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Environmental Barriers and The Physically Disabled

Leif Finden

ENVIRONMENTAL BARRIERS

and the

PHYSICALLY DISABLED

WORKSHOP REPORT

Sponsored By

Cerebral Palsy Research Foundation
Rehabilitation Engineering Center

and

Wichita State University

Holiday Inn Plaza
Wichita, Kansas

February 6-8, 1977

This report was prepared under a grant to the Cerebral Palsy Research Foundation of Kansas, Rehabilitation Engineering Center by the Rehabilitation Services Administration of the Department of Health, Education and Welfare. This workshop was part of the State-of-the-Art RSA/VA workshop series.

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PREFACE

Rehabilitation engineering efforts have been in existance for many years. Early methods and techniques were, perhaps, not known as rehabilitation engineering, but the goal of past engineering activity does not differ from today's or for that matter, tomorrow's. That goal is and will continue to be, to provide for a more meaningful lifestyle for the disabled individual.

What has happened since earlier years is that rehabilitation engineering thinking has become more sophisticated and, likewise, the application and results more outstanding to the point that a new requirement has been created. The need now exists to define what a near term and long range rehabilitation engineering strategy should be.

Recent advancements enable one to see that the magnitude of the problem is great. Much knowledge is available in localized research environments while the needs exist universally. In contrast to that, knowledge gaps exist universally and are concentrated in localities. Specific areas of fundamental and applied research must be accelerated along with a universal information dissemination process.

A series of workshops are being conducted to address specific areas of rehabilitation engineering, including a definition of rehabilitation engineering itself. This report covers one of the workshops that is entitled - Environmental Barriers and the Physically Disabled. A Steering Committee was formed consisting

of Pamela J. Cluff, Thomas M. Moses, John F. Jonas, John H. Leslie and Roger G. Nelson. This group met in Wichita, Kansas in early December, 1976. After an orientation and review of the local Rehabilitation Engineering Center's research, the group proceeded to develop a workshop format.

During the next few ensuing weeks, the workshop plans were finalized. The workshop would be held at the Holiday Inn Plaza in Wichita on February 6,7 and 8, 1977. The program was determined to consist of three phases. 1) presentation of papers 2) conducting of workshops and 3) presentation of the workshop's results. Specific barriers to be addressed would be attitudinal, architectural, transportation, housing, service delivery, vocational, educational, recreation and aging. Participants were invited from all across the United States, Canada and the Netherlands. Those in attendance represented a wide variety of disciplines directed to the needs of the handicapped, including the handicapped themselves.

This report of the work shop is divided into basically two parts; part 1 contains the summaries and recommendations of the workshop. Part 11 contains the presentations summarized by the individual author, the workshop sessions and supporting appendices.

It is hoped that this report will document the workshop precedings and provide the proper ingredients necessary to develop a comprehensive rehabilitation engineering strategy. Further, those in attendance were, hopefully, challenged with needs and possibilities while concurrently given a sense of reward for their personal involvement and dedication.

The workshop cannot be adequately summarized without mentioning Dr. Harold Yuker's keynote address on Sunday evening. His personal witness of being cerebral palsied and put down, but substantially challenged to overcome his inabilities was a definite positive force toward establishing the tone for the conference.

Sincere appreciation is extended to the staff of Mr. Jonas, Dr. Leslie and Roger Nelson, for their many hours of preparation and behind the scene efforts to assure a productive conference.

A special vote of thanks is also extended to Pamela Cluff and Thomas Moses, for taking time from their busy schedules to chair the conference. Their leadership and guidance contributed greatly to the attitude of participation.

PURPOSE AND GOALS

PURPOSE AND GOALS

The mission of this Rehabilitation Engineering Conference was to investigate barriers as they relate to the employment of the severely disabled. The conference assignment was to determine ways in which the Rehabilitation Engineer could interface with the alleviation or removal of barriers to employment of the severely physically handicapped. This workshop was to complement other workshops being held to determine the overall aspects of the application of Rehabilitation Engineering to the problems of the disabled. A preliminary look at barriers to employment of the severely handicapped indicated many areas in which the Rehabilitation Engineer can apply his engineering expertise.

The Rehabilitation Engineering Center in Wichita is, primarily, associated with developing vocational opportunities for the severely disabled, in a normal or near-normal environment. Upon examining the problems associated with employment of the disabled, other barriers intimately related to the success of the employment of the severely disabled emerge. Once an individual has been employed, and is made productive in an industrial environment, other barriers develop and as a result impede his progression to achieving a meaningful lifestyle.

Upon employment, barriers in housing, transportation,

recreation, service delivery areas and attitude serve to impose road blocks in the path of the individual who has become productively employed. While employment barriers were initially dominant, now other barriers become the dominant force in preventing a meaningful lifestyle.

If an individual is initially employed, this very act creates other barriers in that individual's life. This would also be true if a person is housed without a job. No matter which of these individual barriers is identified first, it is obvious upon examination of the person's lifestyle, that many other barriers exist.

Therefore, this conference attempted to react to many barrier issues that create a negative impact on the achievement of a meaningful life style of the severely disabled. The intent was to address the Rehabilitation Engineers' involvement with these barriers. If a short term and long term strategy for the Rehabilitation Engineer is to be developed, the application must be to the total lifestyle of the severely disabled population. A composite of barriers takes the form of a puzzle with segmented components. The mission requires the identification of barrier components with a goal of connecting these components in a complimentary form. If any one critical component is missing, the entire form will be found nonfunctional.

Singling out individual areas only presents "handicapping"

situations for the individual. Certain barriers such as those related to attitudes are somewhat difficult for the Rehabilitation Engineer to solve. This is an area for the social sciences, and probably a field in which the engineer can make minimal contributions. However, by designing environments such that the physically handicapped can compete successfully with his able-bodied counterpart, the Rehabilitation Engineer has gone a long way in the reduction of, or elimination of, the attitudinal barriers by placing the severely disabled individual into mainstream society. Other areas, such as housing, transportation, recreation, service delivery and employment, however; can benefit from contributions by the Rehabilitation Engineer. It was to this end that this conference was committed.

All the barriers, therefore, are inter-related, and this conference was designed to look at the barriers facing the severely disabled, and attempt to develop an integrated approach for the reduction or elimination of such barriers. The conference was also an educational process for those people currently involved in Rehabilitation Engineering programs. In many cases, it is true that professionals working in one area do not realize other technical utilization areas for their research. The conference, therefore, was designed to acquaint the Rehabilitation Engineer with other problems related to the severely disabled outside of his or her specific realm of research. The requirement, therefore, for the Rehabilitation Engineer is to analyze

the total picture with all the barriers included. The concept of barriers is such that the removal of one barrier still results in an environment in which the physically disabled individual is not able to realize his primary capabilities as a human being.

Developing a short term strategy for the Rehabilitation Engineer relates more to what each individual is involved in on a day-to-day basis. The development should be an organization of individual efforts so that the overall result could be combined into a satisfactory arrangement. Planning a long range strategy goes far deeper than today's research efforts. The needs of the population must be defined. The population itself, must be defined relative to numbers and degrees of disability requiring rehabilitation engineering solution. It would seem essential that the needs of the most severely physically disabled population must be addressed. It is apparent that if these needs are addressed many levels of handicapped would also benefit from this research. The needs must be specifically defined before solutions are developed. Once the population has been identified, and needs developed and funding bases created, goals can be identified in the areas of need for trained manpower and financial resources to solve the problems of the severely disabled, as well as facilities required to provide the support activities, and the legislative requirements associated with the solution of the problems of the disabled.

While barriers are being removed, it must be assured that other barriers are not being created. The final question which should be asked through all phases of rehabilitation engineering research as related to the barriers of the physical disabled is, "is the overall result the improvement in the quality of life of the severely disabled"? If this question cannot be successfully answered, then the research is indeed worthy of reevaluation. It is the responsibility, therefore, of the Rehabilitation Engineer to develop solutions which can be applied on an immediate basis to the problems of the physically disabled, rather than developing laboratory concepts which cannot be utilized by the severely handicapped population to better their lifestyle.

It is apparent that the goals of such a conference can be many and very far reaching. In light of this, the following elements were decided to receive major emphasis.

1. Housing
2. Transportation
3. Education
4. Service Delivery
5. Employment
6. Economic Analysis
7. Attitudinal Barriers
8. Recreation
9. Rehabilitation Engineering
10. Aging

As may be observed, this list is not all inclusive. The list also presents areas which are inter-related. It is an over-simplification to examine each of the barriers as a discrete unit since they all relate to one another in a very complex pattern. The list does, however, represent a broad spectrum of barriers faced by the severely disabled population throughout the world. It, also, in most cases, represents areas where the Rehabilitation Engineer may and should become involved in order to assist in solving the problems of the severely disabled population. If today's engineer is going to adequately address the issues and accept the challenge of providing a meaningful lifestyle for the severely disabled, he is going to have to become more and more involved with the habilitation of the severely disabled on a broad spectrum of issues involving the redesign of the total environment and the development of systems within that environment, in order that the physically disabled may achieve the quality of life so prized by other segments of the American population.

The results of this conference includes the participants inputs processed into a formal document of summaries and recommendations designed to address the issues relevant to providing a meaningful lifestyle for the physically disabled within the next decade. These recommendations are summarized in a later segment of this report into specific areas in which the Rehabilitation Services Administration can direct its financial and political energies.

SUMMARIES AND RECOMMENDATIONS

REHABILITATION ENGINEERING

SUMMARY

Federal programs have supported the application of technology to the needs of the physically handicapped for the past twenty years. The greatest progress has been made in the field of prosthetics and orthotics largely due to the strong organizational support, funding base, and service delivery systems of the prosthetics and orthotics industry. Other than this instance, the application of technology to the severely handicapped has experienced limited success.

Attempts were made during the 1960's to utilize the sophisticated technology developed by NASA, the computer industry, and space-age spin-offs. This effort was eventually abandoned with no significant success. The failure stemmed from the lack of inter-disciplinary communication and a mechanism within the clinical environment that could integrate the technology in a manner that was acceptable to patients.

A more realistic approach has placed engineers, physicians, and related professionals together in a clinical setting to work directly on patient problems. This approach has been termed Rehabilitation Engineering, and has received major support from the Department of Health, Education, and Welfare, and recently from the Veterans Administration. The Rehabilitation

Services Administration has set forth to establish a network of Rehabilitation Engineering Centers throughout the country, each emphasizing core area of research while cooperating with the other centers in information dissemination.

The overall objective of Rehabilitation Engineering is to utilize engineering to improve the quality of life for the disabled, regardless of the setting. Within this objective must be a continued awareness of the client's problems and developing solutions that are consumer acceptable.

The number of individuals who can possibly realize the benefits as a result of these technological efforts would approximate six million. The moral worth of rehabilitation justifies the program without considering the cost benefits to society that are often experienced. The current status of Rehabilitation Engineering indicates that a program is under way with stable funding, but lacking an adequate plan for a delivery system.

Therefore, it is concluded that a need is apparent. A justification of efforts still exists, a significant beginning has been made by the RSA, and the challenge for the future is not decreasing. The results of this workshop will provide a significant contribution to the Rehabilitation Services Administration strategy that will result in the delivery of rehabilitation engineering service.

RECOMMENDATIONS

Housing

1) Rehabilitation Engineering should design and develop adaptations that allow the disabled to use the housing facilities provided.
2) Engineering should provide ways in which to modify the housing environment so as to reduce service delivery needs and, thereby, costs.
3) Rehabilitation Engineering should provide methods to assure that life safety standards are able to be met by the disabled individual.
4) Human factors data, as it relates to the disabled, should be developed and then incorporated into the design of fixtures, controls, etc.
5) Engineering methods should be utilized to establish service and maintenance standards, staffing patterns, and scheduling of personnel as is required by the service delivery system.
6) The Rehabilitation Services Administration, in conjunction with the Veterans Administration, should jointly sponsor a research effort to develop housing systems and hardware for the aged and severely physically disabled.

