

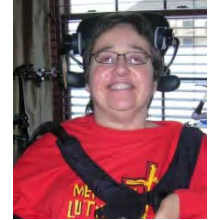
Pam

Accessibility Problems

- Bath
- Kitchen
- Entrance
- Bedroom
- Living Area
- Whole House
- Outside (deck, ramp, etc.)

Personal Profile

- Pam
- Quadriplegic since 2007
- Accessibility Improvements Made in 2007



Accessibility Solutions

After a car accident left Pam with quadriplegia, she and her husband needed to find a home that was accessible and accommodating to Pam's needs. The home they lived in before the accident was a split-level home built in the 1970s which would take too much time and money to remodel. They bought a new two bedroom, two bathroom house which could be more easily made accessible (Fig. 1). Below is the floor plan of the new home that Pam and her husband purchased (Fig. 2). Following are specific improvements that were made to the new home.



Figure 1

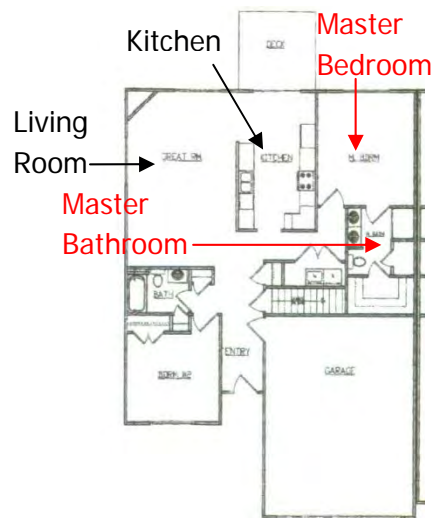


Figure 2

Bathroom: Pam and her husband feel that the bathroom and the bedroom were the two most important rooms that were modified. In the master bathroom the biggest change was the addition of a roll-in shower (Fig. 3). In order to fit the roll-in shower in the original bathroom, as well as the Hoyer transfer lift (Fig. 4), a walk-in closet and a linen closet that were in the bathroom were removed. They widened the bathroom doorway, installed shelves along the sides of the roll-in shower, and replaced the sink with a pedestal sink so that Pam can get closer to it in her wheelchair. They also installed a higher toilet that allows a shower chair to roll over it (Fig. 5).



Figure 3



Figure 4



Figure 5

Bedroom: Changes that were made in the bedroom included widening the doorway and replacing the door hinges with swing clear door hinges so the door would open wider to provide easier access for Pam's large wheelchair (Fig. 6). Window shades that can open from the top down were installed (Figure 7), and the carpet was replaced with laminate flooring. Pam enjoys having shades that open from the top since her bedroom is on the first floor and she can still lie in bed and enjoy the sunshine while maintaining her privacy. The most significant piece of furniture added to the bedroom is the Turn-Q bed to help prevent bed sores (Fig. 8). It does this by turning Pam every 15 minutes in the night and filling the mattress with air that comes through and blows on her skin.

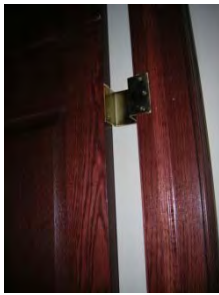


Figure 6



Figure 7



Figure 8

Kitchen/Living Room: The kitchen and living room also underwent several changes to become more accessible. The area has an open floor plan so it is virtually one room (Figs. 9 & 10). The kitchen is equipped with a refrigerator that is more accessible with the freezer located on the bottom (Fig. 11). The sliding glass door from the kitchen to the deck was replaced with a regular back door that has an automatic door opener that Pam can control from her wheelchair using a joystick (Fig. 12). The entryway from the kitchen to the deck is a no-step entrance and a ramp was added to the side of the deck to allow for easy exit in case of fire (Fig. 13). In the living room the carpet was replaced with laminate flooring (Fig. 14).



Figure 9

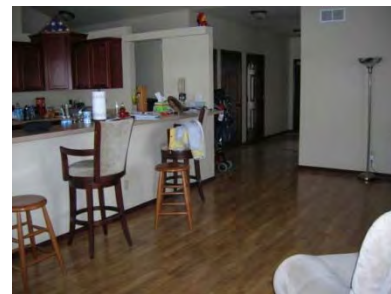


Figure 10



Figure 11



Figure 12



Figure 13



Figure 14

Pam's computer is also located by the kitchen and living room (Fig. 15). She uses Dragon Naturally Speaking to help her. She is fortunate to have some technical assistance from Simanta Mitra, a Senior Lecturer in Computer Science at Iowa State University. He created a "cheat sheet" for Dragon Naturally Speaking for Pam to use and has consulted with her about other Smart House technology which she has added (Fig. 16). The desk for her computer has also been raised so that she can roll up to it in her wheelchair and get very close. Pam's friend also created a reading table for her (Fig. 17). He used pipe to make the table taller, attached a platform to hold a book, and has a utensil that Pam can hold in her mouth and use to turn the pages.



