

Improving Railway Platform Safety via Awareness Campaign

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Abstract To address the challenges of managing crowded platforms during peak hours at Swiss railway stations, we implemented a sensitization campaign to enhance passenger safety, using Sursee Station as a case study. The campaign employed auditory announcements and visual posters to raise awareness about train passage risks. Results showed that auditory announcements were more effective, with 40% of passengers reporting increased awareness and behavioural adjustments. Future research will focus on the long-term impact and the potential for periodic reinforcement to sustain safety improvements.

Keywords railway station, platform safety, pedestrian tracking, real-life observation

Introduction and Background

At Swiss railway stations, no physical barrier exists between the danger zone at the platform edge and the safety zone in the middle of the platform. Therefore, the platform design and the behaviour of the users must ensure the passenger safety, also during peak hours and while considering the expected increase in passenger demand. One common approach to accommodate more passengers involves platform expansions. However, such expansions are costly, spatially constrained, and can take several years to implement. Consequently, there is a need for alternative solutions that can be deployed swiftly while still providing significant benefits to passengers. One crucial aspect of these alternatives is the ability to influence passenger behaviour to enhance safety and efficiency on the platforms [1].

Sursee Station, located in Central Switzerland, is a medium-sized station featuring an island platform and a side platform. The island platform (2/3) is relatively narrow and is already highly utilized during peak hours. Additionally, two trains frequently stop on the same track (track 2) simultaneously. Specifically, the S-Bahn from Lucerne stops at the far end of the platform, necessitating that all disembarking passengers walk at least 100 meters to the nearest exit (see Figure 1). During this circulation period, an intercity train passes through on track 3. The direction of travel obscures the approaching train from the passengers' view, leading to recurrent hazardous situations. Passengers tend to walk close to the platform edge and are often startled by the approaching train. Although no accidents have occurred to date, this scenario poses a significant risk that needs to be addressed.

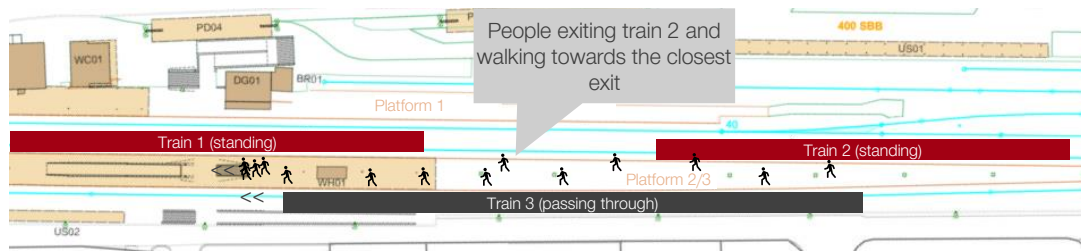


Figure 1: Station layout and the train positions during the alighting process from train 2

Method

Given that a platform expansion is not feasible in the near term for Sursee Station, alternative approaches were explored. We implemented a sensitization campaign, aimed at increasing passengers' awareness of the risks associated with train passages and encouraging them to remain within the designated safety lines, thereby avoiding the danger zone. The campaign disseminated this information through both auditory

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announcements in the incoming train and visual posters displayed at the station. Both messages were kept short so that they can be quickly grasped.

Conducted over a two-week period in the spring of 2024, the campaign's efficacy was evaluated using a multi-method approach. Surveys were distributed at the station before, during, and after the campaign. The survey was done by distributing leaflets with a QR-code and a small chocolate as an incentive. Passenger movements on the platform were recorded and analysed using a sensor, which records anonymous tracking data as well as the nearby train movement.

Results and Discussion

For the survey, 3000 leaflets were distributed which resulted in an overall return rate of 22%. The participants showed a good distribution concerning age, gender and frequency of the station usage. The results revealed that visual posters were largely ineffective; only approximately 25% of passengers noticed and read the posters, and a mere 8% reported that the posters influenced their behavior (see Figure 2). Conversely, auditory announcements proved more effective: nearly 40% of passengers indicated that the announcements heightened their awareness of train passages and prompted them to adjust their behaviour accordingly. Analyses to determine whether age and/or gender had an impact on the results were also conducted. The older the passengers were, the more they listened to the announcements (under 18 years: 31%, over 60 years: 68%). Gender did not show a significant difference in response to the announcements, but men noticed the posters significantly more often than women (29% compared to 12%). The survey conducted after the campaign showed a slight reduction in the percentage of people who reported a change in behaviour. Therefore, the long-term effectiveness is not necessarily guaranteed and requires further consideration.

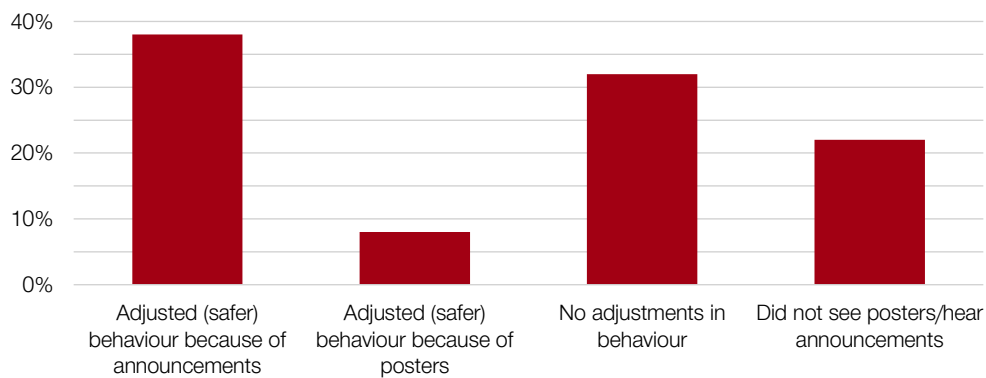


Figure 2: Self declared impact of the campaign on the customers

Sensor data corroborated these findings, showing a consistent decline in the number of individuals in the danger zone during the campaign and in comparison to the initial measurements before. Initially, an average of 5% of passengers were outside the white safety lines during the described situation in the morning. After the campaign, this number decreased to 3.1%. In the evening, a reduction was also measurable, although slightly less pronounced than in the morning. Future research will focus on assessing the long-term impact of the campaign by distributing follow-up surveys at the station. It is hypothesized that the campaign's effect may diminish over time. Therefore, periodic reinforcement of the campaign and announcements throughout the year is being considered. A permanent implementation is avoided due to the anticipated habituation effect.

The findings highlight the potential of auditory announcements as a cost-effective and immediate measure to enhance passenger safety on overcrowded platforms. Further studies are warranted to explore additional behavioral interventions and their long-term efficacy in various station environments.

Bibliography

- [1] Schneider, A., Krueger, E., Vollenwyder, B., Thureau, J., Elfering, A., *Understanding the relations between crowd density, safety perception and risk-taking behavior on train station platforms: A case study from Switzerland*, Transportation Research Interdisciplinary Perspectives **10**, 100390, 2021.