Economic

1) Rehabilitation Engineers should provide living systems and solutions that economically interface within societies' framework.

2) Engineering investigation of possible solutions to the disabled's life style should be encouraged, i.e., employment, unemployment, levels of employment.

3) The Engineer should engage in systems development to address various groupings of disability so as to include even the most severely disabled.

4) Solutions to the economic problems of the severely disabled should utilize the engineer's methodical logical application of existing components to build a more effective economy for each disabled segment involved.

Attitudinal

1) The Rehabilitation Engineer may become an effective attitudinal barrier remover by designing and developing environmental devices and adaptation, and, in general, providing systems whereby, the handicapped population actively participate in every day society.

Service Delivery

1) Rehabilitation Engineering must assist the service delivery systems with the design of equipment and adaptations for the physically disabled.

2) The Rehabilitation Engineer should be a member of the team that designs the service delivery system, so that the advantages of Engineering become a working part of the system.

Education

1) Rehabilitation Engineering personnel should design and develop methods and equipment by which the severely

Education

involved, non-verbal handicapped person may participate in the classroom and obtain an education.

2) Rehabilitation Engineering should interact with the educational community to provide assistance in developing systems that allow all handicapped individuals to obtain an education that would be channeled towards a vocation.

3) Rehabilitation Engineering should become involved with the child's early learning systems and follow through so as to support the student throughout his educational years.

Transportation

1) Rehabilitation Engineering should become involved in all transportation systems for the disabled and elderly, whether private or public, from the standpoint of accessibility, economy, and energy saving devices.

2) The methodical analysis ability of the engineer should be applied to the operational methods of public and private transportation.

3) The Rehabilitation Engineer should be incorporated into the manufacturing process to provide methods and types of adjustments to hardware so that it is made accessible and usable by the elderly and disabled.

4) Rehabilitation Engineering should work with manufacturers so as to enhance their production capability to incorporate devices for the handicapped, without such

devices becoming a cost burden for the manufacturer or the consumer.

5) An engineering analysis of the levels of transportation for various levels of disability should be made so as to determine what is expected of society for the disabled or elderly.

6) Engineering systems should be developed that would make the surrounding environment accessible by methods that would not put an extreme cost burden on the consumer or specific segments of society.

7) Items of legislation have been passed and the engineer should work to the best of his ability within that legislation before further legislation is requested.

Recreation

1) Rehabilitation Engineering through the design of adaptive devices should allow the handicapped to be more included in recreational activities.

2) Engineering should become involved in the modification of wheel chairs for use in specific sports and athletic activities.

3) Rehabilitation Engineering can become involved in the design and development of new and additional equipment, devices, and materials for use in various activities.

4) Engineering should make equipment adaptable for the various segments of the handicapped population, including the most severe physically and the profoundly mentally retarded.

5) The value of swimming to the handicapped is beneficial to the extent that the engineer should become involved in the facilities, devices, and equipment to make swimming more economical and useful by the handicapped.

6) Rehabilitation Engineering should become involved in designing facilities, equipment, devices, and materials to enable the disabled and handicapped to participate in regular program settings to the maximum degree possible.

7) Rehabilitation Engineering should address outdoor recreational facilities such as camps and wilderness areas, so that the disabled and handicapped can effectively utilize these areas.

8) Engineering should concentrate on providing adaptive means whereby the disabled may participate in seasonal activities, no matter what the season.

Aging

1) Environmental controls and control systems specifically designed for the aged and disabled aged should be researched and developed.

2) The environment, and possible modifications to it should be researched so as to determine what degree of an adaptive environment is available.

3) After knowing the research results and determination of adaptive devices, methods of development should be improved.

4) A more stimulating environment should be engineered for the elderly person.

5) The Rehabilitation Engineer must become involved immediately in the definition of problems, development of solutions and distributions of those solutions along with the general information dissemination of all research activities.

6) The feasibility of a Rehabilitation Engineering Center being established to address the problems of the aging should be a priority of the Rehabilitation Services Administration jointly with the Veterans Administration.

7) Rehabilitation Research activities for the aged should be centered in areas where there is a heavy concentration of aged population.

Employment

1) Rehabilitation Engineering must accept the challenge of being the catalyst that brings employer, employee, and support agencies to a workable solution.

2) Rehabilitation Engineering must be instrumental in developing employment alternatives.

3) Engineering must utilize the basic fundamentals of the discipline to research, develop, and implement employment management systems.

4) Rehabilitation Engineering must become an intregal part of the educational system of the severely physically disabled, using engineering foresight to design the

systems and tools that will result in vocational preparation.

5) Engineering must design adaptive devices that will allow the physically severely disabled to participate and obtain an education.

6) Practical vocational training utilizing adaptive devices or systems to obtain an acceptable skill level will require sizable engineering support.

7) A system of training rehabilitation engineers in methods of employing severely disabled in mainstream industries should be a function of the Rehabilitation Services Administration.

8) Rehabilitation Services Administration should train rehabilitation engineers so they can become employees of industry and then support and provide methods of employing the disabled.

9) Rehabilitation Engineering should develop methods of evaluating clients to determine the optimum job placement.

10) The Rehabilitation Engineer must be trained and continually updated to be current with newly developing employment systems.

HOUSING

SUMMARY

Housing is a basic human need of life and a fundamental pre-requisite to all other activities. The social and psychological support provided by the home is as important as the shelter that is provided. The rehabilitation of the handicapped is often incomplete because acceptable housing is non-existant.

There is a legislative incompatibility between employment standards and housing standards. While the law encourages employment, it does not provide adequate sources of compatible housing for the handicapped. Presently, normal housing does not fall under accessibility codes; therefore, the lack of integrated housing has resulted in segregated living arrangements.

The basic need in housing is to give the consumer a choice as to price, location and support services. The building industry has failed to meet the need of housing for the disabled by not providing choice or selection. Similarly, the (information) system has failed to educate the building industry decision makers.

Codes are mostly effective only when government funds are used in the construction. Some states have begun establishing

their own minimum standards. Even when accessible housing is provided, the price range of that housing is often unaffordable for the disabled. Efforts are under way to establish federal minimum standards that HUD could adopt. Research projects are beginning to produce results which have not been available before.

Confusion and lack of information seem to be the by-words of the housing industry. For instance, there is little information available regarding section 202 demonstration projects. Confusion exists on the types of architectural standards to be maintained and little enforcement exists of existing standards. ANSI standards have not been incorporated into HUD standards. The lack of fund policy and standards has been a major barrier to accessible housing.

It is noted that an obstacle to the removal of architectural barriers is the cost of removal. The cost of barrier-free new construction is not as extensive as renovation of existing buildings. A problem related to barrier-free new construction seems to be the result of mass production which tends to breed inflexibility into the housing industry. Some states are allowing tax cuts for builders who make buildings accessible, but a problem exists in that most of the people do not know what their states' regulations are.

Often modified apartments go unused for disabled people because they cost too much and, secondly, handicapped people are

unaware that they are available for occupancy. Further, apartment managers are unaware of special apartments within their own complexes and rent them to able-bodied residents. Able-bodied residents seem to sense no dissatisfaction with living in a barrier-free modified living arrangement.

Life safety codes as they relate to housing are less than desireable. Interpretations, locally, vary too much for acceptability. Efforts should be made to clarify and interpret the code more clearly, and a system of appeals should be made available to overcome interpretation variations at the local level.

When housing is planned for the disabled, efforts must be made to provide flexibility so that the handicapped individual has an opportunity to make choices. Living conditions can be improved for every one through a re-evaluation of all human needs in residential situations. A choice of housing is just another of the qualities of an independent, normal, life-style.

RECOMMENDATIONS

1) It is recommended that barriers be overcome in new construction by manufacturing standards being changed for items used by all the population.
2) Information should be made available on which previous housing projects were successful and why they were successful.

3) The standards that result in removal of architectural barriers should be incorporated into one federal standard.

4) Communities should develop a central registry of housing available for disabled people.

5) Rehabilitation engineering should design and develop adaptations that allow disabled to use the housing facilities provided.

6) Engineering should provide ways in which to modify the housing environment so as to reduce service delivery needs and thereby costs.

7) Rehabilitation engineering should provide methods to assure that life safety standards are able to be met by the disabled individual.

8) Human factors data as it relates to the disabled, should be developed and then incorporated into the design of fixtures, controls, etc.

9) Engineering methods should be utilized to establish service and maintenance standards, staffing patterns, and scheduling of personnel as is required by the service delivery system.

10) The Rehabilitation Services Administration and the Veterans Administration should jointly sponsor a research effort to develop housing systems and hardware for the severely physically disabled.

ECONOMIC

SUMMARY

An investigation into the economic environment affecting disabled individuals would be beneficial not only to the disabled, but also to society. It is highly probable that economic barriers exist for the individual, for his potential employer or even for society (government) itself. The benefits of rehabilitation engineering must economically support societies' investment as well as the individual himself.

A determination needs to be made as to what level of producibility is expected of the disabled and what amount of cost is going to be shared by the supporting functions. It must also be determined who the beneficiary of rehabilitation engineering is, and who will be funding the engineering effort.

Are employment opportunities really feasible for the severely disabled individual? Does a disabled individual, when he becomes an employee, receive a comparable financial benefit from employment as the non-handicapped individual does? It would seem that the disabled are often faced with economic disincentives to employment. Does our present systems provide security for the handicapped individual or does the utilization of those systems actually provide a lack of security?

Historically, our funding sources tend to support an institutional type of care rather than promoting an independent life-style for the severely disabled. Further, community service funding sources seem to be fragmented, disorganized, and incomplete when a combination of these funding resources are required. The actual percentage of funds that are allocated by the Federal Government is very low when it comes to what the actual consumer (disabled individual) receives. Not only is state and local government utilizing substantial portions of the funds for administrative costs, but the fragmentation and disorganization of funding sources seems to compound the disorganized environment of the disabled. One thing is certain, the rehabilitation engineer does play an important role in establishing a balance of the economic systems.

RECOMMENDATIONS

1) Financial assistance should be provided to the severely disabled who are unable to be gainfully employed, so that a near-normal lifestyle is provided at a minimal cost. (Institutional alternatives)
2) Financial assistance or arrangements should be made that would assure the disabled individual that he is benefited by becoming employed and does not lose money by being employed.
3) The special service delivery needs of handicapped people should be funded by society rather than acting

as a penalty to the handicapped individual for his handicap.

4) The handicapped individual should bear the normal costs that are assessed because of his handicap.

5) Funding sources should be consolidated and streamlined in an effort to provide more net dollars to the consumer directly. Government agencies need inter-coordination effort to eliminate the strangulation rather than the stimulation of access to services.

6) Terminology and definitions utilized by these service organizations must be established and standardized so as to encourage inter-departmental coordination.

7) Supplemental Security Income needs to be re-evaluated to determine why the needs of the disabled are not being met and revised to meet those needs.

8) Rehabilitation engineers should provide living systems and solutions that economically interface within societies' framework.

9) The engineering investigation of possible solutions to the disabled's life-style should be encouraged, i.e., employment, unemployment, levels of employment.

10) The engineer should engage in economic systems development to address various groupings of disabilities so as to include the severely disabled.

11) Solutions to the economic problems of the severely disabled should utilize the engineer's methodical logical application of existing components to build a

more effective economy for each disabled segment involved.

