



THE BUS SERVICES AFTER CORONAVIRUS

CREDITS:

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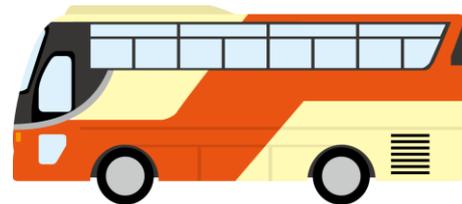
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Problem
identification



Literature review



User study



Opportunity areas



Solutions

ABSTRACT:

Public transport systems such as buses could be a high-risk environment for COVID 19 transmission due to the high number of people in a confined space, limited access control to identify potentially sick persons, and most importantly a number of common surface touch points such as tickets, money, handrails and door knobs. Since public transport is a vital service in any society and service continuity is important, a redesign of the bus service system in India is required, taking into consideration all the necessary precautions against the spread of the virus while also keeping it economically viable.

65.8



RURAL

Buses remain the main mode of 65.8% of India's rural households

62.3



URBAN

In urban India too, 62.35% of households primarily depend on buses



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AIM:

To find economically viable solutions to instill the precautionary measures against COVID 19 in public bus service systems either through awareness programs or design interventions.

OBJECTIVES:

01

To find out the causes of corona spread in the buses and at the terminals.

02

To make commuters realise the impacts of not following precautionary measures while using public transport like buses.

03

To come up with design interventions to minimize the spread of the virus in the busses and at the bus terminals.

- Problem identification
- Literature review
- User study
- Opportunity areas
- Solutions



Use of Hepa filters

Release of high-grade disinfectant through fogging

Repeated Sanitization of High-touch points

Providing Sanitizing wipes

Steps Taken World-wide

Compulsion on Masks

Disinfection Robots

Alternate Seating

Proper Queuing

Staff provided with Vitamin-C

Pre-reservations

Ozone Cleaning

Retrofit window-went to increase natural ventilation

Regular Sanitization at Stops

Germicidal chlorine sanitizer for sanitization

Contactless Ticketing

STAKEHOLDERS

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STUDENTS AND EMPLOYEES

AGE GROUP: 19-35 years (85.3%) ; 35-65 years (8.8%)

LITERACY LEVEL: literate

NO. OF PARTICIPANTS: 34

SURVEY METHOD: Online survey using google forms

MAIDS AND SECURITY GUARDS

AGE GROUP: 25 - 58

LITERACY LEVEL: illiterate to semi literate

NO. OF PARTICIPANTS: 9

SURVEY METHOD: semi structured interview



BUS DRIVERS AND CONDUCTORS

AGE GROUP: 25-54 years

LITERACY LEVEL: illiterate to semi literate

NO. OF PARTICIPANTS: 4

SURVEY METHOD: semi structured telephonic interview

INSIGHTS:

Either people are ignorant or not aware of the severity of the situation. (Observation- people often break rules.)

Escalation of fear regarding the use of public transport. (Observation- people do-not want to use public transport anytime soon because of the safety issues.)

Working under fear out of necessity. (Observation- stakeholders like bus driver and conductor are working under fear because if they don't, their families might die out of hunger)

Short-term needs overpower the long-term consequences. (Observation- People overcrowding provided transportation amid lockdown in an impulse of reaching home)

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OPPORTUNITY AREAS

After gathering insights from our review of existing literature and the user study conducted by us, these are the areas where we feel work could be done to reduce the spread of the virus:

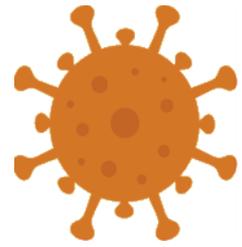
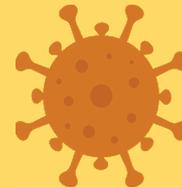
- Spreading Awareness
- Fear factor
- Change in Management
- **Interventions in the existing model of busses**

Our focus area

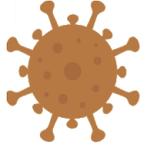
Common touch points:

After looking at those images of bus interiors, we got a clear understanding of some of the common touch points inside the buses :

- The grab rails at the entrance of buses
- The entrance doors
- The bus seats
- The windows
- The grab rails in the buses for standing commuters
- Support poles inside the buses



