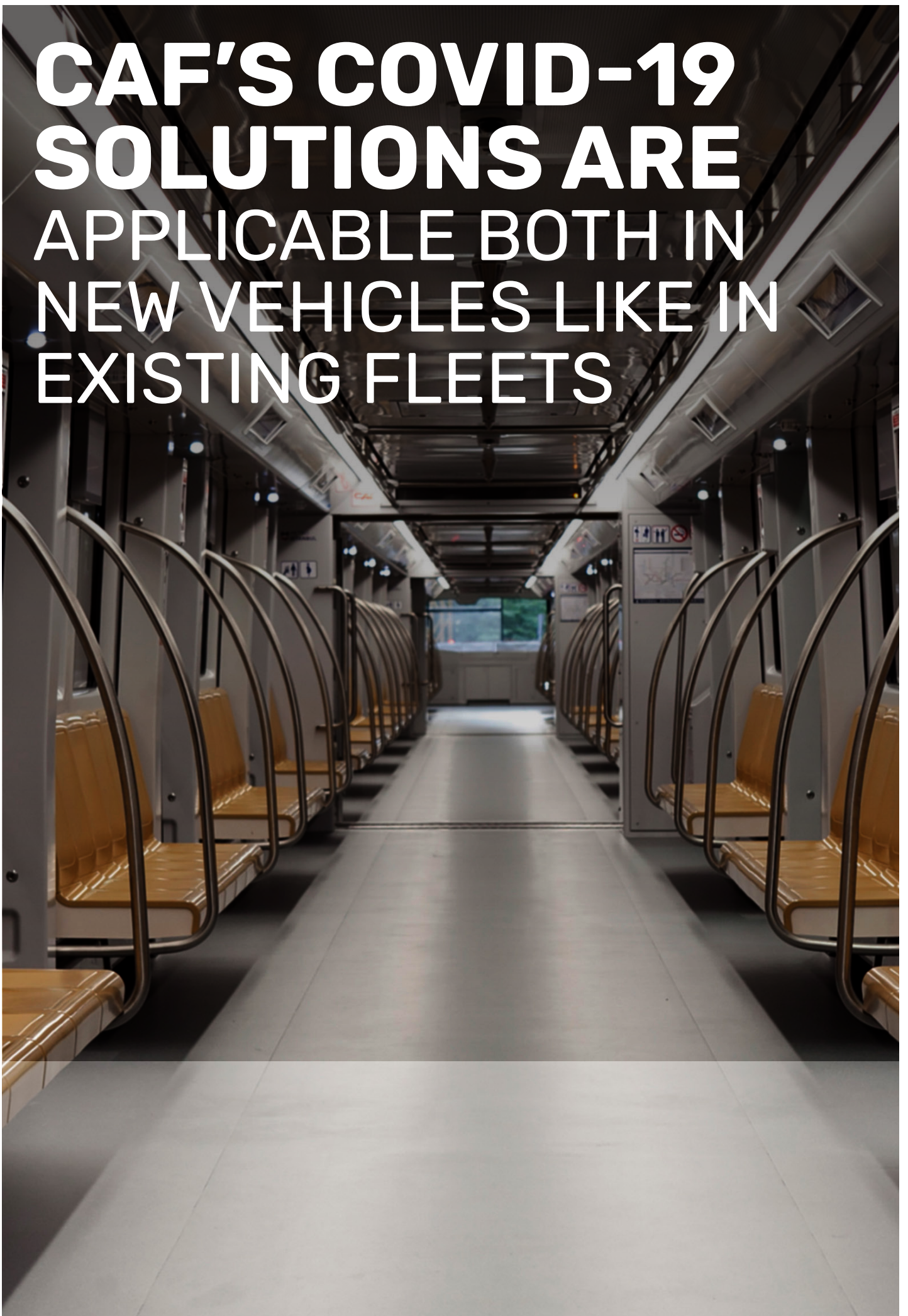




COVID-19 **SOLUTIONS**

SAFETY for passengers and operators

**CAF'S COVID-19
SOLUTIONS ARE
APPLICABLE BOTH IN
NEW VEHICLES LIKE IN
EXISTING FLEETS**



The Coronavirus pandemic demands that transport authorities take urgent measures to guarantee passenger safety on their public transport systems.