ATTITUDINAL

SUMMARY

The disabled are sensitive to how people react to their disability. Many attitudinal barriers are based on preconceptions instead of actual involvement. The handicapped should be allowed to participate in the normal environment so that they become a part of social expectation and acceptance.

It is noted that handicapped individuals range from those mildly effected to the very severely handicapped. It is assumed that if the needs of the most severe handicapped are met, then the needs of the milder handicapped individual are also achieved. It is fair and accurate to say, that the needs today of the handicapped are not met unless the needs of the most severely physically handicapped individual are addressed. It is generally agreed, the handicapped want no more from society than acceptance without special treatment, protection or pity. In short, they want the right to succeed or fail as any other person, as well as to determine their own destiny.

A problem exists in that, the professionals who are involved in rehabilitation, still treat the physically disabled as handicapped individuals, and often fail to overcome unintentional attitudinal barriers. For example, many times medical and dental care is not even available to the handicapped because

of the lack of understanding, ignorance, or misconception. In many instances, rehabilitation engineers and architects do not really have an understanding of the physically disabled. Often, a team approach is utilized in the treatment of the handicapped, and that approach is sometimes hampered by the diverse attitudes of team members. A tremendous barrier often exists, in that the physically disabled are not even included as intregal members of society.

The general emphasis in America today is on the physically healthy individual. This begins in early childhood and is related to all human activities no matter what the age. The general public has failed to understand that the physically disabled are human. It is true that being a physically healthy individual is desirable, but there is no reason why those who are not, should not be accepted. Therefore, the attitude of the handicapped themselves and the variations therein has not promoted an attitude of acceptance by the general public.

The overriding force in today's society which could overcome the attitudinal barriers more effectively than any other source would be the use of media. The media has failed to present the physically handicapped as performing similar daily functions as the able bodied are also required to do. There is very little consideration of handicapped adults in media presentations and when they are utilized they are not the typical average handicapped person. Media presentations have historically

utilized the tin cup approach. Further, television has presented totally unrealistic occupations being performed and mastered by the physically handicapped. The media must allow the development of normal attitudes toward the physically handicapped before they will be widely accepted. Unfortunately, many volunteer health organizations have perpetuated a counter productive image of the disabled by alluding to the "differences" rather than "similarities" as it relates to normalization. This dichotomy is usually related to an emotional appeal for funds. If the current level of public funds were efficiently utilized, many volunteer appeals would not be necessary.

Legislation can not mandate attitudes, but it can mandate attitude changing requirements. Federal and State mandates are currently the best method of changing attitudinal barriers and should parallel the methods that were utilized to remove racial barriers. It would also appear that Federal mandates were more effective than state or local mandates. Legislation without adequate financing is not effective for short term goals. It can be utilized without adequate financing to provide a system through legal processes, to achieve long term attitudinal changes. Of course, financing with larger amounts of money draws more attention and thus presents more effective educational value, but the rate of return on the dollar spent must be clearly evaluated.

While rehabilitation agencies often dwell on changing the attitudes of the mass population, it is also necessary to effectively educate professionals in the field. The most effective method of educating professionals is through the professional organization societies of which they are active members. Further, special persons should be included in the training programs of various professionals which would encourage an understanding of the problems of the physically disabled. Media professionals must be encouraged to present the adult handicapped to the general public.

In general, those in the field of rehabilitation must accept the responsibility of educating the mass public and the professional discipline of the needs and desires of the physically disabled as being the same needs and desires of the normal able-bodied population.

RECOMMENDATIONS

1) The rehabilitation engineer may become an effective attitudinal barrier remover by designing and developing environmental devices and adaptations, and, in general, providing systems whereby the handicapped population may actively participate in everyday society.

SERVICE DELIVERY

SUMMARY

No Nation has equaled the United States' efforts to support the claim that all men are created equal. The physically disabled are, today, in the first phase of achieving their Civil Rights. History provides a pattern to emulate similar to the approach that brought about racial acceptance.

One of the major barriers to integrating persons with physical disabilities into the community is their dependence upon others for physical help in some of their daily living activities. Usually, that needed assistance is provided by those organizations that are separated out of the mainstream of community life. If rehabilitation is to be successful, integration into the community must be a result of rehabilitation.

It must be determined as to what is a fair and just approach to support services for the physically handicapped. Physically disabled in need of support services want to and should pay for ordinary costs of living. They should not be burdened with support costs that are a result of their disability. The determination of fair living expenses must be decided with the individuals' personal involvement in the decisions.

The physically disabled must experience a freedom like any

ordinary citizen, which has bounds that are determined by the proper exercise of that freedom. It is an awesome task to define and then construct a service delivery system that meets the consumer's needs, and yet prevents the management of the system from destroying the consumer's freedom.

Historically in the United States longitudinal government funding for support services has been earmarked for institutional environment, i.e., State institutions, hospitals, nursing centers, etc. Community based programs i.e., (normalization) do not have historic funding basis. A governmental funding system needs to be developed to provide longitudinal funding for community support services with the same probabilities of continuation as institutional dollars.

RECOMMENDATIONS

1) Service delivery systems should be developed with the most severe individual in mind and, therefore, all levels of disability would be accomodated.
2) Workable solutions to the Service Delivery problems must be supported by efficient legislative action.
3) Legislative actions must be supported by corresponding funding to assure that implementation of the legislative action takes place.
4) Future programs must be implemented that include the disabled from birth through adulthood.

5) Rehabilitation Engineering must assist the service delivery systems with the design of equipment and adaptations for the physically disabled.

6) The Rehabilitation Engineer should be a member of the team that designs the service delivery system, so that the advantages of engineering become a working part of the system.

EDUCATION

SUMMARY

It is an acceptable fact that all able-bodied individuals in this country are entitled to an education. Legislation has been passed specifying that all individuals, even though they may be handicapped, are also entitled to an education.

As the implementation of the law takes place, the attitudes of society gradually are beginning to change and accept this mandate as a way of life.

The educational law has been amended with some attention given to environmental barriers for handicapped children. P. L. 94-142 stresses the importance of schooling and the accessibility of schools for the handicapped. Concurrently, the education community is recognizing that children with learning disabilities, minor handicaps and mild physical disabilities require certain adjustments to allow them to achieve their full potential of learning.

The focus on accessibility has overshadowed much concentration on other barriers to education. The removal of evironmental barriers, will require funding that is not presently available. Concurrently, there is a need to educate the various professionals who work with the handicapped on items that affect the handicapped,

to make them aware of other's contributions and needs.

The time has come for rehabilitation personnel to begin addressing the education issues. The accessibility to an education goes much further than the removal of architectural barriers. The development of an educational environment for the handicapped should be enhanced by rehabilitation personnel.

RECOMMENDATIONS

1) There is a need for federal and state agencies to establish a procedure for properly integrating the education and vocational training programs for the physically disabled.

2) Programs specifically tailored to providing the physically disabled with an education that will result in an occupational preparedness should be developed.

3) Career information, counseling and vocational possibilities that are practical should be provided for the physically disabled.

4) There is a need for increased funding of practical research programs designed to meet the education needs of the physically handicapped.

5) Rehabilitation engineering personnel should design and develop methods and equipment by which the severely involved, non-verbal handicapped person may participate in the class room and obtain an education.

6) Rehabilitation engineering should interact with the

educational community to provide assistance in developing systems that allow all handicapped individuals to obtain an education that would be channeled towards a vocation.

7) Rehabilitation engineering should become involved with the child's early learning systems and follow through, so as to support the student throughout his educational years.

TRANSPORTATION

SUMMARY

The Urban Mass Transportation Act of 1964 declares that the handicapped and elderly have the same rights to mass transit methods as the non-handicapped. As a result of the transportation act, the Urban Mass Transportation Administration (UMTA) provided several different methods for implementing the act of 1964. First, the UMTA provides matching funds for planning, engineering, designing, and evaluation of various projects. Further, the UMTA divides matching funds for actual operations. For capital expenditures, the UMTA will fund as high as 80% of the total expenditure.

A further requirement of the UMTA is that many vehicles and facilities must have features to make transit use easier for the disabled and elderly populations. Manufacturers of new buses that are advertised for bid must have wheel chair accessibility options offered as part of the bid package. Furthermore, funds are also available to private, non-profit organizations so they may purchase transportation equipment to privately transport the elderly and handicapped.

The Department of Transportation conducts and supports research and development studies and projects covering various areas of research. Research is presently being conducted to

determine the nature of transportation problems for the elderly and handicapped, what small bus requirements should be, prototypes of 50 passenger city transit buses, wheelchair accessibility on existing buses, and possible escalator modifications to accomodate the elderly and disabled.

Not only is research and development studies a part of DOT, but also the UMTA is engaged in demonstration programs across the country. One specific area that is now being developed is methods of rural transportation for the elderly and disabled. Further, rail transportation is also being affected by sponsorship of programs to accommodate the disabled.

Even beyond accommodation of the handicapped, the Department of Transportation is conducting safety research to improve driver performance and methods to assist handicapped and elderly drivers. Programs are also being conducted in the areas of driver instruction, pedestrian safety, and improvement of driver licensing procedures.

Transportation for the disabled goes farther than what the Department of Transportation is responsible for. The transportation mode utilized by many disabled individuals is the wheelchair. Wheelchairs seem to be far from the optimum in design as required by the physically disabled. Wheelchair initial cost and the continued maintenance cost are major obstacles for the disabled person to overcome.

Individuals who are confined to wheelchairs find that the methods of transportation for them are limited and very restricting in the normal environment in which they must function. Efforts on the part of DOT should be expanded by other organizations to see to it that the wheelchair-bound individual functions with the same transportational freedom as the able-bodied individual.

Presently, methods of wheelchair transportation are not safe, even under minor accident conditions. Further, disabled individuals who drive are in need of better designed adaptive devices for their automobile controls. In addition to that, modified seating and improved restraints are needed.

Methods of transportation utilized today by the handicapped individual often excludes the individual either from a barrier or by policies established by the transportating organization.

RECOMMENDATIONS

1) Incentives should be provided to wheelchair manufacturers to encourage improvement of their product in both quality and economy.

2) A consumer advocacy agency is suggested to provide feed-back from the consumer to the manufacturers of wheelchairs.

3) Rehabilitation engineering centers should conduct testing and evaluation of wheelchairs and publicly disseminate such information.

4) Consumer advocacy needs are critical in the areas of licensing, insurance and cost of insurance.

5) Overall automobile transportation systems for the disabled should be investigated by the rehabilitation engineer and recommendations made for design, development and economical manufacturing.

6) Rehabilitation engineering should become involved in all transportation systems for the disabled and elderly, whether private or public, from the standpoint of not only accessibility but also economy and energy saving devices.

7) The methodical analysis ability of the engineer should be applied to the operational methods of public and private transportation.

8) The rehabilitation engineer should be incorporated into the manufacturing process to provide methods and types of adjustments to hardware, so that it is made accessible and usable by the elderly and disabled.

9) Rehabilitation engineering should work with manufacturers so as to enhance their production capability to incorporate devices for the handicapped, without such devices becoming a cost burden for the manufacturer or the consumer.

10) An engineering analysis of what levels of transportation for what levels of disability should be made so as to determine what is expected of society and for the disabled or elderly.

11) Engineering systems should be developed that would make the surrounding environment accessible by methods that would not put an extreme cost burden on the consumer or specific segments

of society.

12) Items of legislation have been passed and the engineer should work to the maximum within the framework of that legislation before further legislation is requested.

RECREATION

SUMMARY

There must be a removal of the problems and barriers that create less than full participation for the disabled recreational activities. Limited expectations of what individuals can do may unknowingly influence even the most dedicated professional's opinion. Rather than concentrating on the attitudes that prevent participation in recreation, innovative ways must be devised to overcome the barriers. Recreation, like many other segments of the environment, is no exception to the creation of barriers and the ability for those to be removed.