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Problem identification



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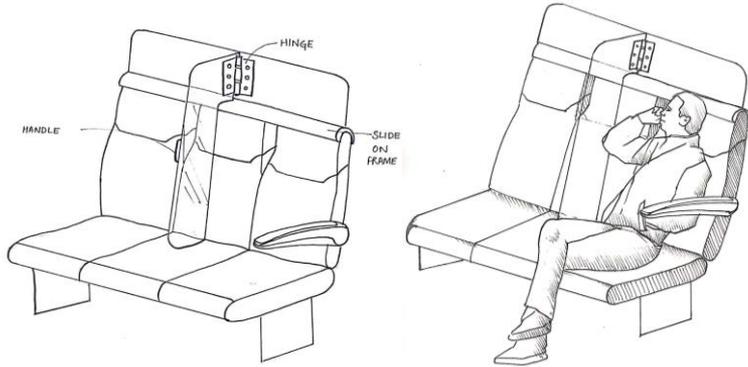
Opportunity areas



Solutions

FINAL CONCEPTS





1. Division between seats

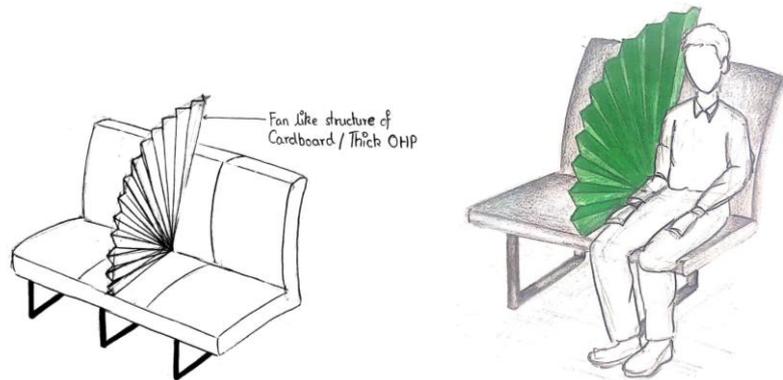
To overcome the problem of the division hindering movement to the inside seat, a hinge is attached to the division, making the division movable so that while entering a person can close the division and after settling in he can open it up using the handle. The division on the back also provides an added benefit of preventing virus spread from the passenger sitting behind. This is specially needed in buses where the height of the back rest is quite low. This arrangement attaches to the seat like a slide on frame

2. A foldable partition

The base end of the fan-like structure is the length of the seat and the other end is a bit bigger than the back-rest of the seat. It attaches to the seat through Velcro tape and can easily be detached.

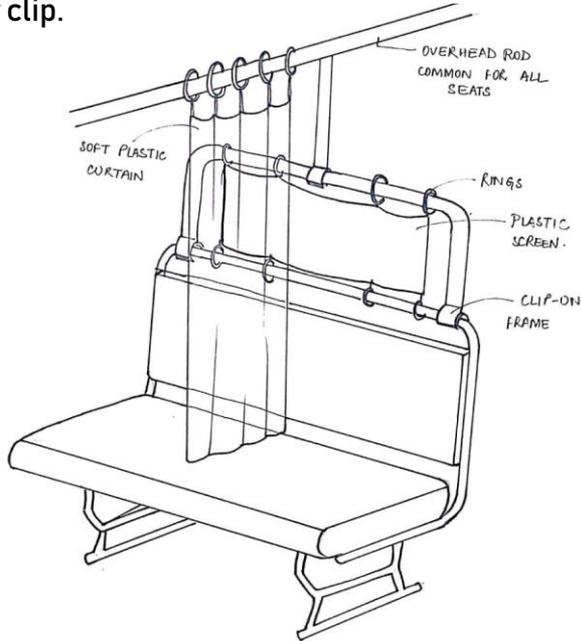
Weakness - As the materials used is cardboard/thick OHP, it won't last that long in a public transport.

Strength - Very cheap to manufacture and can be manufactured according to the required sizes

