

# **Accessible Vehicle Seat** 4weeks

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Ergonomics Coursework

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Personal Works



## Social Background



Growth rate of operating route mileage of urban public transportation in China from 2015 to 2019

As the economy develops, China's urbanization rate continues to increase. With rapid increase of urban population, the public transportation system is also facing a new test, and as an emerging urban transportation closely related to people's life and travel, it is also receiving more and more attention.

## Problem Discovery

In vehicles such as bullet trains and buses, the common problem is that the spacing between the front and rear seats is too small. When facing some tall or obese passengers, due to the certain distance between the two seats, passengers' legs can only curl up between the seats, affecting the overall comfort of riding.

This project provides an adjustable vehicle seat component, which solves the problems raised by the above background technology.

## Market Analysis



Lack of rotating seats for public transportation

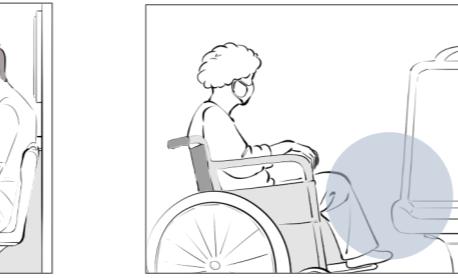


The number of people who are tall and obese is increasing

There are some seats on the market that can be rotated for the convenience of people with disabilities, but they are mostly used for expensive cars rather than public transportation.

With the increasing number of people who are obese and tall, the seats in existing buses are not suitable for these people.

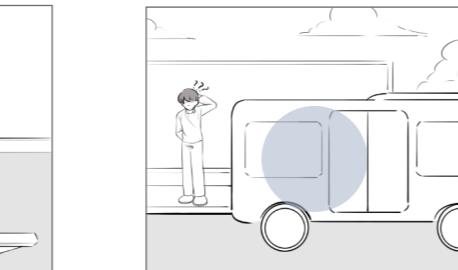
## Problem Analysis



Passengers with taller height can only curl up between their seats.



Disabilities cannot easily move from wheelchairs to seats.

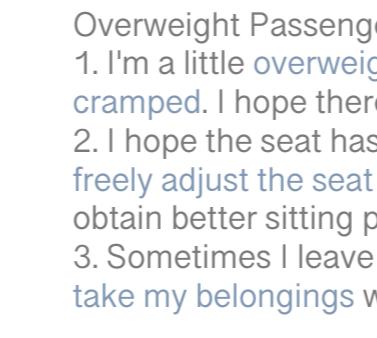


Overweight passengers feel that the space is crowded.



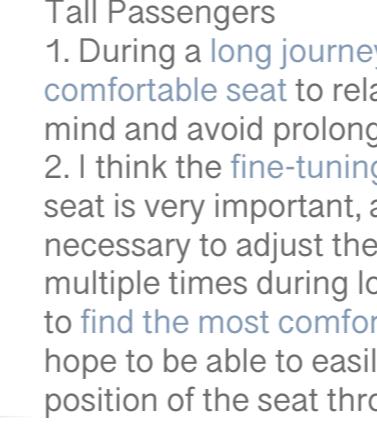
It is easy for passengers to leave small objects in vehicles.

## User Interviews



### Overweight Passengers

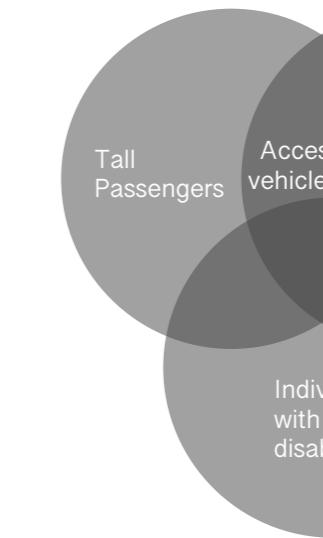
1. I'm a little **overweight** and taking a coach makes me **feel cramped**. I hope there is more space for people like me.
2. I hope the seat has a **fine adjustment function** that allow me to **freely adjust the seat position** while sitting on the chair, in order to obtain better sitting posture and legroom.
3. Sometimes I leave things in the car, and I hope to be **reminded to take my belongings** when I leave.



### Tall Passengers

1. During a **long journey**, I hope to have a **comfortable seat** to relax my body and mind and avoid prolonged sitting fatigue.
2. I think the **fine-tuning function** of the seat is very important, as it may be necessary to adjust the sitting position multiple times during long-distance travel to **find the most comfortable position**. I hope to be able to easily fine-tune the position of the seat through simple operations to meet individual needs.
3. During long-distance travel, I often worry about **having my phone and wallet stolen while sleeping**, and I wish I could store these items safely and conveniently during the ride.

## User Persona



## Exploration Diagram

By setting a turntable, passengers can adjust their seats slightly by controlling their hip strength while sitting on the seat board. This allows the seats to move towards the aisle position, increasing legroom, and enhancing the passenger's riding experience.

By setting a limit component, the movable rod can be pulled to move, causing the compression spring to deform and causing the limit head to detach from the limit hole for fine adjustment of the seat. After the fine adjustment is completed, the limit head can be inserted into the corresponding guide groove to ensure the stability of the seat plate.

By setting up storage components and weight sensors, passengers can place the items they need to store in a drawer for storage. At the same time, when passengers get off the car, the weight sensor senses whether the items have been taken away, and in conjunction with the use of a buzzer, it reminds users to carry them with them.



