

Passenger Comfort in Rail Travel

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The railway is busier, but carrying fewer commuters

1.83bn

GB passenger journeys,
2025-26

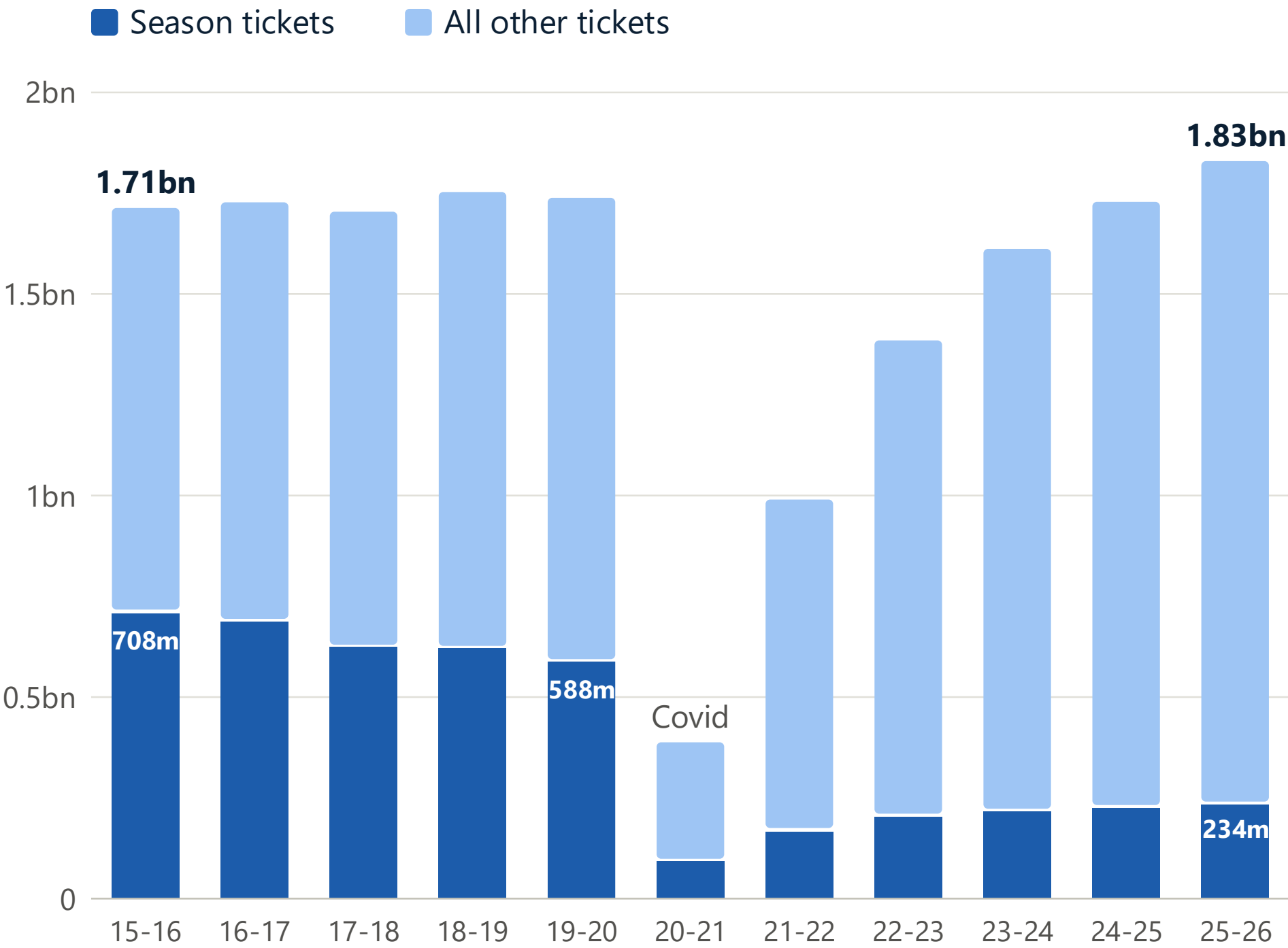
104% of the pre-pandemic
peak

Increasingly, the train is an extension of the living
room and the office.

234m

season-ticket journeys,
2025-26

33% of their 2015-16 peak



Financial years (April to March). Source: ORR Table 1222, June 2026; 2020-21 onwards provisional.

Source: ORR, Passenger rail usage, Table 1222 (June 2026). 2020-21 onwards provisional.

We understand the building blocks of passenger comfort. We are not yet good at putting them together.

