Beyond the Basics

What Maslow's hierarchy teaches us about inclusive rail travel, and why accessible train design needs to look beyond compliance

The publication of Great British Railways' Rolling Stock and Infrastructure Strategy is a significant moment for accessible rail travel. It makes unassisted level boarding a baseline expectation for new fleets and commits GBR to inclusive design guidance developed with disabled passengers. It also promises clearer, more consistent expectations for toilets, wayfinding, and passenger information.

For decades, accessible rail design has focused heavily on removing physical barriers. Step-free access, dedicated wheelchair spaces, compliant universal toilets, and booked passenger assistance have successfully transformed journeys for millions of people. But true accessibility isn't simply a matter of whether a passenger can travel. It is about whether they want to.

DCA's experience in rail vehicle design has shown that bridging this gap requires looking beyond the standards. This subtle but vital distinction can be illustrated with Maslow's Hierarchy of Needs.

The core principle of Maslow's pyramid is progressive: we satisfy our basic physiological and safety needs before we can seek belonging, confidence, and, ultimately, self-actualisation.

When applied to rail design, the bottom two layers focus on the baseline of survival and mechanics: can someone use the train? The top three layers shift the focus to the human experience: does the train empower them?

By designing for the entire pyramid, we can go beyond regulatory compliance and deliver transport solutions that help more people reach their full potential.

Physiological needs – the baseline of travel

At the base of the pyramid sit our fundamental physical requirements. In a rail context, this means ensuring that a passenger can physically fit within the vehicle environment and access critical information.

Current rail legislation and technical standards (such as NTSN ACC or TSI PRM) provide an excellent foundation here. They prescribe minimum door widths, ramp angles, text heights, and auditory announcement frequencies. These requirements set a mandatory baseline that dramatically reduces the physical and sensory demands that a train places on a passenger. However, while essential, meeting these standards is simply the starting point.



Safety needs – predictability and peace of mind

Once physical access is guaranteed, a passenger's focus shifts to safety, both physical and psychological.

At a physical level, the fear of slips, trips, and falls can be debilitating for passengers with limited mobility. Managing height changes and applying consistent, intuitive handholds throughout the train is crucial.

At an emotional level, safety is deeply tied to predictability. Unexpected layout changes or ambiguous wayfinding introduce immediate anxiety. This can be mitigated by designing predictable spatial layouts, clear environmental zoning, and smart contrast and colour-coding strategies that reduce cognitive load and provide instant peace of mind.

Social needs (belonging) – part of the crowd

People travel together, yet traditional accessible design has a habit of isolating individuals. True inclusion means ensuring a wheelchair user feels part of the group, allowing them to board, sit, and travel effortlessly alongside friends and family.

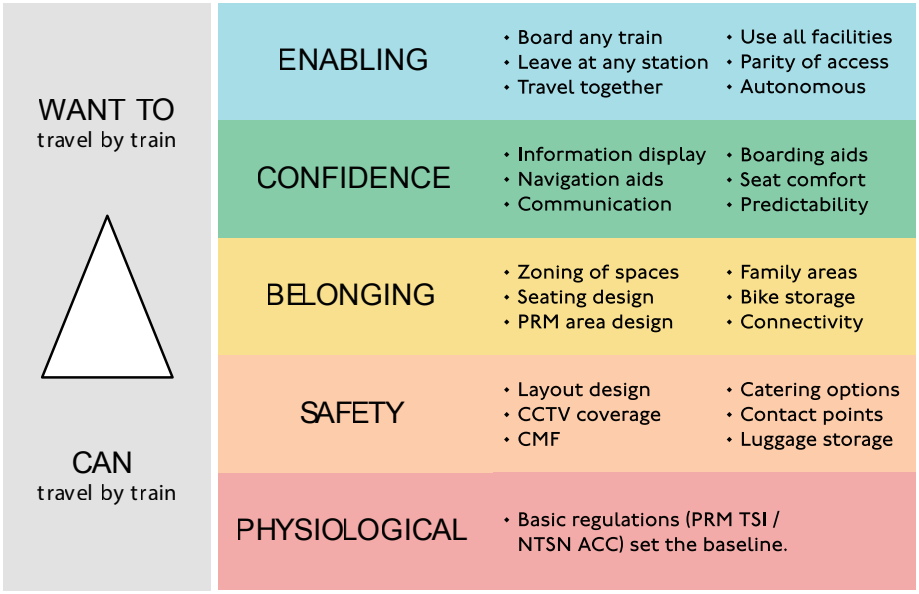
'For many passengers, the most frustrating part of a rail journey isn't a tight turning circle; it's the loss of autonomy.'