CAF, boasting years of experience in the design and supply of sustainable mobility systems, offers its customers a wide range of solutions to address this and similar possible circumstances.



SURFACE TREATMENTS

As well as the cleaning procedures carried out on trains, using antimicrobial coatings on passenger and driver contact surfaces reduces contagion risks at “hot spots”. These hot spots refer to potentially contagious surfaces due to cross-contamination from repeated contact with passengers during operation.

These coatings can inactivate viruses and bacteria through physical (electrostatic discharge) rather than chemical means, rendering them completely safe for passengers and drivers.

CENTRALISED DOOR OPENING

To prevent a risk of contagion from coming into contact with opening buttons, CAF trains are equipped with a centralised door opening function.

DISTRIBUTION OF SPACES

CAF offers space redistribution solutions to avoid contact between passengers and to help create “aerodynamic zones” that prevent pathogens from being dispersed in the air.

Airflow research addresses the type of operation, the position of doors and how often they are opened and closed, as well as the locations of forced extraction and fresh air intake points into the saloon via the ventilation system.

It is recommended that signage be fitted to inform users of regulations on safety, health and distribution inside the train.

FRESH AIR MAXIMISATION

Another way of curbing the spread of the virus is to maximise the use of fresh air inside the train. In this case, this serves to minimise the use of recirculated air in passenger saloons.

To this end, “Healthy mode” operation is recommended, maximising fresh air intake to reduce the risk of contagion.

This solution is supplemented with a CO2 measurement and monitoring system, which allows for the fresh air intake levels to be adjusted in each case, or in an equivalent method, by measuring passenger loads.



PURIFICATION SYSTEMS

Purification systems are the best alternative to optimize climate comfort and energy efficiency during the life of the vehicle while avoiding air transmission.

CAF offers the possibility of including air purifiers that allow to minimize the risk of airborne contagion without reducing comfort conditions or the level of energy efficiency.

To this end, tests have been carried out successfully in real vehicles and in laboratories with different purification technologies, selecting the most effective one. The chosen system has an aggregating effect on the particles.

AIR-CONDITIONING AND VENTILATION SYSTEMS INSPECTION

Performing a general overhaul on the air conditioning systems before the train is commissioned is also recommended. This includes cleaning grilles, diffusers, filters, etc.

For ventilation systems, it is recommended that said systems be started up before commissioning so as to provide sufficient indoor air renewal.

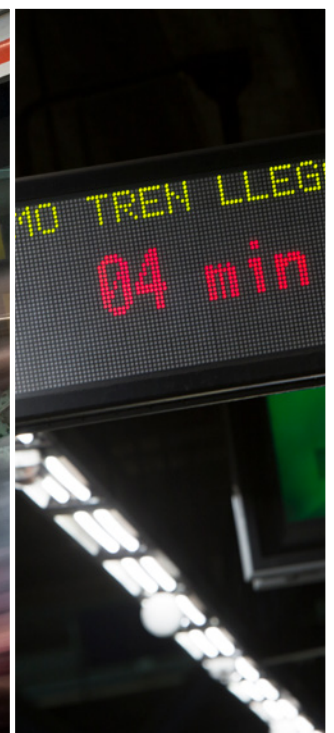


PROTECTIVE MEASURES COMPLIANCE AND OCCUPANCY CHECK

CAF also offers solutions that allow drivers to control occupancy using the information available on the vehicle, such as weight sensors, the passenger counting system or CCTV cameras.

Train occupancy can be measured in real time using these systems. This information is sent directly to the Operations Control Centre or the operator's website using the QR codes, which the user can consult at the stations.

This system can be further supported with other thermal imaging and artificial vision solutions using CCTV cameras, which can detect non-compliances relating to factors such as mask wearing, seat occupancy and body temperature.



CAF'S DIGITAL PLATFORM FOR REAL-TIME PASSENGER CONTROL



LeadMind, CAF's digital train platform, offers a range of features to address the demands of the current scenario.

Real-time data monitoring provides control over the different train operation parameters. The capacity to integrate this information on the each operator's systems (passenger information systems, mobile apps, etc.) allows both the driver and passengers to receive information relating to the occupancy of the various cars on the train.

This occupancy information can also be sent to the Operational Control Centre to identify the stations or time frames with the highest demand to organise service frequency. By doing so, the risk of contagion is reduced whilst maintaining optimal passenger services.





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