Section Sciences et Ingénierie de l'environnement
Design Project 2024 (semestre de printemps)

Proposition n°3

Quantify the effect of the Corona Virus Public Transportation Measure 'All Doors Open'

Partenaire externe ou laboratoire IIE
Geoffrey Klein
geoffrey.klein@vbz.ch Téléphone +41 79 310 5514
VBZ Verkehrsbetriebe Zürich
Taille de l'entreprise (nbre de collaborateurs) : ca. 2700
Luggwegstrasse 65, 8048 Zürich
https://www.stadt-zuerich.ch/vbz

Encadrant EPFL
Prof. Tamar Kohn
EPFL ENAC IIE LCE
GR A0 402 – Station 2
1015 Lausanne
Email : tamar.kohn@epfl.ch
Tél : 021 693 08 91

Descriptif du projet

During two years, from March 2020 to March 2022, Swiss public transportation operators implemented a policy to automatically open all doors at every stop (as opposed to opening only on demand). The reasoning behind this intervention was to maximize the exchange of indoor and outdoor air and thereby achieve a reduction in the concentration of any airborne viruses present in the tram. However, it is not clear to what extent this "All Doors Open" Intervention affects aerosol and virus counts.

Objectif et buts

The goal of this project is to assess the utiliy of the "All Doors Open" for trams, and - if needed - to suggest alternative measures to reduce airborne particles in trams.
Specific students will compare the aerosol concentrations and dynamics in trams operating with the "All Doors Open" Corona Intervention vs. the standard "open on demand" policy.
The main questions to address are:
- Does the "all open" door policy effectively reduce particle concentrations in tram air compared to the standard "open on demand" policy?
- Does the "all open" door policy affect CO_2 concentrations in tram air?
- Under which conditions does the "All Doors Open" improve air quality (full/empty, city center/periphery etc…)

- How should we weight the potential benefits (for health) vs. detriments (for energy use) of the “all open” policy?

Descriptif tâches

The work involves measurement campaigns in collaboration with VBZ, the Zurich City Public Transportation Operator, as well as data analysis and literature review. Measurement campaigns will target aerosol particles, CO2, temperature and relative humidity.

Parameters:
Location: Zürich, Switzerland
Vehicles: VBZ Cobra Tram - two vehicles can be used for measurements on two days (more if necessary). Vehicles will be indentified which operate on the same route one behind the other. The drivers in one vehicle will be requested to support (by opening the doors as they did during the Corona Intervention).

Divers
This project will be conducted under the supervision of Profs. Tamar Kohn and Dusan Licina (EPFL) and Mr. Geoff Klein (VBZ).