

TYPE OF INFRASTRUCTURES	REFERENCE	ORIGIN/CITY	TARGETED INDIVIDUALS	AIM / OBJECTIVES / HYPOTHESES	JUSTIFICATION	PARTICIPANTS	METHODOLOGY / SET UP	RESEARCH TOOLS	VARIABLES / INDICATORS STUDIED	ANALYSIS / INTERPRETATION	RESULTS	STATED LIMITS	CONCLUSION (THE BEST INFRASTRUCTURE/PRACTICE)	QUALITY	
Ramp and steps	Bochsler, T. M., Legge, G.E., Gage, R., & Kallie, G.S. (2013). Recognition of ramps and steps by people with low vision. <i>Investigative Ophthalmology and Visual Science</i> , 54 (1) 288-294.	Minneapolis, MN, United States	Visually impaired	Assess the impact of viewing conditions and environmental factors on the recognition of ramps and steps by people with low vision and determine if results from previous studies of normally sighted subjects, wearing acuity-reducing goggles, would generalize to low vision.	As of 2004, there were about 3.3 million Americans over the age of 40 years with impaired vision, with the number expected to increase to 5.7 million by 2020. Visual impairment is a risk factor for both falls and fractures in the elderly. Obstacles on the ground or discontinuities in the ground plane, such as steps, pose hazards for people with low vision.	n = 16 (mean age 49) with heterogeneous forms of low vision (from moderate to severe, being 20/200 to 20/2000) (for experiment #3 n = 13). <b>Exclusion criteria:</b> being 86 years old (participants are asked to climb a 16-inch step). <b>Comparison group:</b> n = 48 normally sighted individuals (mean age of 22), wearing blurring goggles (effective acuity to 20/135 or 20/900).	<b>Experimental design:</b> 3 experiments: 1) Large, windowless, 33.25 x 16.58m basement classroom was used. A uniform gray sidewalk (1.3 x7.5m) was built. <b>5 possible targets:</b> single step up or down (7-inch high), ramp up or down (7-inch change of height over 8ft), and flat surface. <b>Target:</b> A 4x8ft, 2-inch-thick regular panel of expanded polystyrene, painted gray.	Acuity, Target recognition, Distance	Lighting, Target recognition	Descriptive analysis (percentage of correct responses), confusion matrices, ANOVAs and t-tests to compare experimental groups	Low-vision performance tended to decrease with lower acuity. Significant main effects of viewing distance and target type. Low-vision and comparison groups performed better at the shorter distances (2 and 10ft), but both did not show significant differences in performance between 5 and 10ft. A step up was more recognizable than a step down for both groups (perhaps because of the high contrast between the top of the step and the floor). The most important recognition biases happened when the subject viewed the ramp down target and confused it with a flat surface or when he viewed the ramp up target and confused it for a flat surface.	The study is not representative of the population since it excluded elderly people, a target group that commonly experiences vision impairments.	Locomotion and viewing distance strongly influence performance, while background contrast and lighting arrangement have weaker effects. Since ramps are less recognizable, it is important to provide additional visual and tactile cues to support their recognition.	43	
							<b>#1 Targetbackground contrast and viewing distance:</b> subjects viewed the gray targets against a gray (contrast = 0.25) or black (contrast = 0.82) background with standard overhead room lighting on 3 distances (5, 10, and 20 ft). 4 trials were performed.								
							<b>#2 Lighting arrangement:</b> 2 different lighting arrangements: a light box simulated a window to the rear left or left; 40 trials (2 windows x 5 targets x 4 trials/target) at a distance of 10ft were performed.								