Handicapped individuals can take part in recreational programs whether the participation be in an everyday public recreation facility or a special sheltered program specifically designed for that individual's group. Adaptations or modifications to facilities and/or equipment often allow a number of disabled to participate. Recreational activities may be designed for therapeutic, educational, training, instructional rehabilitation, or recreational purposes. Of course, to participate in recreation, other barrier-conscious disciplines must interact, such as housing, transportation, education and service delivery. The overriding objective of recreation is to let the individual sense an independent life style by being able to participate.

Those involved in developing adapted recreation systems need to be fully aware of the problems before problem solving begins. Development and solutions without input from the consumer is a critical error that is repeated far too frequently. Adaptations must include common sense as one of the design parameters.

RECOMMENDATIONS

1) Professional recreation leaders should be educated to know how to include the disabled into regular public recreational programs.

2) It would be desirous to have active handicapped persons train and teach other handicapped individuals how they may participate in recreational activities and how to adapt to those activities.

3) Rehabilitation engineering through the design of adaptive devices could allow the handicapped to be included in recreational activities.

4) Engineering should become involved with the modification of wheelchairs for use in specific sports and athletic activities.

5) Rehabilitation engineering can become involved in the design and development of new and additional equipment devices and materials for use in various recreational activities.

6) Engineering should make equipment adaptable for the various segments of the handicapped population, including the most severe physically and the profoundly mentally retarded.

7) The value of swimming to the handicapped is beneficial

to the extent that the engineer should become involved in the facilities, devices, and equipment to make swimming more economical and usable by the handicapped.

8) Rehabilitation engineering should become involved in designing facilities, equipment, devices, and materials which enable the disabled and handicapped to participate in regular program settings to the maximum degree possible.

9) Rehabilitation engineering should address outdoor recreational facilities, such as camps and wilderness areas so that the disabled and handicapped can affectively utilize these areas.

10) Engineering can concentrate on providing adaptive means, whereby the disabled may participate in seasonal activities, no matter what the season.

11) Prosthetic devices should also be included as possible means for the handicapped to participate actively in recreation activities.

12) A system for better utilization of research information needs to be developed to more effectively make available information regarding adaptive devices that already exist in the area of recreation for the disabled.

AGING

SUMMARY

It is most refreshing to see the Rehabilitation Engineer begin addressing the issues of the aging. As the rehabilitation personnel began the development of systems for the aging, it is anticipated that the general public will slowly begin to accept its moral responsibilities for caring for the aging. There is no reason why the aging should not enjoy a meaningful lifestyle in their latter years. The elderly population cannot be considered as one homogenous group of individuals. Service Delivery Systems may be broken down into various groupings. For instance, the aged person may be active in participating in ongoing society, while others are unable to actively participate. Further, that active aged population may be composed of able-bodied or disabled individuals. Likewise, the inactive group may also be made up of the disabled or non-disabled individuals.

Today's society has generally placed the family in a situation of sharing the burden with the elderly in one of three catagories.

1. Can and does care for the family member
2. Can care for, but refuses to care for the family member
3. Can't, or is unable to care for the family member

As a general rule, it is presently societies' lot to care for the aged individual as long as the individual's very basic

needs have been supplied. Society has felt no further obligation to the individual's lifestyle.

Many problems infiltrate the environment of the aged, which would include, but not be limited to, mobility, transportation, service delivery, cost of equipment, cost of care and, last but not least, legislative restrictions. Now the case often occurs in which the elderly individual does not know what services are available, what funding sources are available, what housing is available, what devices are available or what rights are really his.

The care facilities and assistance required by the disabled elderly may be significantly different than those required by the non-disabled. It would appear that the elderly physically disabled person would require similar care, as the younger physically disabled person, along with the services available to them and required by the elderly non-disabled population. There would be some correlation between the elderly disabled individual's care requirements and the elderly sick or inactive individual. These assumptions should not be made without further study. Such a study should include viable options for individuals beyond a nursing home environment, perhaps by improving, from an engineering point of view, the ability to remain at home and care for one's self, or assist outside services in providing care. In determination of services, a significant difference may often exist between the chronological, psychological and physiological aid to the elderly person. All factors that weigh

upon the individuals lifestyle should be brought together and evaluated before a determination is made into what would best benefit the disabled, elderly individual.

A critical situation exists, in that the general public is not aware of what is happening for the aged, or even more critical, what is not happening for the aged. The attitude and general education of the public is one of the greatest barriers to overcome.

RECOMMENDATIONS

1) Studies must be made to determine what the problems are for the aged and a specification of objectives should be made.
2) An investigation should be made into the effects of chronological, physiological and psychological age upon the determination of a satisfactory service delivery system.
3) Rehabilitation organizations should conduct specific conferences on problems for the aging and disseminate the solutions found to the general public.
4) Parameters for solutions should be established that would be practical and affordable by the individual and the Service Delivery System.
5) Information about practical, adaptive devices should be more widely disseminated to the general, aged public.

6) Environmental controls and control systems specifically designed for the aged and disabled aged should be researched and developed.

7) The environment and possible modifications to it should be researched so as to determine what degree of an adaptive environment is available.

8) After knowing the research results and determination of adaptive devices, methods of development of such should be improved.

9) A system should be provided so that elderly persons are retained in the work force for a greater number of years.

10) A more stimulating living environment should be engineered for the elderly person.

11) Alternative lifestyles should be available so that socialization does not facilitate the effects of aging.

12) The Department of Housing and Urban Development should develop a streamlined approach to providing adapted housing for the aged and the disabled aged.

13) Attitudes toward the elderly should be improved by on-going education and public relations by the media.

14) The public should be made aware of what services are provided for the aged, and what services are not provided for the aged.

15) Legislative interaction with the needs of the aged will determine the success or failure of the public to accept its responsibilities.

16) Following legislative action, appropriations must be made that will best economically serve the requirements of the aged.

17) The Rehabilitation Engineer must become involved immediately in the definition of problems, development of solutions and distribution of those solutions along with general information dissemination of all research activities.

18) The feasibility of a Rehabilitation Engineering Center, being established to address the problems of the aging, should be a priority of the Rehabilitation Services Administration jointly with the Veterans Administration.

19) Rehabilitation Research Activities for the aged should be centered in areas where there is a heavy concentration of aged population.

EMPLOYMENT

SUMMARY

Employment opportunities have historically been minimal to non-existant for the severely physically handicapped. The lack of employment has greatly contributed to the attitudinal barriers associated with the disabled, and has been a real deterrent to a rewarding and meaningful lifestyle. Today's society rejects the unemployed even when able-bodied. This, coupled with being both disabled and unemployed, the handicapped person has little chance of being accepted.

The employment of the able-bodied requires more than completing an application. More-so for the severely disabled, employment requires more than completing an application and having the necessary qualifications. Because of the barriers preventing employment, a practical approach and new system must be developed. A more accurate expression would be "systems". The problems associated with employment do not exclude the employee, the employer, or the service delivery organization.

Our educational system has not provided a means whereby a physically disabled child may obtain an education that will prepare him for a vocation that is obtainable. Without being vocationally equipped, there is a small chance for competitive employment. Even if the education and training were functional,

the possibilities of employing the disabled are limited. Employment requires a support system ranging from minimal and part-time, to major and full-time. A good portion of the support system may be engineered, but other disciplines complement the team.

From the employer's viewpoint, a multitude of questions arise regarding the employment of the severely disabled. Many of these are legitimate questions. To expect the employer to bear the out-of-ordinary costs associated with employing the severely disabled is as contrary as expecting the disabled to pay his out-of-ordinary living expenses due to his physical disability. Many employers exclude the severely handicapped simply because they don't see how to make them productive employees.

To imply that the employee and employer have all the problems and potential solutions without including the service delivery organizations is certainly unjust. The support system has not had technical support or ways of technically evaluating its clients. A communication gap has separated the socially oriented and the industrially oriented. New and innovative approaches have not been exhibited to generate the interest and support of industry. Labeling the solution as easily solved is inaccurate, but without some means of self-evaluation, the system development will be slow to change.

The whole employment concept will be incomplete as long as the disabled individual lacks the freedom of choosing an attainable vocation. The design of systems that include vocational options for the consumer are those that add to the quality of life.

RECOMMENDATIONS

1) The policy and attitude that employment results in total independence of supportive services for the severely physically disabled must be revoked at a Federal level.
2) Social, vocational, educational and engineering personnel must be integrated vocationally as a function of the disabled individual.
3) Rehabilitation Engineering must accept the challenge of being the catalyst that brings the employer, employee and support agencies to a workable solution.
4) Rehabilitation Engineering must be instrumental in developing employment alternatives.
5) Engineering must utilize the basic fundamentals of the discipline to research, develop and implement employment management systems.
6) Rehabilitation Engineering must become an intricate part of the educational system of the severely physically disabled, using engineering forsight to design the system and tools that will result in a vocational preparation.

7) Engineering must design adaptive devices that allow the severely physical disabled to participate and obtain an education.

8) Practical Vocational training utilizing adaptive devices or systems to obtain an acceptable skill level will require sizable engineering support.

9) Funding sources to support out-of-ordinary support service costs that are employment oriented must be a Federal priority.

10) A system of training rehabilitation engineers in methods of employing the severely disabled in mainstream industries should be a function of Rehabilitation Services Administration.

11) Rehabilitation Services Administration should train rehabilitation engineers, so thay can become employees of industry and then support and provide methods of employing the disabled.

12) Rehabilitation Engineering should develop methods of evaluating clients to determine the optimum job placement.

13) The Rehabilitation Engineer must be trained and continually updated to be current with newly developing employment systems.

14) Rehabilitation Engineering must support and develop alternatives to on-going employment that emulate the mainstream, rather than sheltered employment. Although

a goal of on-going employment needs to be maintained. Practical realities require a buffer system of employment to develop a systems approach and cover the time frame between concept and total achievement, i.e., Center Industries Corporation, Wichita, Kansas.

LEGISLATIVE

SUMMARY

Legislation has been generously discussed throughout the various barriers for the severely handicapped that surfaced through the course of workshop. However, there is one barrier that is not independently identified in a categorical breakdown that needs to be referenced. This barrier could be termed legislative barriers to the handicapped. This is not to suggest that executive, congressional, and government staffs have purposely set a course to impede the progress of developing meaningful life-style for the disabled. However, it does strongly suggest that the system offered by Congress and the executive branch and edited by government staff has developed an unfortunate maze of services that include contradictions and that have negative impacts on the creation of meaningful lifestyle for the severely disabled. This statement should further be qualified by stating that many of the following recommendations concerning these contradictions are currently being identified by respected agency personnel; and hopefully legislative proposals are being developed to correct the negative impacts. The historic legislation and funding systems "developed to meet the needs" of the severely disabled are designed around the "exclusion theory", rather than the "inclusion theory" of mainstreaming. As of this writing there is yet to be developed a longitudinal funding base to meet the requirements of disabled individuals at the

community level.

During this time frame, however, historic funding is available to meet the needs of institutions, hospitals, and nursing homes. Even though the cost factors of mainstreaming (reasonable dignity) are often less burdensome to the taxpayer than the "historic exclusion approach", it is suggested that much can be learned in developing new national policies for the handicapped after reviewing foreign successes.

One of the barriers most dependent upon legislative action is that of housing. The greatest potential for assistance in housing for the disabled is under Section 202 and Section 8 of HUD. Today, HUD has had minimal experience in providing and developing housing concepts and systems to meet the requirements of the disabled. Unfortunately, HUD has extended the language of regulations for the elderly to cover the requirements of the disabled. The disabled and elderly are viewed as one homogeneous grouping. It is understood that efforts are currently underway to correct this generalization.

