

IMPROVING TENT AND VESTIBULE ACCESSIBILITY THROUGH UNIVERSAL DESIGN AND CONSUMER INPUT

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ABSTRACT

The accessibility of camping tents was improved through a process involving consumer input and the application of universal design principles. In focus groups involving campers with a variety of limitations and staff for inclusive outdoor programs, problems with existing products were identified and design specifications for potential solutions were developed. Prototypes were designed, fabricated and tested by the campers, including six door designs, four vestibules, and a tent with an accessible vestibule. Accessibility was greatly enhanced, with all campers able to enter and exit at least three of the doors independently. Space and size specifications were determined for an accessible vestibule area.

BACKGROUND

Americans are camping in record numbers. The top “soft adventure vacation” of U.S. adults was camping, with 64.7 million, or 33% of U.S. adults camping in the last 5 years (1). The 1994 Forest Service-sponsored National Survey on Recreation and the Environment (NSRE) reports people with disabilities are camping and participating in outdoor recreation activities(2). Physical barriers and a lack of accessible facilities were two of the most frequently cited barriers to their participation in outdoor recreation. Since the Americans with Disabilities Act, public facilities and programs at campgrounds and parks have been made more accessible. Accessibility standards for campsites have been developed and a minimum number of accessible sites required per campground has been recommended. Still, the most important “facility” a camper needs access to is a tent.

STATEMENT OF THE PROBLEM

Participants in focus groups identified the following problems with tent and vestibule designs:

Easy access: People with disabilities need quick access to shelter, as some people have difficulty with thermoregulation and exposure to wind or rain may adversely affect their ability to stay warm. Wet clothes may also negatively impact a person with a spinal cord injury who is prone to pressure sores. There are many factors which slow or impede access into and out of tents.

Doors and doorways: Doors are not typically wide enough for a wheelchair or larger people to get through easily, and they are too narrow for assisted transfers. They are too short for people with back injuries to easily get through. Zippers make it hard to open the doors. They usually require a significant degree of manual dexterity and range of motion. In addition, they require visual and cognitive abilities to trouble shoot when they are being opened or when they get stuck.

The bathtub floor, a 6-8” lip typically found at doorways, presents a trip hazard to individuals with mobility and/or visual impairments.

Space for storage and maneuverability: With one or two exceptions, tents and vestibules do not provide storage space for people and/or wheelchairs or other equipment. There is little or no maneuvering room for someone using or storing a wheelchair or walker. People need space outside the sleeping area in order to sit, stand, lie down for toileting, or to change positions, especially when the weather prevents them from going outside the tent.

Ventilation mechanisms: Window and ventilation opening and closure mechanisms often include zippers, are difficult to reach from ground level, and require dexterity to operate them.

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Set up: Tents usually require a person of average strength, dexterity and reach to set it up. It also requires perceptual abilities and can be difficult for someone with a visual impairment.

Poles: Poles at eye height present problems for people with and without visual impairments.

Toilet access: A key consideration for people using mobility devices is access to accessible toilets

APPROACH

A universal design approach was taken, looking at factors such as ease of use, flexibility in use, simple and intuitive use, low physical effort, and size and space for approach and use (3). The design question was whether we could design a tent and/or vestibule to be more accessible, meet all the criteria of camping tents, and offer improvements to campers without disabilities as well.

Consumers with vision and mobility impairments and family members of children with disabilities were involved in the design process. Organizations providing inclusive outdoor adventure programs were also included. At times, staff members were asked to answer questions from the perspective as campers without disabilities to get a more universal appraisal of the needs.

The initial session involved a needs and problem identification, discussion of what individuals and programs used at present, and shortcomings or positive design features of the equipment. The session ended with a “dream tent” brainstorm. The concept of a “Universal Vestibule” which could attach to a variety of tents and offer an accessible sheltered area was presented and reacted to.

Dimensions and specifications for key elements such as the door width and height, vestibule space, and head room were determined.

The design team fabricated prototypes, including two structures of different sizes and construction, and four doors for testing at the second session.

Session two involved the presentation of the prototypes to group. Individuals were asked to try each door independently and complete a survey. A group discussion followed, and suggestions for improvements and changes were made.

The designers fabricated two new structures and three new doors.

The final session involved testing of the second round of prototypes.

DESIGN

The input from the consumers and staff led to two different tent and vestibule design solutions, based on different types of camping.

Universal Vestibule: The first design concept is that of a “universal vestibule” which can be used with a wide range of tents to provide an accessible shelter and storage area. It would attach via a coupling, or fly extension. It could involve different wall options, potentially providing a common space or entryway for a combination of up to three tents or a vehicle. This may be used more by families who are camping or for group camping situations where it makes sense to attach a vestibule to one to three tents. It could be used as a standalone shelter for a private commode or gear storage.

Combination Tent/Vestibule: The second concept is that of a tent with a built-in accessible vestibule. This would more likely be used by more independent campers, where one or two people will be camping. It offers the simplicity and reduced bulk and weight of a single shelter.

Both units would include accessible doors and room for a wheelchair to maneuver in.

Door design: Six door designs which required minimal or no dexterity were built and tested by the participants. Two designs were hands-free, swinging open or closed when pushed and returning to position once a

person got past the door. The other designs required minimal dexterity and included a sliding door, fan door, curtain and V door. Such designs



Figure 1. Café doors

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provide advantages to campers with and without disabilities. The doors would be easier to use for a person who has their hands or arms full, is wearing gloves or mittens, or is pushing a wheeled device such as a bicycle or stroller.

DEVELOPMENT

The design team incorporated consumer input into the space and size of the vestibules and doors. Concepts were sketched and small prototypes were built and tested. Once concepts were solidified, pole structures were constructed, patterns made, and a fabric model was cut and sewn. Computer models of tents representing different styles and sizes were developed in order to test the universal vestibule's fit virtually, rather than trying it out physically with all of the tents. A model of a truck, a van and a person using a wheelchair were also developed for use in the virtual simulation.

EVALUATION

As discussed in the Approach section, evaluations took place in the focus groups. Results indicated that all participants were able to enter and exit the tent independently with some of the door styles. The preferred styles were the sliding and curtain door, although other styles got high ratings as well. The café doors, a hands-free model was rated the easiest to get in and out independently. Further design work is needed.

DISCUSSION

Further work must be done on designing the structures for ease of setup, exploring the technical feasibility of a zipper free screen door and window opening and closure mechanisms. Additional work needs to be done on the doors as it relates to improving weather and bug resistance. It seems the designs offer many advantages to campers without disabilities as well, including provision of additional storage and an easy to access sheltered area.

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