Where would you rather sit?



Spring case



Plush foam recliner

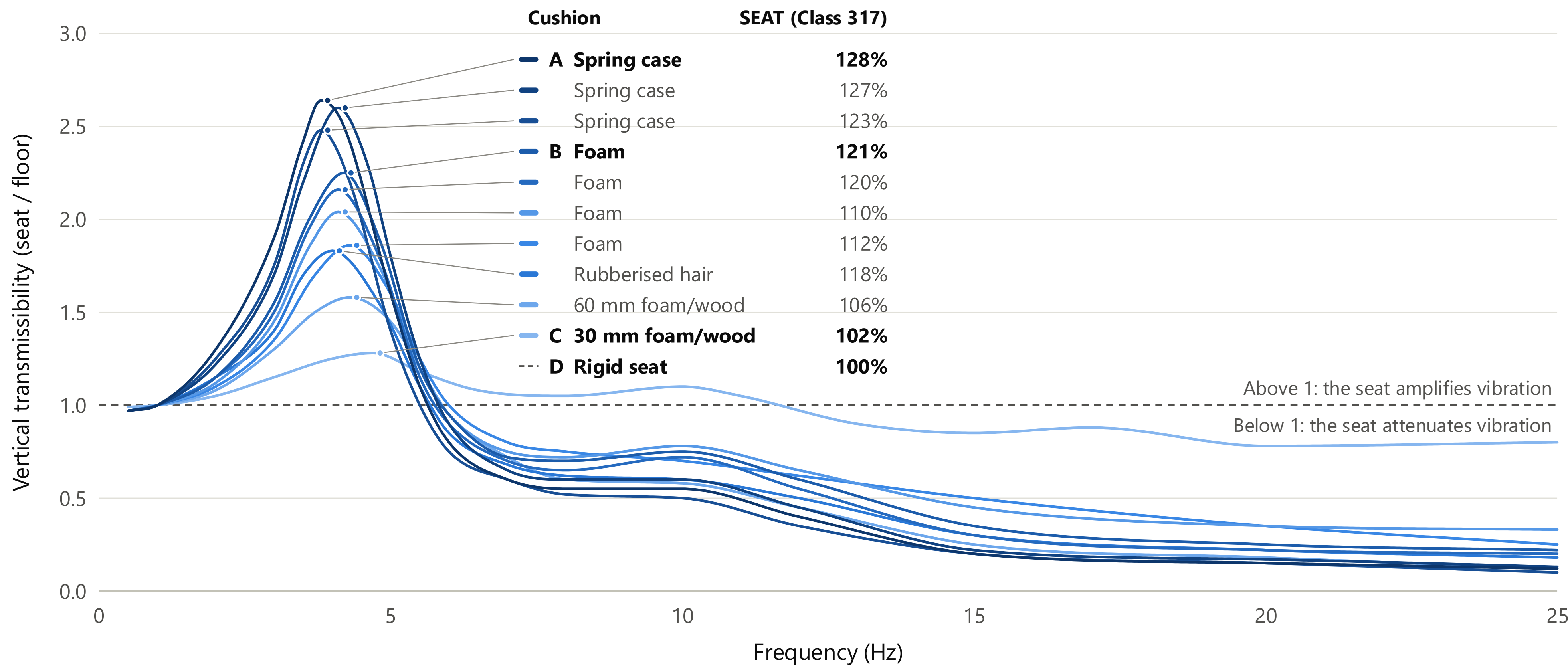


Thin foam, firm shell



Rigid wooden seat

Softer cushions make the ride worse



Illustrative redrawing after Corbridge, Griffin & Harborough (1989). SEAT above 100% = ride worse than on a rigid seat.