We believe inclusion shouldn't feel like a bolt-on feature. DCA believes inclusion shouldn't feel like a bolt-on feature, and strives to weave it directly into the fabrics. By designing flexible, integrated seating areas and social spaces, we ensure that every passenger feels like an anticipated guest, rather than an afterthought.

Esteem needs – confidence, dignity and autonomy

This level of the pyramid represents the most significant shift in design philosophy. It moves past physical metrics to focus on psychological well-being, self-worth, and dignity. For many passengers, the most frustrating part of a rail journey isn't a tight turning circle; it's the loss of autonomy.

Dignity comes from design solutions that strip away moments of friction and elevate the aesthetic experience for everyone. DCA applies its combined industrial design and



‘Inclusive design isn’t about creating special provisions for niche groups. It is simply good design.’

engineering expertise to create Universal Access Toilets (UATs) and interior spaces that look elegant, premium, and cohesive, while remaining flawlessly functional. There should be no trade off in quality or functionality between accessible areas and any other sections of the train. When an environment is designed this intuitively, a passenger doesn’t have to repeatedly ask for help. That independence is the very foundation of travel dignity.

Self-actualisation – spontaneous freedom

At the peak of the pyramid sits self-actualisation: the ability to act with total spontaneity, to explore, and to travel without a meticulous, anxiety-inducing military-style plan laid down in advance.

Achieving this requires a deep understanding of the widest possible range of passengers, including the less obvious demands of neurodiversity. It requires us to predict where subtle points of friction might creep in before the train ever hits the tracks.

Engineering the entire pyramid

The brutal reality of Maslow’s hierarchy is that if a lower tier fails, the entire structure above it collapses. You can design the most welcoming, brand-aligned, and socially integrated carriage in the world (Social & Esteem), but if the physical step-threshold is unmanageable, or the accessible toilet is out of service (Physiological), the journey stops dead.

DCA’s team seamlessly combines industrial design, mechanical engineering, and human factors to close the gap between achieving compliance and a truly elevated passenger experience.

DCA works with a diverse range of stakeholders to actively test and validate our concepts early in the development process using:

- Detailed 3D CAD models with Digital Mannequins to explore how a diverse range of people fit within the space.
- Interactive Virtual Reality (VR) and posture-tracking tools to simulate varied physical abilities and neurodiverse perspectives.
- Spatially accurate, flexible ergonomic mock-ups to evaluate real-world flow, clearances and sight lines.
- High-fidelity, full-scale mock-ups to assess long- and short-term responses to CMF, environments, and comfort.
- Direct co-creation and testing with diverse user groups to challenge assumptions and gather evidence-based insights.

Inclusive design isn’t about creating special provisions for niche groups. It is simply good design. By designing for Maslow’s entire pyramid, DCA helps rail operators create transport networks that are welcoming, resilient, and ready to take everyone where they want to go – in short making rail their mobility solution of choice.

DCA

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NEWS IN BRIEF

BRODIE ENGINEERING APPRENTICES BACK LEARNING ON THE JOB

Kilmarnock-based Brodie Engineering, which maintains, refurbishes and overhauls passenger and freight trains, took on more apprentices in August as part of a partnership with Ayrshire College. The firm employs nearly 150 people and its apprenticeship programme has allowed it to consistently grow its own talent. Lewis Emberson recently completed a near-five-year apprenticeship with the firm and said the hands-on approach meant he learned quicker. Office for National Statistics figures show more than one in eight (13 per cent) young people aged 16 to 24 were not in education, employment or training.

EMR TO PILOT GBR RAIL FOUNDATION APPRENTICESHIP

East Midlands Railway (EMR) will pilot the new GBR Rail Foundation Apprenticeship, working with industry partners including DFTO and Network Rail, with the first cohort due to start in January 2027. The 12-month programme will be open to young people aged 17 to 25 and will combine practical workplace experience with structured learning. Participants will develop skills across areas including railway operations, safety and security, customer service and performance. Successful participants will be able to progress into further rail apprenticeships or permanent employment.

WOMEN IN RAIL AWARDS 2027 OPEN FOR NOMINATIONS

Colas Rail UK Nominations are open for the Women in Rail Awards 2027, the awards’ tenth year, across 13 categories recognising individuals and organisations advancing gender balance, equity, diversity and inclusion across the UK railway. The categories include the newly renamed Social Mobility Award. More than 3,000 nominations have been received since the awards began in 2018, including 432 in 2026. Nominations close on 29 January 2027, and winners will be revealed at a gala dinner at Old Billingsgate, London, on 6 May. More information is available at *womeninrail.org/awards*.