							<b>#3 Locomotion:</b> comparison of stationary (recognition distance 10ft from target) and walking (starting at 20ft) conditions for recognition performance.	Walking or stationary condition, Target recognition							
	Canale, I., Felici, F., Marchetti, M., & Ricci, B. (1991). Ramp length/grade prescriptions for wheelchair-dependent individuals. <i>Paraplegia</i> , 29, 479-485.	Lazio, Italy	Mobility impaired, wheelchair-dependent individuals (WDI)	Identify the most propitious relationship length/grade to be adopted in ramp construction for wheelchair-dependent individuals. 1) Measurement of maximal voluntary isometric contraction (MVC). 2) Correlation of MVC with significant parameters such as age, sex, or subjects, etc. 3) Verification of prescriptions using a specified length/grade test ramp to be traversed by a consistent number of WDI.	The quality of life of WDI is dependent upon a number of factors. One of the most frequent difficulty is represented by gradients, thus the necessity to provide WDI with facilities that can help them in managing such architectural barriers.	n = 140 (86 males, 54 females). <b>Exclusion criteria:</b> subjects unable to attain the minimum force application levels in 21 of the 3 basic, pre-selected, wheel rim positions.	<b>Experimental design with mixed methods:</b> Questionnaire and MVC were measured. <b>Set up:</b> 2 ramps of 3 and 6m length and 12 and 10% incline respectively had been assembled in the gymnasium of Santa Lucia Center.	Questionnaire: information related to self-sufficiency outside home (SSOH) and active sport experience (ASE)	A mathematical simulation of kinetics and kinematics of WDI ramp ascent was incorporated into a computer program to illustrate the relationship between ramp-length transversability and individual maximal voluntary isometric contraction (MVC) exerted by WDI on both wheel rims.	-80% of the subjects were able to climb ramps of 8% grade for a 3m length and 7% grade for a 6m length. 80% of the subjects who were active in sports were able to ascend ramp inclines of 15%, slightly more than double the achievement of the 80% of subjects. There are negligible differences in force obtained by WDI with different placement of the hands on the wheel hand-rim. Not all the WDI who attempted to traverse, and subsequently successfully completed the task, pertained to the ASE group, although they pertained to the SSOH group as well.			Ramp length/grade relationships: 1) When we have no reasons to force the incline of a ramp, a wise solution would be represented by an 8% incline. This incline, which poses no practical limitations in terms of ramp length, can be easily traversed by the majority of WDI population. 2) When we are faced with public buildings that can not be easily altered in their structure, a maximum ramp length of 15% for a ramp length of 1 m, 12% for 3m and 10% for 6m ramp length can be allowed.		
	Cappozzo, A., Felici, F., Figura, F., Marchetti, M., & Ricci, B. (1991). Prediction of ramp traversability for wheelchair-dependent individuals. <i>Paraplegia</i> , 29, 470-478.	Lazio, Italy	Mobility impaired, wheelchair-dependent individuals (WDI)	Obtain a single, objective criterion, based on easily-obtainable and reliable measurements, which permits the prediction of allowable limits of length and grade for ramps that can be adopted for any special categories of wheelchair-dependent individuals (WDI). <b>Hypothesis:</b> the maximum voluntary force (MVC) that a subject can exert in pushing a wheel rim is the most important determinant of the limits of possible ascent. MVC can be assumed to be a sufficient predictor of WDI ascent capacity.	Ramps are commonly used to provide opportunities for WDI to overcome differences between grade levels. Yet, the limits of allowable grades have not been based upon stated scientific criteria. This is reflected in widely differing standards among various countries.	n = 12 WDI who all had become paraplegic as a consequence of traumatic events. (5 were selected as being representative of different levels of spinal lesions for kinetic and kinematic measurements)	<b>Experimental design. Set up:</b> Adjustable grade ramp (6-m long and 1.50 m wide).	Accelerometer (placed horizontally on the midpoint of the wheelchair axle)	CG kinematics. Maximum voluntary force (MVC) and velocity	Kinematics measurements. Displacement	Quite the same modality of pushing was observed in each of the 6 male subjects tested. Irrespective of ramp grade, each subject consistently used the same amount of force which varied between 75 and 85% of MVC. When grade was augmented, the mean speed of progression and the time interval between pushings decreased.				

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