BRAKE DUST

AeroSolfd
filtration devices

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REDUCING BRAKE EMISSIONS AT THE SOURCE

Brake dust is considered particularly toxic. Not only vehicles but also buses, trams, and trains emit large amounts of emissions from brakes, tires, and rail-wheel contact. Therefore, an existing and proven passive brake dust particle filter (BDPF) concept developed by MANN+HUMMEL for passenger vehicles will be modified for bus and commercial vehicle brake applications. This solution, which is specially designed for long-lived public road transport assets like buses, will reduce brake emissions and capture brake dust at the source.

BACKGROUND & OBJECTIVES

For passenger cars, MANN+HUMMEL has developed brake dust particle filter technology over the past decades. A passive filter concept and samples have been tested in the lab and in real driving conditions. The advantage of the passive filter concept is the retrofit option. In AeroSolfd the passenger car concept is adapted to commercial bus/truck brakes. First concepts already existed (Fig. 1) in TRL 4 to start with.

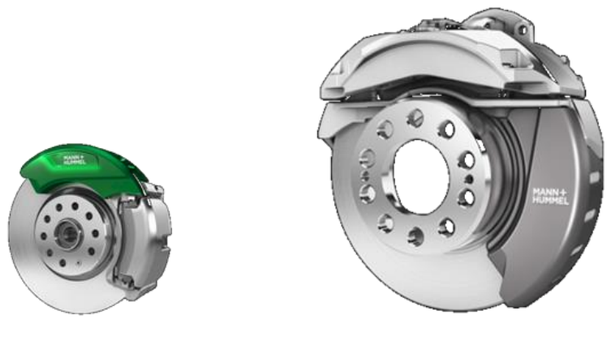

Figure 1 Passive brake dust particle filter concepts for (left) passenger cars and (right) bus/truck application

METHODOLOGY

Brake emissions strongly depend on the driving/braking cycle. The focus of the AeroSolfd project is on achieving cleaner urban air. Braking can be different in cities and depends on the local conditions. Therefore, in AeroSolfd a method will be developed to obtain the brake emissions typical for a city and not to develop a general brake cycle.

PRELIMINARY RESULTS

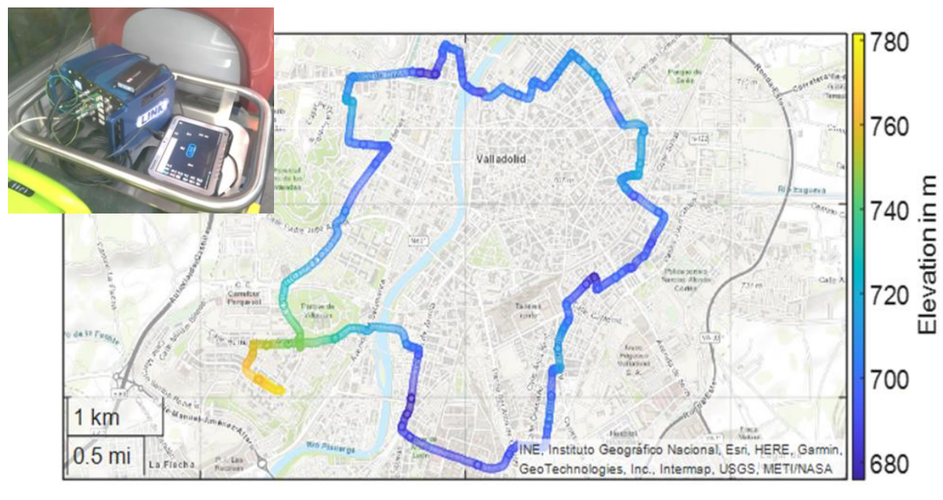

Figure 2 Example of a representative inner city bus route selected for Valladolid, ES and (upper left corner) measurement equipment installed in a bus

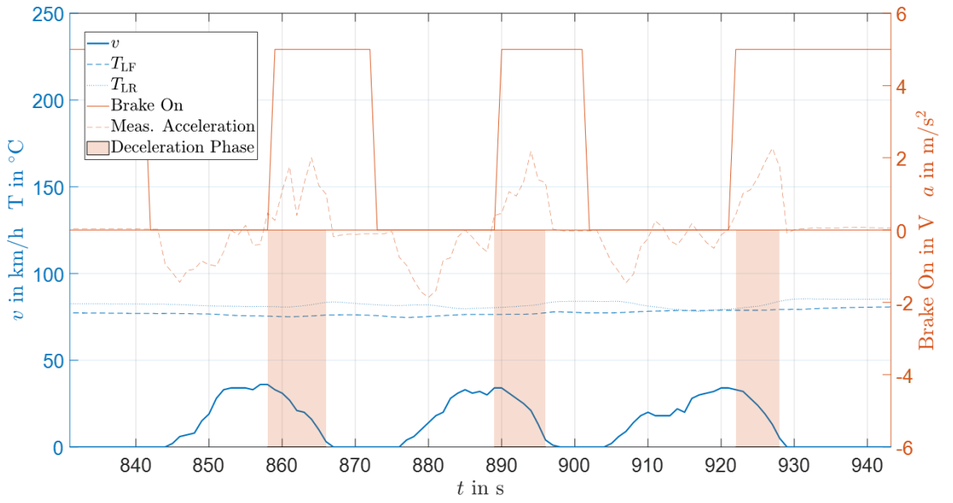

Figure 3 Example of brake events measured for a bus in Valladolid, ES

CONCLUSIONS

The first step of obtaining the brake pattern of inner-city busses operated by our partners is ongoing. Starting in Valladolid, bus traffic has been analyzed and representative bus routes have been selected (Fig 2). A LINK® V-Max has been installed on the busses to track the braking events. In addition, a temperature was mounted near the brake to obtain temperature data for later setting the cooling air flow when testing on a dynamometer. The brake events have been measured (Fig. 3).

In the next step, the data will be condensed to a brake cycle typical for Valladolid. Similar kinds of measurements have been done already at Ancona, Italy. With the same method as developed for Valladolid, a brake cycle typical for Ancona will be derived. Brake emissions measurements on a dynamometer will follow to obtain the baseline of emissions at the source.

LITERATURE:

AeroSolfd – Developing retrofit filtration devices for cleaner urban mobility: A project overview; M.J. Lehmann et al. FILTECH Proceedings 2023, FILTECH 2023, Cologne // Filtration Devices for Cleaner Urban Air – An Overview of the EU Project AeroSolfd; M.J. Lehmann et al.; AFS FiltCon 2023, Proceedings, Louisville, KY

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