Some Federal agency must be prepared to accept responsibilities for finding a means of securing services and of performing the management function required by specialized housing. Development of successful community based living arrangements for persons with severe disabilities cannot be achieved by the utilization of HUD supported programs alone. Successful implementation requires an existing agency with experience in both service

delivery to the disabled, and hopefully, in some aspects of long term care or long term management can make the commitment of a sponsorship. Service and housing integration requires specific and astute planning in the use of funds. Shelter is frequently only the beginning, not the end.

If employment is to become less of a barrier to the severely handicapped, some definite commitments at the Federal level will have to be made. The Federal Government should expand its efforts in providing set aside contracts to assist the employment requirements of the disabled. Current provisions under NISH and SBA are extremely limited in scope of funding. One of the primary reasons that foreign employment systems for the handicapped have been successful is tied to the government's willingness to set aside large government contracts. Such contracts are developed around the working environment that mixes able-bodied with disabled to create a near normal working environment. The current regulations, under Wagner-O-Day, restrict the ratio of the able-bodied to disabled at a 25% able-bodied and 75% disabled mix. A 60% able-body to 40% disabled is suggested as a more reasonable mix. This concept would also support a positive cash flow, by allowing substantial contracts to come into a facility requiring only 40% of the job stations to be modified, rather than the current 75%. It would also further assist in neutralizing the argument that contracts were being set aside to service the needs of the disabled at the expense of the able bodied population.

RECOMMENDATIONS

1) Section 8 of Housing and Urban Development rent subsidy should permit the living in of an attendant (relative or friend) without resulting in a negative impact regarding funding.
2) SSI payments should not be counted as income under section 8.
3) A revision of income eligibility should be required to allow greater levels of income for disabled than for the elderly. Currently, the elderly and disabled are packaged together. While most elderly have peaked out on highest level of income, many disabled individuals requiring housing assistance are in their early growth period of income, and thus could be disqualified for rent subsidy.
4) Tax rebate should be permitted for the disabled home-owners who require remodeling and renovation to permit accessibility including engineering modification, i.e., development of devices permitting transfer.
5) It is recommended that a congressional committee be appointed to study and evaluate handicapped employment systems currently successful in foreign countries.
6) It is recommended that a Congressional committee review the current disincentives for employment that would include SSI, medical, rent subsidy, and other traditional welfare support systems that create unnecessary risks for the severely disabled individual who wishes to seek

employment.

7) It is recommended that Wagner-O-Day legislation be amended to create and employ a ratio of 60% able-bodied to 40% disabled.

8) Tax incentives should be provided to on-going industry to encourage the employment of the severely disabled.

9) Tax rebates should be provided on salaries of rehabilitation engineers who are employed by on-going industry.

10) Tax rebates should also be provided to cover the cost of adaptive devices and other (out of pocket) expenses paid by the employer as related to the employment requirements of the severely disabled.

PAPER PRESENTATIONS

HOUSING

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Editors Note: The following paper is a reproduction of the actual presentation as tape recorded February 7, 1977

Adequate housing is one of the basic needs of life, and is said to be a fundamental prerequisite to all other human activities. The social and psychological support, which the home provides, is as important as the shelter and is equally important to all people, regardless of their age, physical, mental or other ability or disability. This nation spends vast sums of money on energy, on rehabilitation of individuals who have disabilities. One goal of rehabilitation is to restore a persons functional abilities to live independently, and to assume an active role in society. One obstacle to the realization of that goal is inadequate housing. People concern themselves with getting out in the world, seeking employment, developing as a person when they cannot even get into their bathroom or cook a meal without assistance. What disabled person can risk attempting to undertake his independency when emergency and other services may not be available nearby? The dependency, or poor self image fostered by inadequate housing is because living accommodations are not conducive to rehabilitation goals

The disabled person may be rehabilitated in the eyes of the educated, and he may be able to find a job. The present laws guarantee a required sum degree of accessibility to facilities for these purposes. A person will very likely not be able to find housing near his job which is physically accessible to him, within a price range he can afford, and in a location which can offer the services that he and his family might both require. No accessibility requirements apply to normal housing. Standards for design for the disabled in building codes have not applied to most housing. Housing for disabled people is in sufficient numbers and inadequate in design. Alternatives for those who cannot afford to build their own, and in these days who can, require the concession to either dependent living lifestyles, or segregation in special facilities or institution-alization, where the handicapped are grouped together or included with the elderly people. In 1974, National Conference on housing for the physically disabled was held in Houston. The conference brought together many groups concerned with housing and disabled people to discuss their housing needs and problems. The dominant theme, recurring theme, from that conference was the need for variety or range of choices of housing; type, price, location, and available services. This need was again emphasized in 1975 when the Architectural and Transportation Barriers Compliance Board held public hearings on the housing needs of the disabled.

Several research projects of recent years have also been completed for the purpose of determining the housing preferences

and needs of people with disabilities. Someone recently said that the disabled had been studied, poled, surveyed and sampled, questioned, and in recent years otherwise investigated, and yet no changes have taken place in the building industry toward improving housing. Comments by disabled people in building industry representatives at the Compliance Board hearings and elsewhere reveal a complex mix of traditional attitudinal, educational, legal and economic causes which have created our stock of poor housing and have impeded change within the housing industry. For example, most engineers, architects, and builders who produce housing are not aware of the potential of the disabled people who live active normal lives, and they do not know how to design for people with disabilities. The schools of architects, design and engineering, emphasize the anthropometrics of the adult able-bodied male as criteria for design.

Designers cannot rightly be expected to be responsive until their schools begin to include appropriate curriculum programs. Most designers total exposure to disability in design is in the building codes and standards which they must try to comply with. And that is a totally inadequate education medium. Disabled people with their low disability and few job opportunities have not generally been considered as potential market for free enterprise housing providers. With new hiring practices and years of exposure, the situation may begin to change. Codes and standards bodies have also been reluctant to require accessible design in one and two family residences. A feeling, I suppose, that a man's home is his castle and that such

legislative requirements would be an infringement on some basic rights.

The government, however, when investing in housing does regulate the construction of that housing with minimum standards which give or tends to become industry standards no matter what source of funding. Another obstacle of housing has been zoning laws which have been used to prohibit one or more housing types which might afford more independent living for some severely disabled people. And still another problem that came out from these hearings has been cost concerns usually based upon misconceptions about the design for the disabled and lack of information on economical products and procedures which would simplify the task of the building industry in trying to accomodate people with all kinds of abilities. The ANSI standards since 1961, the ANSI-A 1171 standard has been the single reference for design engineers. It did not contain recommendations for housing and was inadequate in other areas. The minimum property standards used to insure safety and adequacy of housing receiving government assistance has also not included provisions to insuring accessibility. Realizing the gap to national standards, many state codes such as North Carolina, for example, have begun to require some departments to meet minimum standards for accessibility. In our state for example, 5% of housing apartments which are in complexes of 10 units or more are required to meet minimum standards. This has been a little better than nothing at all, in that it has produced some degree of choice. However, it is not very effective because

when you have 5% of the units in a large apartment complex, they then tend to disappear. The management usually do not even know which units were designed to be accessible. Visually, they look no different than any others which is good, but if you can't find them when you need them, they are not very good. Also a problem has been the price range, for this kind of housing has usually been higher than can be accomodated by many disabled people, even though they may be newly employed, their income levels are not adequate for that type of housing. In 1974, HUD, with Easter Seal Society, and the President's Committee on Employment of the Handicapped, began a research project to revise the ANSI standard to include accessibility requirements for housing and other concerns which had not previously been included in the 1961 standard.

This project is now completed and the research team had developed recommendations for a concept in housing, which may have significant impact on industry. This concept is one of adapted vs. adaptable design of housing. The team has come up with recommendations for both adapted and adaptable housing which could be incorporated into the HUD minimum property standards for all housing receiving federal funding on assistance adapted housing is housing which has been equipped to meet the needs of the specific user. That is it would include all the necessary equipment, space, structure, everything required to meet the needs of a particular disability. Adaptable housing on the other hand includes basic structural and spacial requirements which would allow that structure to be easily and

inexpensively adapted to the needs of an individual's disabilities when and wherever it is necessary. Features of adaptable housing might include additional floor space in bathrooms, kitchens and hallways.

Another feature might be de-mountable cabinets or adjustable cabinets which could be lowered and raised. A third feature might be reinforcing in walls and ceilings which would allow easy attachment of grap bars and lifts where and whenever they became necessary without major structural alterations to the building. I can see no reason why adaptable design recommendations could not become standard practice throughout the housing industry and all housing eventually be used by disabled people. There's no guarantee that HUD will adopt these minimum requirements for adaptable housing, including them in the minimum property standards, but they have begun the process to have these recommendations developed and is possible that it could happen with the proper kinds of encouragement and reinforcement.

The agencies such as HUD, several agencies have undertaken research projects in recent years, some of which are still underway, many of which are innovative and beginning to produce results, information and technical assistance which has not been available to most designers for many years. One example is HUD's recent mobile home design feasibility project which was conducted in North Carolina which was developed and proved the feasibility of safe and accessible mobile homes for disabled people. This project is at least beginning to expand some of the choices for housing. Mobile homes had previously been totally out of the

question for many disabled people. The project is completed and it is reported that the main purpose of the project was to encourage the mobile home industry to begin manufacturing units which could be used by people with all types of disabilities as an alternative housing type. I think with adequate support, reinforcement and encouragement, or whatever, to HUD and the other agencies to continue other types of innovative designs with the future having many more housing options will be available.

TRANSPORTATION

Ira Laster, Jr., Program Coordinator

Office of Environmental Affairs

I. INTRODUCTION

Ladies and gentlemen, I appreciate the opportunity to appear before you today to discuss the question of environmental barriers to the disabled and the activities of the U.S. Department of Transportation in this area.

I am pleased to say that the U.S. Department of Transportation carries out a variety of activities aimed at a reduction in barriers to travel by the disabled, and I shall now describe some of these activities.

II. DOT ACTIVITIES TO REDUCE BARRIERS IN TRANSPORTATION

A. Mass Transportation. First, in the area of mass transportation, section 16 (a) of the Urban Mass Transportation Act of 1964, as amended in 1970, declares "the national policy that elderly and handicapped persons have the same right as other persons to utilize mass transportation facilities and services, " and it directs "that special efforts shall be made in planning and design of mass transportation facilities and services so that the availability to elderly and handicapped persons of mass transportation which they can effectively

utilize will be assured." In an effort to be responsive to this policy, the Urban Mass Transportation Administration (UMTA) carries out the following activities:

1. Planning Assistance

Under section 9 of the Urban Mass Transportation Act of 1964, as amended, UMTA provides 80 percent matching money to approximately 250 metropolitan and 50 State agencies for transportation planning, engineering, designing, and evaluation of urban mass transportation projects. UMTA regulations on "Transportation for Elderly and Handicapped Persons, "published on April 30, 1976, state that transportation planning at the local level must include "special efforts" to plan mass transit facilities and services that can effectively be used by elderly and handicapped persons, including wheelchair users. UMTA also requires urbanized areas to budget for and implement specific projects for the elderly and handicapped, including wheelchair users.

2. Operating Assistance

Under section 5 of the UMTA Act of 1964, as amended, UMTA provides matching funds on a 50/50 basis to States and local public bodies (such as a city, county, or regional transit authority) to cover up to 50 percent of the operating costs involved in providing transit service.

Operating costs include such expenses as salaries,

administrative expenses, advertising, maintenance, and routine bus replacements. All transit operations receiving section 5 funds may not charge elderly and handicapped persons more than one-half of the regular fare applied to general transit users during peak hours. This requirement is applicable only in off-peak or non-rush hour periods. For example, if the regular bus fare is 40¢, elderly and handicapped persons would pay only 20¢ a ride during the non-rush hours of 9:00 AM - 3:30 PM and 6:00 PM to 6:30 AM.