Ride is only a small part of the picture



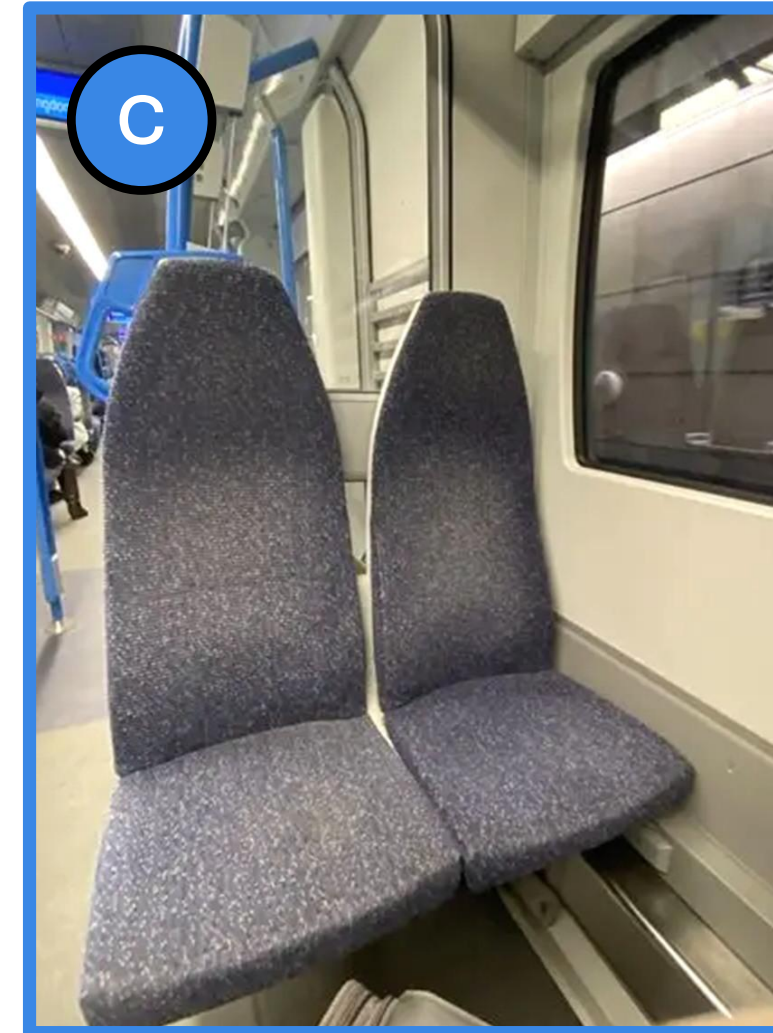
Spring case: the Hogwarts Express
SEAT 128%

Context: shared with other people's over-excited children, esoteric buffet service.



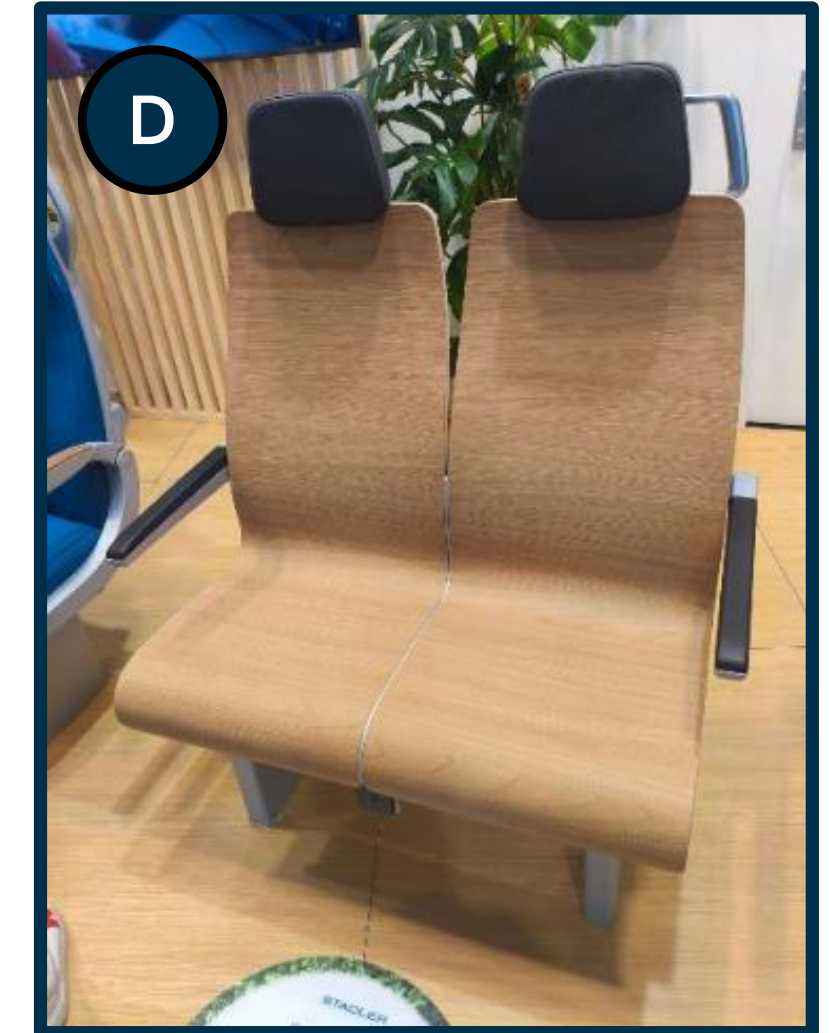
Foam recliner
SEAT 121%

Context: a quarter fewer seats, but a fare you can double – or so the manufacturer tells us.



