

Chapter 5 Discussion and Conclusion

Purpose of Research

The purpose of this research is toward increasing the autonomy of persons reliant on mobility assistive devices, and to reduce the load on care workers in providing such mobility. At the time of writing the gap between areas accessible to mobility disabled persons and fully mobile persons is great. The gap is largely on account of the presence of stairs but includes entry to secondary forms of transportation such as vans and the entry to such as traditional Japanese homes. The focus of this thesis has been the proposal of a semi-autonomous practical stair-climbing wheelchair employing track based technology and the proposal of a wheel cluster based high single step and stair-climbing mechanism that overcomes a number of shortcomings of stair-climbing mechanisms available at the time of writing.

Personal discussions with disabled persons

Personal discussions with long term wheelchair users have tended to diverge as to whether they have full or limited upper limb ability. Persons with full upper limb functionality tend to desire an increasingly lightweight wheelchair and arrange their world to work around known accessibility limitations. The light weight of their wheelchair minimizes their mobility efforts as well for any assistance should they ever desire or need to venture outside their (accessible) world. To such persons the very thought of adding any weight to their or any wheelchair is often inconceivable. On the other hand for persons who use a powered wheelchair, usually due to limited upper body functionality, the concept of adding stair-climbing or a high step capable mechanism to their already heavy but very stable wheelchair has typically been received in a very positive light.

Toward light-weight and compactness

The progress of nearly any device towards lighter weight and compactness tends to come with time and market demand. In the case of the Nagasaki stair-climber “Sakadankun” the vehicle weight has dropped from over 200Kg (1997) to the most recent model which weighs in at about 100Kg (2002). The aspect of electromechanical and sensor complexity tends to be similar in that as increasingly complex systems are proved reliable the complexity tends to be increased

in order to provide greater functionality. Perhaps one of the greatest areas of growth in the last five years or so has been in the areas of miniaturization including nano-technology, that is providing increasing capability via a device of reducing size.

Matching personal mobility assistive needs to the environment

In light of such trends toward compactness the high step stair-climbing mechanism has been proposed as being a potential “step” towards increasing the mobility of disabled or elderly persons in the real world. The ideal behind the concept of the high step mechanism is to provide a general purpose mobility assistive device that will increase the accessibility of non-mobile persons to be as close as possible to able bodied persons. The reasoning is based on providing an assistive device to help match the needs of the individual to the environment. This is held in contrast with adapting the environment to meet the needs of a small percentage of the population often at the expense of the larger part of the population. Simple examples of this surround us, for example the presence of early tactile pavements provided for the blind. The general population was and continues to be disadvantaged in that they are difficult to walk on, very difficult to wheel such as heavy luggage on and very difficult for wheelchair users to negotiate. A newer tactile pavement specification has since been adopted in many countries to address these issues.

Accessibility

Regarding accessibility, in many European countries accessibility has been made a priority on account of the net actual cost of non-accessibility. The net-cost of accessibility must include such as the cost of elderly or disabled persons being unable to work simply because they cannot get to their place of employment. Also the overall sense of “welcome” is to some degree connected to accessibility. This aspect is very important to a countries’ tourism industry. In the case of many European countries a move has been made to low floor buses to cater for such as wheelchairs or any persons that find the high steps difficult to negotiate. This however contrasts with such countries as New Zealand that at the time of writing would like to use such as low floor buses. However most buses are privately operated and the cost of such as low floors buses are significantly greater compared with standard buses. The question remaining is will the general public pay double (for example) for the additional functionality which will at most benefit say

1% of users, or should such as a government subsidy be provided to make the country more accessible as well as more welcoming to such as tourists. In the case of New Zealand tourism is one of the major national industries.

Door to door mobility in Nagasaki

The stair-climber “Sakadankun,” developed in Nagasaki continues to provide a robust and practical stair-climbing wheelchair on the slopes of Nagasaki. The addition of an overhead monorail system is proposed to complement the stair-climber to provide “door to door” mobility for the elderly and disabled on the slopes of Nagasaki. That is from the nearest point of vehicle access to the person’s home.

While mobility assistive device based solutions have been proposed in the case of Nagasaki, namely the provision of vertical feed transportation feeds (monorail) and horizontal feeds (Sakadankun) the implementation timescale of such will most likely be over a long period of time and coverage of all locations impractical. In light of this reality the concept of “mobility administration” which has now been made available to all eligible persons (that is persons deemed in need of mobility assistance) in and around Nagasaki is estimated to be able to fill in the gaps. That is to be able to provide mobility for people “now,” until some future unknown time when a technology based solution may become available.

In conclusion

In conclusion some future steps have been proposed and some practical steps have been taken towards making the taking of steps a reality for step taking disabled persons. Such steps could be considered “even greater steps for man and mankind,” steps towards a vision of providing mobility equality for all.