3. Capital Assistance

Under section 3 of the UMTA Act of 1964, as amended, funds are made available to public agencies and private operators (through contracts with public agencies) to fund 80 percent of the cost of capital acquisitions including new bus and rail car purchases and construction costs of maintenance facilities, bus garages, new rail lines, etc.

The UMTA regulations on "Transportation for Elderly and Handicapped Persons" require that many vehicle and fixed facilities (stations, terminals, etc.) have features that can make transit use easier for these individuals. The requirements include such things as improved handrails and stanchions, non-slip flooring, lighting in the bus step well, priority seating signs for elderly and handicapped persons, warning strips next to boarding platforms and other hazard warnings in transit-related buildings. In addition to the

above requirements for the currently available transit bus, all newly designed, full-size transit buses advertised for bid and purchased with UMTA grant funds after February 15, 1977, will be required to have front door step risers not exceeding eight inches in height. This is the same accessibility standard now applied to buildings.

In addition, for new design buses advertised for bid and purchased after February 15, 1977, UMTA has required that manufacturers offer, as an option, a wheelchair accessibility package consisting of a level-change mechanism (lift or ramp), sufficient front door and passageway clearances to permit the wheelchair to reach a securement location in the bus and at least one securement device to hold the wheelchair in place. UMTA also requires that all new transit buses to be advertised for bid or purchased with Federal grant funds after February 15, 1977, have effective floor heights of not more than 24 inches. This requires both a lowering of bus floors from the current 34 to 35 inches and incorporation of a "kneeling feature" to lower the front of the bus when it stops. In other words, some combination of kneeling feature and lowered floor height must be capable of producing a net floor height of 24 inches or less.

4. Capital Assistance Program for Private Nonprofit Organizations to Transport Elderly and Handicapped Persons

Under section 16 (b) (2) of the UMTA Act of 1964, as amended,

UMTA administers a special capital assistance program, known as the "16 (b) (2) program," to provide capital grant funds to private nonprofit organizations for the purchase of transportation equipment to provide transportation services to elderly and handicapped persons. About twenty million dollars was committed to more than 1,000 private nonprofit organizations under this program in fiscal year 1975, and twenty two million dollars was allocated for the fiscal year 1976 program.

5. Research

In order to acquire a better understanding of the problems elderly and handicapped persons encounter in using public transportation, and to solve some of those problems, the Department of Transportation conducts and supports a variety of research and development studies and projects.

Some examples of current and planned research activities include:

a. A major national study, entitled Research on the Transportation Problems of the Transportation Handicapped, has been underway since April 1976. This project's objective is to determine the travel requirements of various classifications of handicapped people and to develop multi-modal transportation service

alternatives which can cost-effectively satisfy such requirements. The primary emphasis of this national needs study is a market research effort among persons with disabilities who experience difficulty using current transportation systems and facilities. Although much research has already been undertaken in this area, the Department's Urban Mass Transportation Administration recognizes the need to fill the information void about the nature of the transportation problems of the handicapped. This research study will (1) describe a national program for improving the mobility of transportation handicapped persons and estimate the cost of implementing such a program; (2) conduct a cost/benefit analysis and rank the alternative approaches for meeting the transportation needs of the transportation handicapped; (3) develop minimum standards and guidelines for a range of alternative service and equipment improvements; (4) develop a manual for urban transportation planning for the transportation handicapped; (5) develop criteria for selection of representative urban environments where actual operating demonstrations may be designed to evaluate proposed solutions; and (6) recommend operational demonstration projects to be conducted in three urban areas.

b. Another project, the "Small Bus Requirements, Concepts, and Specifications" program, has been initiated : (1) examine small bus operations and projected desired

operations in the United States; (2) establish needed and desired operating features for small buses; (3) determine desirable features for accomodating the special needs of the elderly and handicapped, including wheelchairs travelers; (4) produce conceptual small bus designs to meet the operating features; and (5) establish a performance standard for a small bus suitable for mass transit service in the United States.

c. The TRANSBUS program, now nearing completion, provided for the development of three prototypes of new standard 50-passenger city transit buses which are specially equipped with experimental hardware that can readily be used by elderly and handicapped persons, including wheelchair passengers. Extensive testing of the prototypes has been completed but further research is continuing to achieve the design goal of a 22" floor in full size transit buses.

Information gathered from the TRANSBUS project was utilized in developing the regulations on Transportation for Elderly and Handicapped Persons, issued April 30, 1976.

d. Research is underway for the preliminary design of a wheelchair accessibility package for current model buses. This investigation and design will produce a lift or ramp for production line installation in current design buses. Future research is also anticipated for

retrofitting existing buses with lifts and securement devices.

e. Research is also anticipated to determine whether modification of existing escalators is a feasible way to help elderly and handicapped persons change floor-levels in those transit stations where escalators exist. Another area of anticipated research will be to assess the use of inclined elevators in transit stations, such as Stockholm, Sweden. This case study will determine the potential value of the inclined elevator in transit stations in the U.S.

6. Demonstrations

The UMTA Service and Methods Demonstration Program provides funding support to develop, test, and promote innovative and nationally relevant transportation services and methods. Program funds may cover part or all of the project expenses involving capital investments, operations, administration and evaluation. As an example, demonstration projects have included: testing the viability and effectiveness of user-side subsidies for the elderly and handicapped in Danville, Illinois; starting a large city transport service in Chicago, Illinois that is coordinated with health and social service agencies; and conducting an exemplary demonstration of a comprehensive, transit company operated, special transport system for the elderly and handicapped in Portland, Oregon.

B. RURAL TRANSPORTATION

1. Demonstrations

a. A program which benefits the handicapped and elderly living in rural areas, although it is not designed specifically for them, is the Rural Highway Public Transportation Demonstration Program, established pursuant to section 147 of the Federal-Aid Highway Act of 1973, as amended, and authorized to begin in fiscal year 1975. Under this program, the Federal Highway Administration has selected for funding 102 demonstration projects in 48 States. The selection and evaluation criteria specifically required consideration for the adaptability of transportation systems to the needs of the elderly and handicapped. The projects selected for funding represent a variety of service strategies including use of "dial-a-ride" systems, taxicabs, small buses, school buses and automobiles. Most projects will also pool financial assistance from various levels of government.

b. Section 143 of the Federal-Aid Highway Act of 1976 extended the eligible use of Federal-Aid funds available for carpool demonstration projects to include such measures as "providing carpooling" opportunities to the elderly and handicapped. Regulations incorporating this revision were published in the Federal Register on June 26, 1976, and have been made part of the Federal-Aid Highway Program Manual.

C. RAIL TRANSPORTATION

1. Cooperation with Amtrak

In the area of railroad passenger service, the Federal Railroad Administration (FRA) through its Office of Federal Assistance has collaborated with Amtrak in order to sponsor programs and design of special facilities within the railroad industry that will accomodate the handicapped and elderly populations simultaneously. These programs created by Amtrak are fully funded through FRA's Office of Federal Assistance. As of now, new equipment designed for the handicapped and elderly have already been put to use on the turbo liners in upstate New York and on the Am Fleet (operated in the North East Corridor, midwestern and western routes).

D. SAFETY

1. Research

In the area of safety, the National Highway Traffic Safety Administration (NHTSA) is supporting research designed to improve the driver performance and to assist handicapped and elderly drivers. Some of the projects that are being supported by NHTSA funds include:

a. Identifying vehicle design deficiencies that might lead to accidents by the handicapped and elderly drivers;

b. Identifying driver visual limitations of the elderly driving population and treatment requirements for correcting the vision problem;

c. Development of a supplemental driver manual to inform

those over 55 years of age of the possible problems they may encounter and should anticipate to be safe drivers; and

d. Identifying driver licensing and improvement requirements of older drivers.

2. Highway Safety Program

Under the State and Community Highway Safety Program of the National Highway Traffic Safety Administration, States are encouraged to plan and execute their own projects to benefit the elderly and handicapped. Through the use of Federal, State, and local funds, States are planning, preparing, and providing programs for the elderly and handicapped in the areas of driver instruction, pedestrian safety, and driver licensing.

The activities that I have described have dealt primarily with the Department of Transportation's efforts to improve access to transportation systems. In carrying out some of these activities, we have, however, relied on rehabilitation engineering, particularly in determining the types of adjustment in hardware that are required to make it accessible to and usable by individuals with different types of disabilities. We anticipate that rehabilitation engineering will continue to play an important role in the

Department's efforts to improve transportation for the physically disabled population.

Thank you for the opportunity to present these remarks. I shall be pleased to respond to questions at the appropriate time.

EDUCATION

Max W. Mueller, PhD
Chief Research Projects Branch

Editors Note: The following paper is a reproduction of the actual presentation as tape recorded February 7, 1977

My first experience with architectural barriers for the handicapped came about three miles straight west of this building when a very enlightened grade school principal, out in what is known as Hoovers Orchard, discovered that he had quite a few; I think what we would say today is orthopedically impaired and intellectually handicapped children. Those days we called them crippled, retarded, which shows that we have come someplace in the last twenty years. But he felt that those kinds of kids needed special help and decided to start a class; hired me to start it, and then placed us in what Wichita knew in those days as the "Annexes", which had seven steps leading up to a single room out behind the school building, and being able-bodied I couldn't get into the place and I was suppose to be teaching fifteen handicapped children there. So it is nice to come back twenty years later and be in the same town that was so

enlightened at that time.

Another reason for being especially delighted to be at this particular meeting, the Rehabilitation Services Administration, as a whole rehab community, has such a fine record of involving those of us who specialize in special education. So it is nice as a special educator to come to this sort of a meeting. Finally, I thought it was a particular delight to be here because it would be so easy to present a paper at this meeting. The educational law was amended a little over a year ago now with some special attention to environmental barriers for handicapped children and I figured I could just read to the group from the new regulation, unfortunately the new regulations are not out yet. We are going to beat the record set by Rehabilitation Services Administration in terms of Section 504 but Section 607 of the Education of the Handicapped Act is also going to be a little late in terms of its regulation. I think the new law still does provide a basis for some, particularly important steps may come about. From P. L. 94-480, to P. L. 94-142 it is remarkable how little change there actually is in the law. Each intervening law has simply called further attention to the particular needs of particular groups, expansion of the definitions of handicap and expansion in the various parts of society that need to be accessible. The latest law in this area, P.L. 94-142, stresses the importance of schooling and the accessibility of schools to the handicapped. I think another thing that is really putting us on the firing line, and one reason

that rehab has called this, as well as other conferences in this series, is the fact that increasing litigation and legislation relating to least restrictive environments, that it is no longer socially acceptable or politically acceptable, in this country, to simply provide facilities for various handicapped groups which perhaps segregate them or takes them out of the mainstream. I think another reason it is important to consider education in this whole process is the fact that schools probably tend to be behind many other institutions of the community in terms of accessibility. I don't have any hard data on that, but believe me, particularly since the passage of P. L. 94-142 which provides money for modifications of school facilities there are a great many people who seem to feel that the schools are among the slowest institutions in their communities in providing complete accessibility to the handicapped.

The conference this week, I think, will be focusing on establishing a better idea of what some of the problems, which we face, are in making programs fully accessible. As a special educator, in particular, there are several aspects of this problem that seem particularly critical. Again, I was delighted with the agenda for this conference, in that it seems that what I thought was a state of the arts or a state of the philosophy in this country doesn't seem to appear at all in this particular agenda.