Figure 15



Figure 16



Figure 17

Van: Pam and her husband purchased a van called the **Braun Entervan** (Fig. 18) that has "kneeling" suspension. The passenger side of the van lowers toward the ground to reduce the incline for the ramp (Figs. 19 & 20). The van has automatic doors and an automatic ramp. Also, the passenger seat in the van has been removed so Pam can sit by her husband (Fig. 21). The driver's seat can also be removed in the event that Pam would be able to drive the car using controls. Pam and her husband also built a ramp in the garage that leads into the house (Fig. 22). They plan to add an edge strip on the open side so the wheelchair won't tip off the ramp.



Figure 18



Figure 19



Figure 20



Figure 21

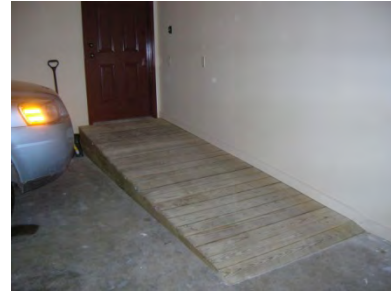


Figure 22

Other modifications that have been added in the home are buttons on the joystick on her wheelchair for the front and back door (Fig. 23), as well as voice commands for some of the appliances in the home. Pam can open the front and back door (Fig. 24) from her wheelchair using the joystick and can turn on/off the lamp and TV in the living room, as well as change the channel using voice commands. They also have a no-step entrance to their home and a wide open entryway (Fig. 25). Pam also uses a Bluetooth headset for her cell phone so that she can answer the phone without using her hands.



Figure 23

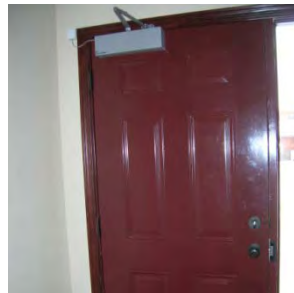


Figure 24

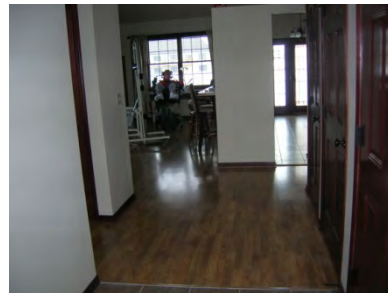


Figure 25

Pam has a manual wheelchair for days when the weather outside doesn't allow her to use her electric wheelchair, as well as if there are any problems with her electric wheelchair (Fig. 26). She has a tilt table that she straps to; it helps by putting pressure on her feet and legs since she sits in her chair all of the time, and also helps with blood pressure (Figs. 27 & 28). She also has an "E-Stim" electrical device that she hooks up to her arm to stimulate her muscles (Fig. 29). Another tool that she has is an electric arm (Fig. 30). This device helps her move her hand so she can possibly hold objects or feed herself. She has been having problems with the one she currently has since her hand is turned, and a brand new piece should help her (Fig. 31). She is able to run the electric arm by buttons by her shoulders. The problem is that everything has to be set up perfectly in order to work right.



Figure 26



Figure 27



Figure 28



Figure 29



Figure 30



Figure 31

Another modification made to Pam’s wheelchair is an elevating option. Pam can raise her wheelchair from its regular setting (Fig. 32) up to seven inches (Fig. 33). She uses this when she goes out to eat and sits at tall tables, when she is at the computer table, and when she is playing cards. They also added this to the chair in case she would get use of her hands and she could turn on/off the light switches. Pam said she would definitely recommend this.



Figure 32



Figure 33

Financing the Project

- Personal Funds
- Loans
- Grants
- Other: Money raised at a church benefit for her

Challenges/Lessons Learned/Advice for Others

Pam and her husband have encountered some struggles during the home modification process. The first struggle they faced was that they had not planned to move any time soon. Because their

previous home was a split-level house built in the 1970s, they were essentially forced to move; they figured it would be easier to buy a new house that was more accommodating and make relatively minor modifications than it would be to spend a lot of time and energy remodeling their previous home.

Another struggle was they didn't know which assistive technology devices were the best, or what companies they should go with. Since Pam's condition was unexpected, they had no experience working with these new technologies.

They also found there is a lack of support for assistive technology devices in their area of the state. Living in rural central Iowa has made it difficult to find anyone in the area who sells or works on devices they needed. For instance, the roll-in shower came from North Carolina. Lutheran Services in Iowa, however, was very helpful with buying necessary equipment. There is also a lack of social support. They have found some at Iowa State University, and a few other people with quadriplegia, but other than that there is not a whole lot in the area.

The couple also mentioned that one major struggle was getting the carpenter who installed the floors to get to the house and get the job done on time. They were happy with the job that he did, but they did have a hard time. Also, the door openers that they originally looked at were very pricey and the support was in Chicago, IL (six hours away) which would make it hard to get any help or support if something did go wrong. It would also probably be very expensive to have anything fixed if the company had to send someone out. Luckily they were able to find a less expensive door opening system that Pam can access from her wheelchair. Pam said, "Each modification gets you closer to being independent and having a richer quality of life."

What Difference Did It Make?

These home modifications have made all the difference in the world. Pam is able to use the different rooms in her home and access most of the things she needs. She can easily get around the home, go inside and outside and ride in the van. Her bed has made life a little easier for her husband since he doesn't need to get up in the night to turn her. They have also been very fortunate and happy to have the support of friends at Iowa State University. Pam said, "Visits from my friends and family have been priceless."

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