Thameslink Class 700
SEAT 102%

Context: fine across central London; less so from Bedford to Brighton.



Rigid wooden seat
SEAT 100%

Context: really is as uncomfortable as it looks.

Not bad seats, just the wrong seat in the wrong place.

Every seat is a balance of compromises

Static vs dynamic

- Static comfort is judged in seconds
- Ride comfort shows over the journey
- A seat can win the first test and lose the second
- Class 800: fairly or not, widely judged “too firm”

Safety and durability

- Fire standards limit the foams and fabrics you can use
- Crash-safe seatbacks are taller, and block the view
- Seats must survive years of heavy use and cleaning

Capacity vs space

- Thinner cushions buy legroom or seats
- More seats mean fewer tables
- Seats out of line with windows lose view and shoulder room

And underneath every one of these: cost.

Evidence: RAIL 1066 (July 2026); RAIL and Rail Engineer on Class 800 seats; Toward, PhD, Univ. of Southampton; ISVR seat pressure studies.



Folding table: easier to get in and out



Phone rest



Power, USB and wireless charging

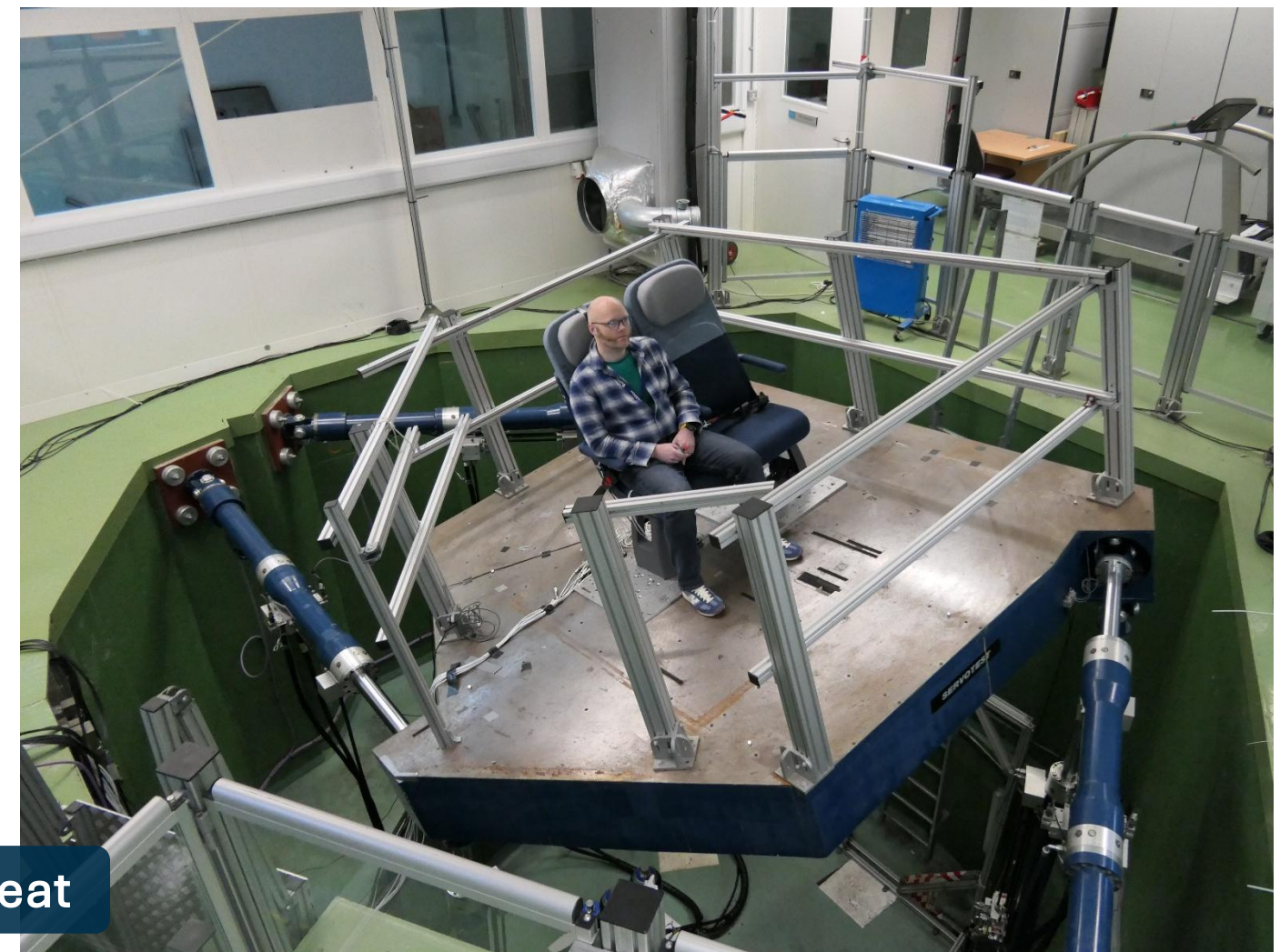
Bringing the whole journey into the lab

A world-class laboratory for making people feel uncomfortable and sick

- Six-axis platform reproduces the measured motion of any train, car or aircraft