The problems that I had listed prior to coming here included the fact that accessibility too often focuses specifically or even

exclusively on buildings. Accessibility means far more than that. The agenda, you will notice, says a great deal about attitudes, transportation, recreation, a great many things which for all the advances we've made in recent years go beyond the heavy focus on buildings. The second thing which was mentioned a couple of minutes ago; I think so much of what we have done relating to accessibility has focused to too great an extent on orthopedic handicaps. People have failed to recognize or fully recognize that the deaf do have particular needs that may require certain accessibility characteristics; as well the blind. We are just barely beginning, at least in the education community, to recognize that even children with learning disabilities, the mentally retarded, many of the minor handicapped populations or the mildly handicapped populations require certain adjustments. Another problem that I have seen in the past, at least; and I think that many of us in education may be a little bias in this direction, but I still think it is true, it is certainly true of the ANSI standards, that the focus on accessibility has been too much with adults. We've not given adequate consideration to the fact that accessibility may mean slightly different things when you are talking about children.

A final problem and one which I think has been already mentioned and will be mentioned again, is the financing related to meeting environmental barrier requirements. This is a particular problem in the case of schools, I did quite a bit of background reading for this conference; discovered that there is a wide

variance in what people think about the cost of overcoming architectural barriers in particular. In the building industry, the estimates for new construction run from about ½ percent, to maybe slightly over 1 percent of the cost of building being associated with making that building accessible. When you get into remodeling or rennovation of buildings, it is a far greater range of possibilities. Everybody agrees that it is more expensive, but the estimates of how expensive range from about the top of the original building, 1 percent, to some people estimating as much as 10 percent of the cost of building for rennovation. This puts a particularly difficult task in the hands of the public schools because of the declining school population. We are no longer building new school buildings to any great extent in the entire country these days, so if we are talking in terms of accessibility for school children, we are talking about the more expensive rennovation, and financing is not really available for that. Some of the needs that I see worthy for discussion in the education session of this workshop includes one that was mentioned earlier. There is needed a better curriculum for our architects, space planners, environmentalist, along with the whole array of social service, professional and institutional personnel in terms of developing their awareness of the special needs of the disabled that those of us who work with them experience.

A second major need for further research, development, planning and stimulation is the move which is very apparent at this conference toward interdisciplinary sorts of issues. The special education

community, the rehab community and the medical community must start working together in working out these barriers.

The third point is this. There is a need to identify much more precariously what we mean by access to education. In 1958, Emporia State Teachers College, a school about 90 miles up the road from here, did a major survey of accessible colleges and universities in this country. The focus in that was almost totally on orthopedic handicapped, the ability of persons to get into school buildings. About a year ago we followed up with a much more current survey of higher education, which I think represents what I would like to see going on in all segments of work with handicapped persons. In that we do not focus just on orthopedically handicapped we looked at programming for various handicapped populations. Secondly, we just didn't look at the physical accessibilities of colleges and universities, but looked very broadly at special programming, availability of VA services, availability of rehabilitation services, availability of financing for college students, the whole range of services that are needed for that group. It seems to me that some of you who are familiar with that particular area of accessibility might want to take a look at the 1958 report from KSTC and the 1976 report from the APT associates, a private concern in Cambridge, Mass. Look at some of the differences and see if those are not the specific areas where we are making some progress and still need to make further progress in education of the handicapped.

SERVICE DELIVERY

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Editors Note: The author was unable to attend the workshop due to illness. The paper as submitted is enclosed.

No nation in the world, has proclaimed the concept of the equality of all human beings in such a way or to such an extent, than has my friendly neighbour, the United States of America. Declaring over 200 year ago that "all men are created equal", the value of equality of human beings became the very essence of the fabric of American society.

As a Canadian, who was fortunate to do graduate study at an American University, I was taught the valuable lesson of the importance of history. Through the history of Black Americans, we have much to learn and much to apply in our deliberations today and tomorrow.

In the beginning, as slaves, Black Americans were unequal to White Americans and were separated out from white living quarters. Thus the words unequal and separate would characterize the first phase of the history of Black Americans.

By 1865, almost 100 years after the Declaration of Independence, and with their freedom being declared, Black Americans became equal in the eyes of the law; but they remained

socially unequal and separate.

In the next century, and principally after World War II, Black Americans rejected their equal but separate legal status, and they rejected their unequal and separate social status. Their Civil Rights Movement has achieved equality and integration for the most part in law, but there remains resistance to full social integration and equality in many of our communities today.

Thus, we learn that the process of achieving social equality and integration for Black Americans, while not yet achieved, is:

first, unequal and separate; second, equal and separate, and finally, equal and integrated, with the social achievement always following the laws of the land.

The population of people with physical disabilities is, like the Black American population, a heterogeneous minority group. In my view, people with physical disabilities, are in the first phase of their history towards achieving their civil rights. They are, for the most part, socially unequal and separate.

Let us learn from the 200 year history of the struggle of Black Americans to achieve equality and integration.

Let us resolve to eliminate the intermediate steps.

Let us strive now and achieve immediately the opportunities for full equality and social integration of people with physical disabilities.

One of the major barriers to integrating persons with

physical disabilities into our communities is their dependence upon others for physical help in some of their daily living activities. A second barrier to community integration is that this needed physical assistance is most frequently and typically found in nursing homes, chronic care hospitals, homes for the aged, or other institutions separated out from the mainstream of community life. Thus, many "graduates" of rehabilitation programs may quickly begin lives of isolation and dependency even though individuals may possess good educational and vocational potential and have been equipped with skills and devices for self help. If the rehabilitation goal of active, productive living is to be achieved, and if we are to achieve an equal quality of life for disabled people, then we must ensure their integration into the community through the availability of a range of accessible living, accommodation, together with a broad range of supportive services such as attendant care and transportation, key elements in successful integration.

With social equality and integration as our immediate targets, I now want to present two basic principles to act as the basis for all our deliberations, including the aspect of support services related to shelter or housing.

The first of these is fairness or justice. What is a fair approach to support services? I submit to you that physically disabled people in need of physical support services want to, and should pay for the ordinary costs of living. This is fair and just. I further submit that physically disabled people should <u>not</u> have to pay for any extra-ordinary costs of living

occasioned by an inability to perform physical functions for themselves. To be burdened with extra-ordinary costs of living associated with physical disabilities would be unfair and unjust. As an illustration of what is ordinary and what is extra-ordinary, let us, for a moment, look at the "Case Study of Heidi" which is available to you. Heidi, now 28 years of age, has been a quadriplegic since she broke her neck in a diving accident 5 years ago. Dependent on her motorized wheelchair for mobility, she is nevertheless employed in a hospital, earning $19,500.00 per year. Her major extraordinary costs of living are:

1)	Van transportation to and from work	$2640.00
2)	Transportation for recreation	324.00
3)	Housekeeping and Meal Preparation	4080.00
4)	Physical Care Services	1200.00

The total of Heidi's extraordinary costs of living were $8603.51 all of which was also taxable as earnings.

Her ordinary or usual costs of living, contained in Appendix C were calculated at $5668.16 per year. You will note from Appendix F Table I, that Heidi had to earn $19,000 per year just to break even; she could not save any money; and she could take only one vacation per year, and that was restricted to the city in which she lived. Based on today's costs, Heidi would have to earn over $22,000.00 per year in Metropolitan Toronto, a municipality of over 2 1/8 million people, just to survive.

A second feature under the principle of Justice, is that

disabled people must have significant involvement in the planning and management of any enterprise concerning them. Planning with disabled people is fair, where with is the operational word. Aside from what is fair, planning for someone else is foolish and usually results in under or non-utilization as well as unhappiness and the misuse of finances.

The third basic principle for our deliberations and planning is freedom - freedom to interact on an equal basis with one's fellow human beings, freedom to choose where to live and in what kind of accommodation on the same basis as any other citizen; freedom to take risks that would involve oneself; freedom to make one's own decisions; freedom to be responsible and accountable for one's actions and behavior; freedom to enjoy privacy and with the assurance that others will not betray matters of confidentiality, freedom from control by others, and freedom to assert and do for oneself as much as possible. I might better have said the principle of freedom within limits, since each one of us has limits imposed on us in any culture for the protection and well being of all peoples as well as individuals. But, let the limits imposed be applied with equality and fairness for all.

With our targets of social equality and the opportunity for social integration firmly in view, and with our basic principles of justice and freedom as our means of achieving our objectives, what is our task ahead?

Obviously, we must decide what we mean by support services related housing. We should attempt to deliniate between physical

support services and other kinds such as recreation and transportation. We should deal effectively with what are essential and what are non-essential support services, recognizing that non-essential support services might occasionally become essential because of temporary circumstances; e.g. escort service for emergency banking. We should look at the needs of staff for privacy, for duties and responsibilities. We should take a fresh view of the training needs of staff and not be hide-bound with the traditional view of nursing or therapy as being the obvious backgrounds of choice. But above all, we should try to deliniate the needs of the populations we are talking about. This must be the first step.

Appendix A

CASE STUDY OF HEIDI

The information in the profile is based on a real person, but the name has been changed to maintain confidentiality. She is one of more than twenty such disabled young adults who graduate from one rehabilitation centre alone in the Province of Ontario each year.

Heidi, now 28 years of age, has been a quadriplegic since she broke her neck in a diving accident 5 years ago. She is permanently confined to a wheelchair which is motorized (cost - $1,500.00) as she cannot push herself in a regular wheelchair. This chair is usually reliable, but every few months a problem with the motor or electric wires develops which requires the services of an electrician ($15.00), the expense of a van to take the broken chair to and from the repair shop ($12.00), and extra hours of duty from her attendant, who must then accompany her throughout the day to provide her with substitute mobility ($15.00). Two 12-volt batteries provide the power for the wheel-chair. Fortunately, these are usually reliable for a 2 to 3 year period, but when they need replacing, this represents an unexpected expense ($35.00).

Heidi has a university degree and is employed in a hospital ($19,500.00 per year salary). She chose to accept the hospital job, as it was close to her apartment, and to the van transportation services she requires, because of her wheelchair. The shorter distance between work and her place of residence was a definite factor in reducing the already highly expensive wheelchair van

transportation costs ($2640.00).

Heidi was obliged to rent in a modern apartment building because she required a residence without stairs and steps and with an elevator. Because she requires a live-in housekeeper ($4920.00)* to assist her with all activities such as housekeeping, cooking, washing, dressing, etc., she requires a two bedroom unit to afford her housekeeper-attendant some privacy ($2760.00)**. Even at that, the apartment required some carpentry modifications such as having the bathroom door widened and having a ramp made, so she could get over the door sill onto the balcony ($200.00). Heidi's housekeeper is paid to help her get up and dressed in the morning and to get to bed at night. She does housekeeping and shopping errands as well as providing breakfast and cooking supper. She has the hours between 11:00 AM and 4:00 PM to herself as Heidi eats lunch in the cafeteria at work ($240.00). On the weekends, the housekeeper is off and a friend of Heidi's comes in ($40.00 a weekend).

* Live-in Housekeeper's Salaries (for cooking and cleaning) range between $200.00 and $250.00 per month, plus room and board - according to Miss JOESEN of Canada Manpower, Dec. 9, 1974 (Telephone: 363-5931, Local 317) Board has been calculated at $85.00 per month. Heidi pays $100.00 per month more to her live-in housekeeper for dressing and bathing duties on a special arrangement to avoid the twice daily costs of $9.00 charged by the Victorian Order of Nurses on a sliding scale for such services ($6570.00 per year).

** Using rental figures of $230.00 a month for a two bedroom apartment as opposed to $200.00 a month rental for a one bedroom apartment.

Specialized nursing care is required from a registered nurse twice a week. As this visiting service only operates

during regular working hours, Heidi must make up the two hours of working time she loses on Wednesday mornings in order to get this care.

