Product Design Research

bd571, jm3381, er909, jd2589

Problem Statement

Design a device to aid elderly people with mobility issues to enter and exit a vehicle safely and easily whilst putting little strain on their lower body

45%

Of UK residents at the State Pension age report a disability [1]

69%

of the disabled population at State Pension age in the UK is reported to have a mobility impairment

12.7 Million

People in the UK are aged 65 and over in 2022

58%

of the disabled population in the UK use their car to travel in England

Existing Products

This handle is designed to assist elderly individuals when exiting a vehicle. It securely inserts into the car door latch, providing a stable support point for users to hold onto [6]. However, this product does not address challenges related to lower body movement.

A transfer board may be used to allow less abled people to slide out of the car with their feet under them, reducing the need to bend at the knees and the hip [7]. However, the product is not portable and requires a manual installation for each use.

Operating similarly to transfer boards, swivel seats can be used to enable users to exit vehicles with their legs already underneath them, reducing the need to strain while pulling themselves out [8]. While designing a product which is placed on the seat, care must be taken to ensure that the safe operation of the vehicle is not adversely affected.

Group Number 28	Requirements list	Issued on 07/01/2025 Page 1	
D/W	Requirements	Responsible	Changes
	1. Geometry		
D	The system shall fit into Terry's car		
W	The system shall fit into any car model		
W	While not in use the device shall take up little space	JM	09/01/2025
	2. Kinematics		
W	When the device is operated the movement of the device shall be smooth		
W	Where the user is a different size to Terry the systems height will be easily adjustable	JM	09/01/2025
W	The system shall function in a smooth controlled manner		
	3.Forces		
D	When supporting a 90kg person (Terry), the system shall not break		
W	When supporting a 130kg person, the system shall not break		
	4.Material		
W	The system shall be light		
W	The system shall be made from a comfortable material	ER	30/01/2025
D	The system shall be made from a non-slip material		
D	The system shall be made of non flammmable material	JM	09/01/2025
W	The system shall come in different colours		
	5. Safety		
D	The system wont have sharp edges exposed		
D	The system will not be fragile		
D	The device must not prevent in-built safety features from functioning correctly	JD	09/01/2025
	6. Ergonomics		
D	The system will be user friendly for an elderly person	JM	09/01/2025
W	The system shall be weather resistant	JM	09/01/2025
W	Where the system is positioned underneath the sitting driver, then it shall be made from a soft and springy material		
	7. Production quantity		
W	The system shall be easy to mass manufacture		
	8. Aesthetics		
W	The system should look appealing		
W	The system should be discrete		
	9. Assembly		
W	The system shall be easy to build with limited steps ensuring suitability for the elderly	BD	14/01/2025
	10. Transport		
W	The system shall be easy to carry		
	11. Maintainance		
W	If the system breaks then the system shall require minimal maintainance		
	12. Recycling		
D	The system shall be built to last		
W	The system should be built from recyclable eco-friendly materials		
	13. Costs		
D	The system shall be affordable		

Target Market

In 2022, disabled adults aged 16 and over made 686 trips on average per year, compared with 916 trips for non-disabled adults. The difference was smaller among those aged 16 to 59 (14% fewer trips) than among those over the age of 60 (35% fewer trips) [1].

Additional Considerations [3,4,5]

	Height	BMI	Mass
Average Elderly British Male	1.73m	28.9	86.7kg
Average Elderly British Female	1.59m	27.9	70.6kg

Ford Ranger car door width: ~1135mm

Golf Polo car door width: 950mm

References

Research

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