- Cabin: adds 360-degree sound, heat, humidity, lighting and a real seating layout
- Change one variable, hold everything else constant
- Proven at scale: 300 passengers, six at a time, six-hour simulated transatlantic “flight”, meals served. Controlled vibration, noise, temperature, humidity and turbulence
- Proposal: a representative London-Glasgow journey
 - Does comfort change how long the journey feels? (perception of time)



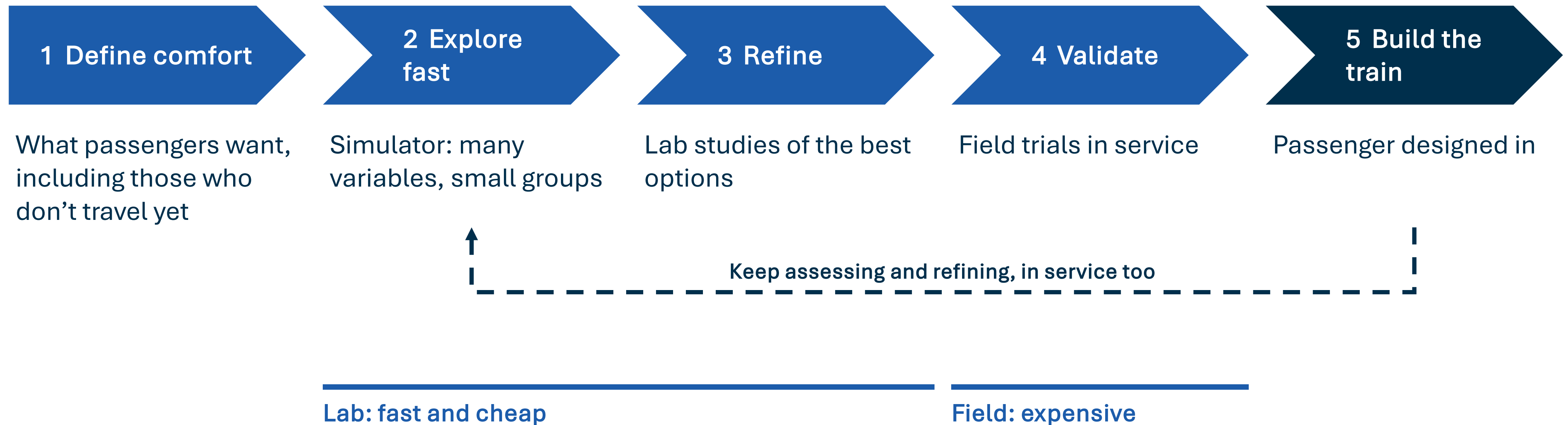
Stability



TGV seat

Evidence: ISVR Human Factors Research Unit, University of Southampton; RAIL 1066 (July 2026).

Test the journey before (and whilst) you build the train



Source: M. Toward, correspondence with P. Dyson, May 2026; ISVR Human Factors Research Unit.

Flying is fast food. The train can be a restaurant.

Train

On board, seated and connected: 4h 20m

4h 45m

Plane

To airport

Security and gate

Flight 1h 20m

To city

4h 15m

Fast food: quick, but most of it is spent queuing.

Restaurant: you sit down for the whole thing.

Appraisal already agrees: a crowded, standing minute counts as 2.3× an uncrowded seat.

We count the minutes we save. We rarely count the minutes we make better.

Wardman & Whelan (2011), Transport Reviews 31(3). Door to door from central London: LNER typical 4h 20m; airport times indicative.

**Specify the passenger
experience, and test it
with passengers
throughout the process**