## Human-machine Relationship



## CMF Design

Regarding color, the **black** color of the chair contrasts with the **white** color of the armrests, creating a sense of technology.

Regarding materials, The **fine pores and perforated structure** of the mesh material allow for free air circulation, helping to maintain ventilation in seats, backrests, or other uses. This is very important for people sitting in chairs for long periods of time, as it can reduce discomfort caused by rising body temperature and sweating.

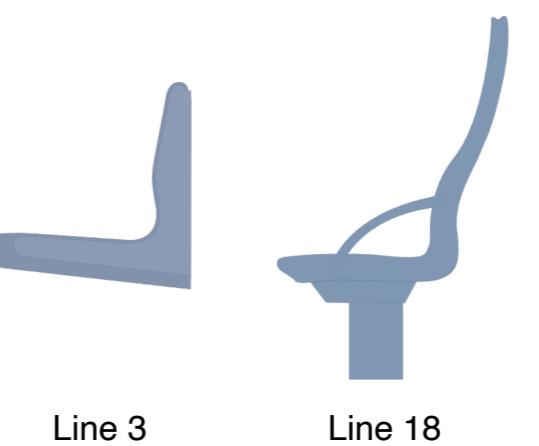
The armrests of the chairs are made of **plastic material**, making them easy to clean and maintain

## Field Research

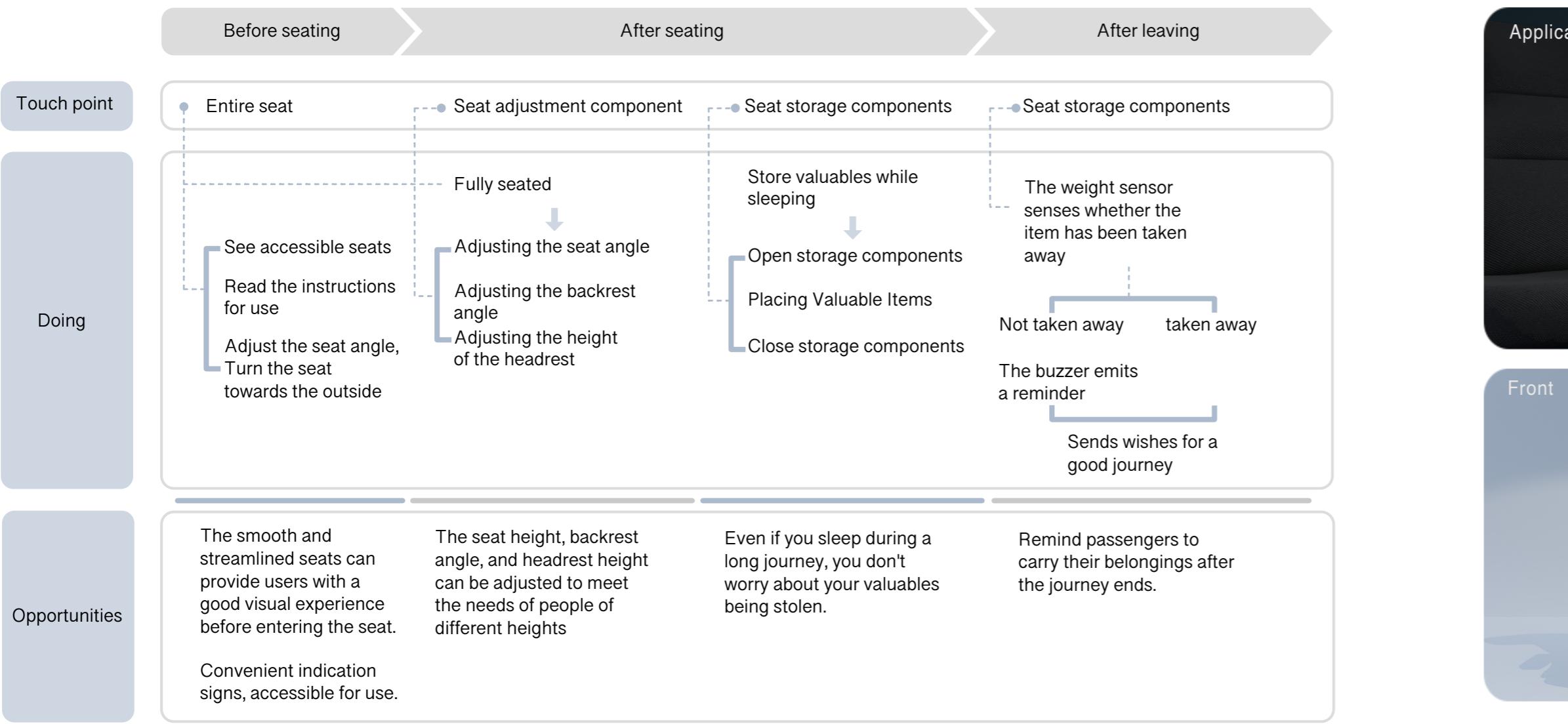
How to design the angle of the backrest and cushion of the seat?

After conducting on-site research on the seats of Guangzhou Metro Lines 3 and 18, the following conclusions were drawn:

1. The seat cushion itself must have an upward tilt angle of at least 15 °.
2. A larger angle between the seat cushion and backrest can provide a better riding experience.



## Use Steps



## Design Visualiser