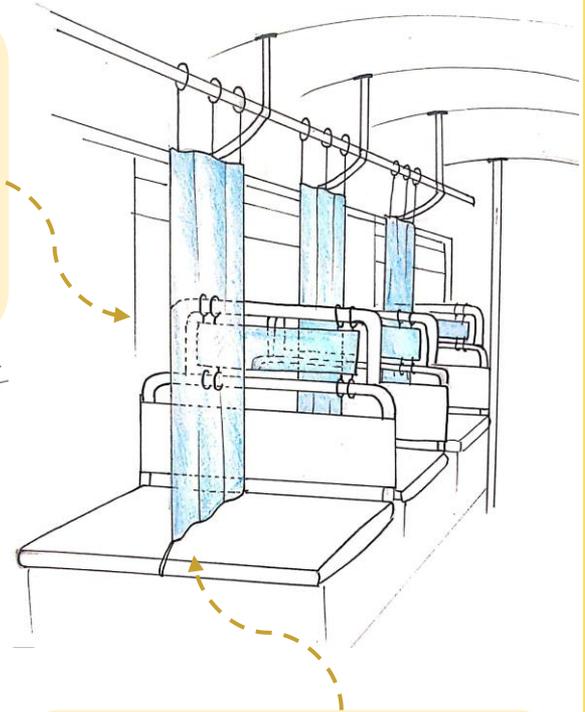


3. A cheaper alternative

This division uses an overhead rod which runs across all the seats and contains soft plastic curtains to act as dividers. It also includes a frame on the back rest which a plastic screen attached to it for preventing virus spread from behind. This arrangement attaches like a clip on, much like the mechanism of a hair clutch or a paper clip.



This design is universal and can be easily modified to any bus design and can also be used as a means of additional privacy if made of translucent or opaque material.



Curtain can be easily moved back in case a division isn't required and can be tied to the back pole. It can also be ties under the seat to prevent movement from wind

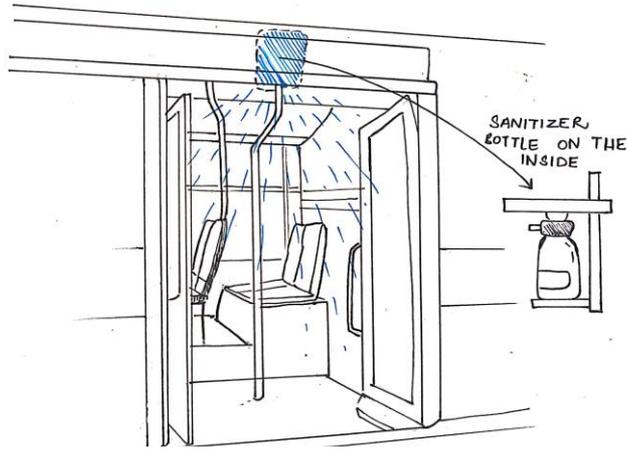
4.Semi automatic disinfecting solution for the doors

This cost effective and easy to operate mechanical system can be operated by the bus-conductor from his seat just like pressing a “Clutch or a Break” pedal of a vehicle.

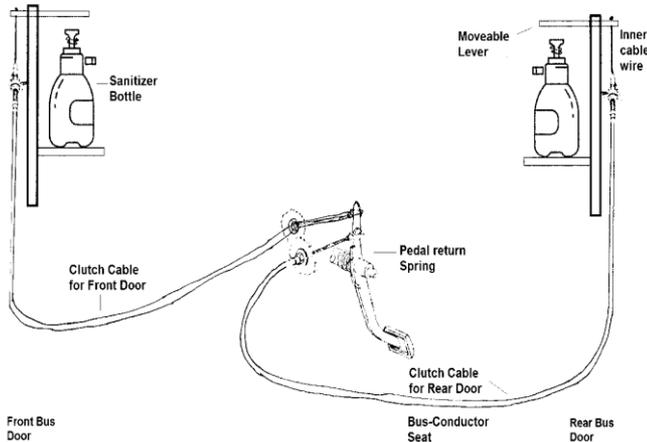
After every bus-stop, once passengers has settled down to their designated seats or place, bus-conductor will simply press the foot-pedal to sanitize the front and back gate area and handrails for passengers boardeing or de-boarding at next stop.

For the safety of passengers only ‘Water-Based’ disinfectant will be used, ethanol or alcohol based sanitizers will not be sprayed in a moving bus due to fire hazards. Preferably Sodium Hypochlorite based disinfectant will be used as it is:

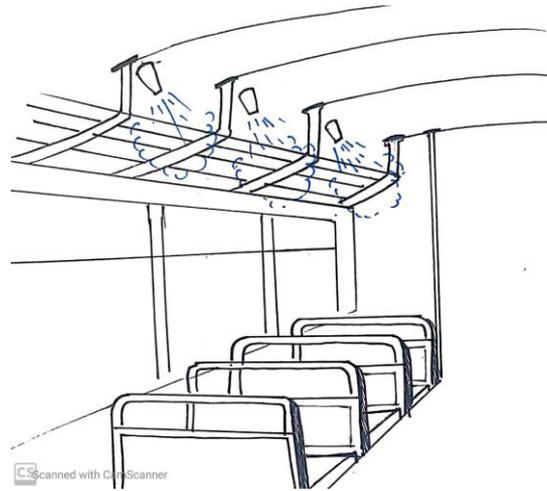
- proven disinfectant for Covid-19
- Cost effective
- Less reactive to other surfaces or humans



