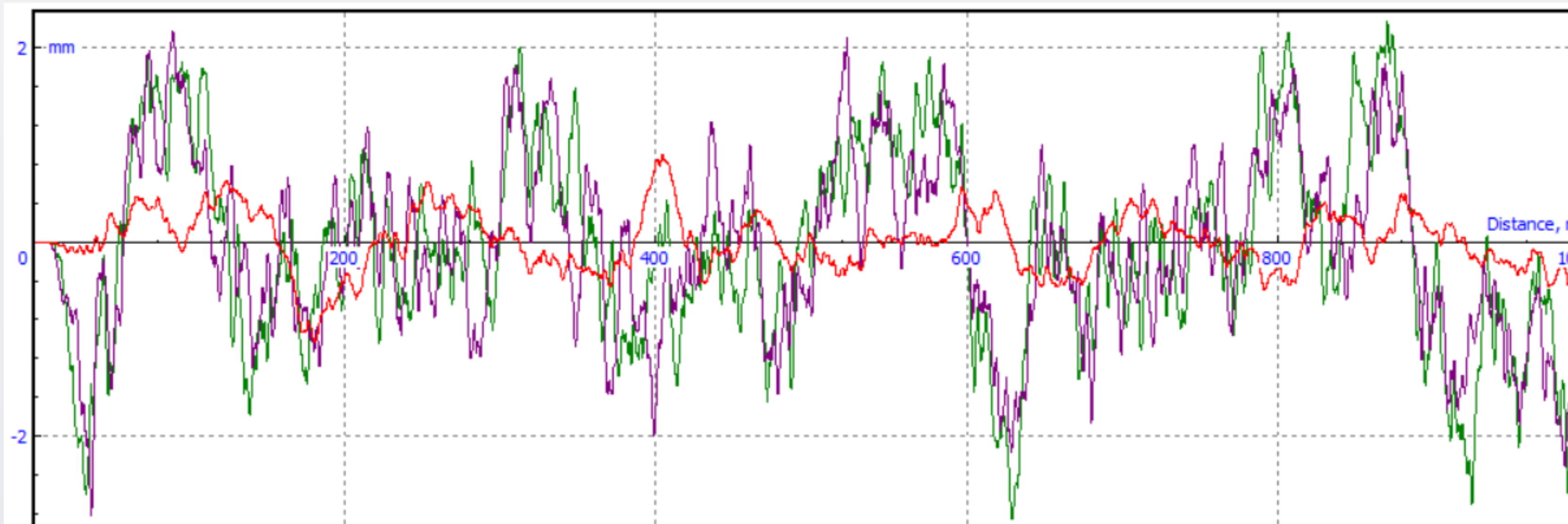


Figure 3. Track irregularities

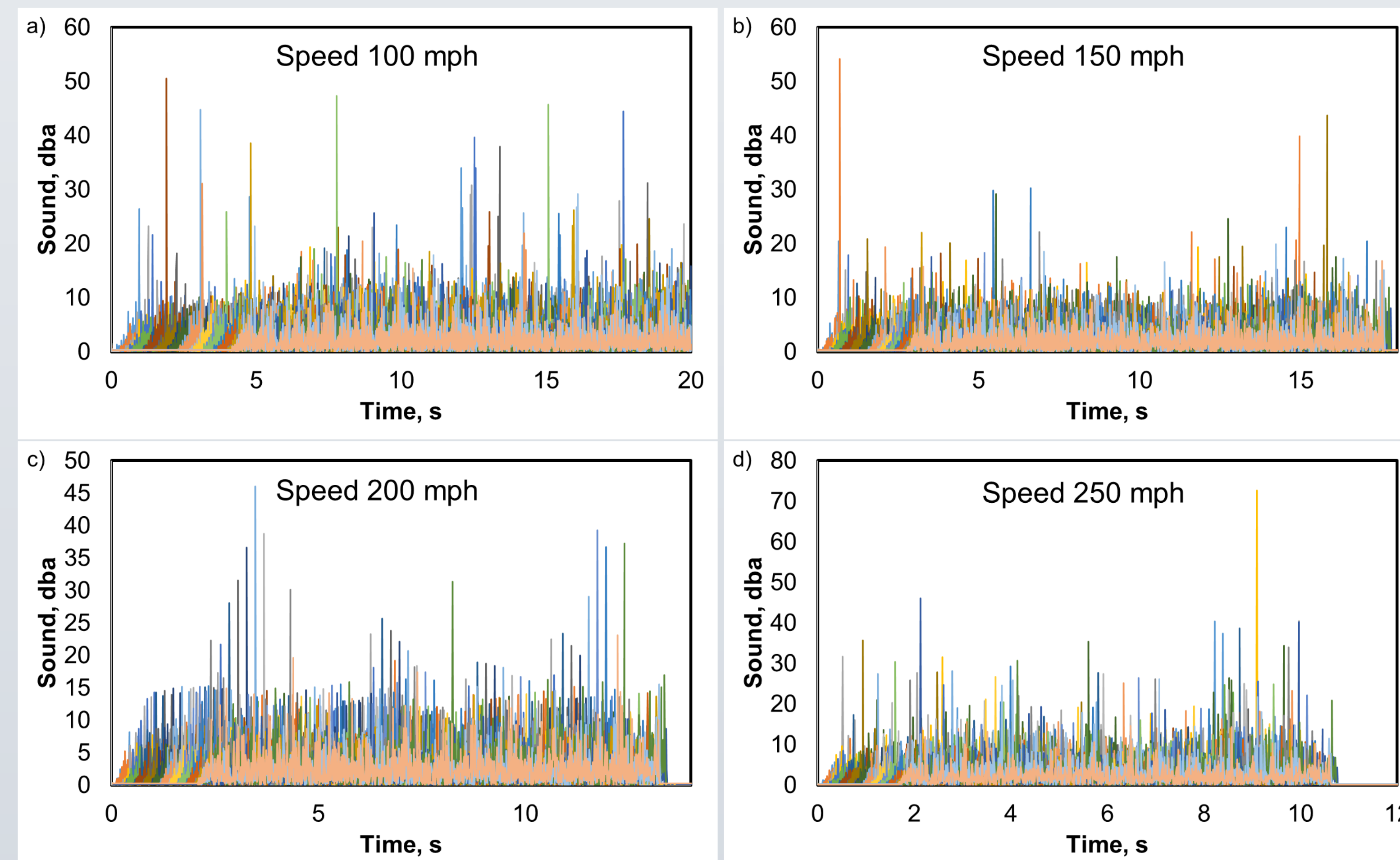


Figure 4. Influence of track irregularities on sound from a high-speed train

## Discussion

- Impact of noise from high-speed trains become significant after a speed of 60 mph;
- Growth of the train quantity influences the noise impact distance from high-speed trains more than increasing the speed;
- A sound level from high-speed trains in urban areas adds 60-70 dba to the overall sound pollution;
- Existing models do not consider the influence of track irregularities and different wheel defects on railway sound pollution;
- A sound level from operating high-speed train on track irregularities adds 50-70 dba to the overall sound pollution.

## Future Research