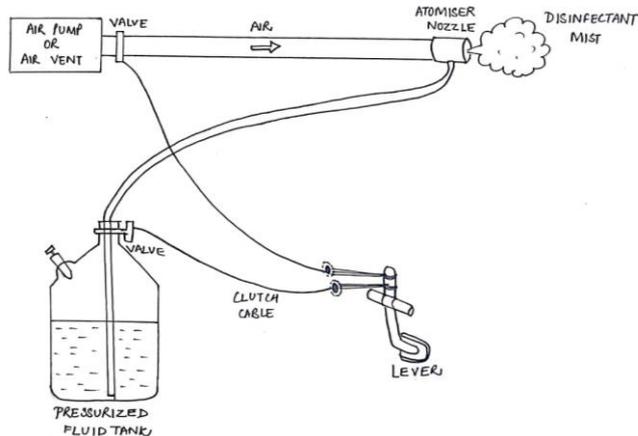
Manual Bus Sanitization System



5. Complete sanitization of the bus using aerodynamics.



Scanned with CamScanner



As we need to sanitize the seats and interior of the bus while passengers are aboard we need a mechanism to create very fine mist so that it covers a large area and dries down fast. For this we will use a combination of pressurized fluid spray and atomizer.

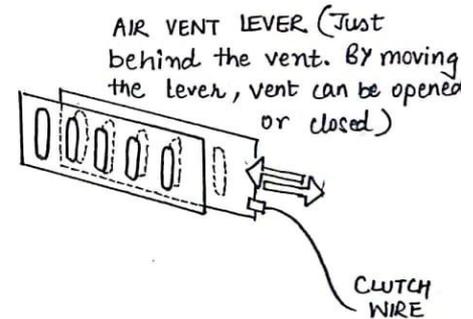
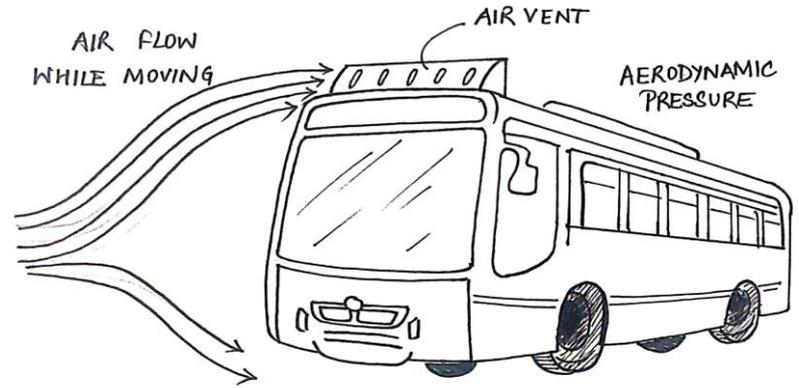
The sanitizer fluid will be pushed to the nozzle from the pressurized fluid tank and air pump/ air vent will send pressurized air to the nozzle. This will create a fine mist with air flow which can cover a large area unlike liquid disinfectant and also will not create a problem of wet surfaces.

The system will be connected to a lever and pushing it down will open up the valves and start the sanitization process. This allows for a large number of sanitizer nozzles to be attached overhead in the bus.

Where does aerodynamics come into play?

While the system would work fine with an air pressure machine, a cheaper alternative to get a similar pressure could be to use aerodynamics that takes place while the bus moves.

While moving, a bus experiences a lot of air pressure even at a slow speed of 15kmph. This is far larger of a pressure any human could possibly exert and enough for the working of the system. Placing an air vent at the top of the bus will trap some of the air inside it and then it can be flowed down to the sanitizer nozzles to create a disinfectant mist.



PART 3 : AWARENESS CAMPAIGN

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We wanted to contribute towards raising awareness as it being a foremost topic, with a hope to reach out to people and encourage them to bring a change, for small steps leads to big changes.



CITY BUS
MOCKUP
EPS 10



CITY BUS
MOCKUP
EPS 10

Campaign mock-ups