Buying clothes ($500.00) represents a major expense as nearly all of the clothes must go to a dressmaker for alterations for easier getting on and off ($100.00). Hairdressing is a necessity for Heidi as she cannot lean forward over a bathroom sink and only the hairdresser sinks are at the right height to provide the backward reclining position which can accommodate her neck ($260.00).

Generally speaking, Heidi has few problems with illness. To maintain her good health however, she must take the drug "furidentin" daily the year around ($240.00). In addition, to reduce the spasm in her arms and legs, she must take "Valium" daily ($80.00). Drug bills are therefore high, although she is covered by an Extended Health Care Plan which covers the cost each year after $50.00 deductible. Equipment costs, in addition to her motorized wheelchair, represent an expense as she requires a manual lightweight adult wheelchair with removable arms ($362.00), a doyer lift ($392.00) and a bathtub clamp ($179.00) in order to utilize the lift safely for transfers between wheelchair and bathtub.

Heidi is covered by regular medical insurance ($51.12 a year) so medical attention is not a problem, although the 10% she must pay of the physician's bill is higher than the norm as she cannot get to the local physician's upstairs office and house calls must be made rather than office visits.

Regular visits to a dentist ($25.00) are not within her budget as she has to travel downtown in the wheelchair Van ($12.00) in order to visit a dentist in a modern office building which has no stairs or other architectural barriers.

Heidi's grocery costs are not more excessive than anyone else's who has to provide for two people ($1920.00). However, she seldom can afford to entertain people for supper or a party ($50.00). Neither can she permit herself the luxury of going to a movie or play, or even going to another person's house due to the transportation charge ($12.00), plus the cost of the entertainment itself ($5.00). Household sundries, unusual expenses, subscriptions, etc., also add to her already excessive expenses and of course, we have not even considered the initial cost outlay for furnishings ($2000.00).

Although Heidi is permitted a $1706.00 basic personal exemption and a $1066.00 disability deduction (1974), her income tax still represents a major loss of income ($4906.00) due to Heidi's relatively high annual salary ($19,500.00)

Considering all the expenses outlined above, daily as well as unexpected costs, it is quite probable that Heidi will have no margin of financial security at the end of a year.

Heidi, as a well educated, well motivated, ambitious woman, is much admired within her community for her courage, determination and pleasant attitudes in the face of such a permanent disability. What her neighbours should be admiring (but don't because they have no knowledge of it) is her courage in maintaining such a slender insecure hold on an overwhelmingly,

costly, complex arrangement for independent living. Heidi must live with the ever lurking knowledge that it is only a slender thread of happenstance which keeps her from the one alternate life-style available to such as she - i.e., confinement to an institution where she would be subjected to institutional rules and regulations, loss of privacy and freedom, loss of employment and salary, and demoralizing dependence on the limited annual income ($876.00)* which disabled people are allowed to keep from provincial assistance in such circumstances. Instead of supporting herself and others through tax payments ($5,127.20), Heidi's care would be costing others not less than $6,351.00 per year **.

Heidi is, in fact, one of the few fortunate persons who have been able to mesh all her problems into a workable solution i.e. accomodation, care services, transportation, employment, etc. If one part of this puzzle does not fit - she is then likely to require the services of a nursing home or extended care facility and her job is no longer possible.

* The allowable costs set by the Province of Ontario are $11.00 per day ($4015.00 per annum) for a residential care person and $15.00 per day ($5474.00 per annum) for an extended care person in a 61 bed residence in Toronto providing some supportive care. (These allowable costs prevail in approved Nursing Homes as well.) Each single, disabled resident may receive family benefits assistance from the Province of either $225.00 (ambulatory allowance) or $238.77 (wheelchair user allowance) per month. Of these amounts, each resident contributes $5.75 per day for care, room and board and is thus allowed to keep $53.00 a month for his/her comfort. The wheel-chair user is allowed to keep an additional $20.00 a month for transportation costs ($12.00 a return trip by van transportation). Thus, the total cost to the Province for some supportive assistance is between $4,651.00 and $6,351.00 per year per resident. Heidi's cost to the Province for these would be $6,351.00 per annum in this residence or in a

nursing home. If Heidi had to stay in an extended care facility, the Province would pay an average of $37.96 per day, or $13,855.40 per year.

** "Ontario Hospital Compilation", published by the Ontario Hospital Association and reporting for the period January to June, 1974, revealed that the median per diem cost for patient care was $37.96 for the 16 participating hospitals providing extended care facilities (the range was from $56.82 to $29.77). The reporting hospitals were classified as public, chronic, extended care, convalescent and rehabilitation.

APPENDIX B

EXTRAORDINARY COSTS OF LIVING FOR A SINGLE PERSON BECAUSE OF DISABILITITES

a) Transportation @$12.00* per day return trip — 2964.00

1. To and from Work @ 220 days — 2640.00

2. Social, Cultural, Religious, Recreational — 324.00
   (based on 1 outing every 2 weeks within Toronto and 1 vacation each year in Toronto)

* On December 9, 1974, the cost was $12.00 per return trip with the cost assured of rising to $14.00 by the end of the month. The Toronto Transit Commission's Pilot Project for 46 working handicapped is scheduled to begin February 5, 1975.

b) HOUSEKEEPING AND MEAL PREPARATION* — 4080.00

1. Live-in Housekeeper at $225.00 per month — 2700.00

2. Board for Housekeeper @ 85.00 per month — 1020.00

3. Difference in Cost between 2 bedrooms and 1 bedroom apartment @ 30.00 per month — 360.00

* Live-in Housekeeper Salary (for cooking and cleaning) ranges between $200.00 per month, plus room and board (Source of Information: Miss Joesen, Canada Manpower, Telephone: 363-5931, Ext. 317, December 9, 1974)

c) PHYSICAL CARE SERVICES — 1200.00

(i.e. dressing, bathing @$9.00 a visit, twice a day based on fees of Victorian Order of Nurses, or $670.00 per year - used alternative of persuading Housekeeper for another $100.00 per mo.

d)	DISABILITY INSURANCE PLAN @ $12.27 every 4 weeks	159.51
	(Based on Ontario Hospital Association Plan)	
e)	PURCHASE AND MAINTENANCE OF AIDS AND APPLIANCES NOT COVERED UNDER THE EXTENDED HEALTH CARE PLAN	200.00
		$8603.51

APPENDIX C

USUAL COSTS OF LIVING

a)	Purchasing, Maintenance, Dry Cleaning, and Alterations of clothing	$ 750.00
b)	One-bedroom apartment, rental and hydro at $200.00	2400.00
c)	Board (Using $20.00 per week and $30.00 during 3 week annual vacation)	1070.00
d)	Annual vacation and entertainment during year	300.00
e)	Group Insurance at $2.00 per week	104.00
f)	Telephone at $8.56 per month (party line) - varies depending upon the need for a push button phone with speaker amplifier	102.72
g)	Savings for unforeseen and Emergency Expenses (at 5% of annual salary)	500.00
h)	Unemployment Insurance of $8320.00 (maximum insurable income)	83.20
i)	Extended Health Care Insurance for Company Groups at $0.86 per month (based on Ontario Blue Cross Plan)	10.32
j)	Ontario Hospital Insurance Plan at $4.26 per month (plus $1.25 per month for Semi-Private coverage)	51.12
k)	Hairdressing at $5.00 per week	260.00
l)	Incidental Expenses (Magazines, writing supplies, soap, toothpaste, library membership, etc.)	120.00
		$5668.16

APPENDIX D

COMPARATIVE COSTS OF INSTITUTIONS PER YEAR PER PATIENT

NURSING HOMES

	AMBULATORY PERSON	WHEELCHAIR USER
Room, Board and Care	$4927.50[1]	$4927.50[1]
GAINS INCOME COST TO PROVINCE	696.00[2]	876.00[2]
Total Public Assistance	5623.50	5803.50

1. These figures are based on a maximum allowed per diem cost per patient of $13.50. There is no per diem ceiling under the Homes for Retarded Persons Act as opposed to the Homes for the Aged, The Charitable Institutions, or the Children's Institutions Acts.

2. Effective May 1, 1975, single recepients of GAINS will be paid $2887.92 per year instead of $2766.00 annually. The increase actually is paid to a Nursing Home leaving $696.00 per year for an ambulatory resident and $876.00 per year for a wheelchair user for "comfort" and "transportation". (Under the Guaranteed Annual Income System, a single recipient in a nursing home is allowed to keep $43.00 per month for comfort and a monthly transportation allowance of $15.00 per month or $30.00 per month).

EXTENDED CARE HOSPITALS [3]

	LOWEST	MEDIAN	HIGHEST
Room, Board and Care	$10,866.05	$13,855.40	$20,739.30

3. Cost figures obtained from the Ontario Hospital Associations' "Ontario Hospital Compliations" publication reporting for the period January to June 1974.

APPENDIX E

DEDUCTIONS AND EXEMPTIONS

1.	DEDUCTIONS		$ 861.20
	1) Canada Pension Plan	$ 101.20	
	2) Registered Pension Fund Contributions	700.00	
	3) Annual Union, Professional or like dues	60.00	
2.	PERSONAL EXEMPTIONS		2772.00
	1) Basic Personal	1706.00	
	2) Disability Deduction (confined full-time to a wheelchair)*	1066.00	
3.	CHARITABLE DONATIONS		100.00
4.	TOTAL DEDUCTIONS		$3733.20

* As opposed to claiming deductions for a full-time attendant as medical expenses where attendant must be a registered nurse prescribed by a physician.

APPENDIX F

COMPARATIVE INCOMES FOR HEIDI LIVING INDEPENDENTLY

TABLE 1

1. Gross Income	$10,000.00	$14,000.00	$17,000.00	$19,000.00	$19,500.00
2. Extraordinary Costs of Living	8,603.51	8,603.51	8,603.51	8,603.51	8,603.51
3. Effective Gross Income	1,396.49	5,396.49	10,396.49	10,396.49	10,896.49
4. Taxable Income	6,266.80	10,266.80	13,266.80	15,266.80	15,766.80
5. Total Income Tax Payable (1974 Rates)	1,465.60	2,757.60	3,889.20	4,685.70	4,905.00
6. Effective Net Income (after taxes)	-69.12	2,638.89	4,507.29	5,710.79	5,991.49
7. Ordinary Costs of Living	5,668.16	5,668.16	5,668.16	5,668.16	5,668.16
8. Surplus or Debt	-5,737.27	-3,029.27	-1,160.87	42.63	323.33

EMPLOYMENT

Rob R. Gregg, Mgr.
Gates Learjet Corporation

On July 11, 1973, Dr. Leslie sent approximately 58 copies of the attachment "A" letter to businesses in the Wichita area. This was, I thought, a very good presentation of the facts. The following reflects what happened to that letter and how the program was started at Gates Learjet Corporation.

Our copy of the letter was received within a day or two of the July 31, 1973 date. Where it went from early August until August 27th is unknown. On the 27th, it was received by the Vice President of Industrial Relations. He referred the letter to me with the "Rob???" note in the upper left-hand corner. This was not buck-passing, but his shorthand requesting recommendations. This was one of many pieces of correspondence received, and my first reaction was to send a negative reply. Why a negative reply?

We were already involved in a maze of programs which included the handicapped. The personnel responsibilities today are so complicated it is no longer possible to perform the function and be assured you can keep your company out of trouble.

For example, you must have the right mixture of people and skills by male and female, minority, majority, veteran, handicapped, disadvantaged, ex-offenders, etc. There is the Affirmative Action program monitored by the Federal Contract Compliance Office with actual performance plus good faith

effort plus upward mobility for all groups. In addition, there is support for the United Way, junior achievement, bonds, etc.

With all of the programs now under way and reasonably good performance on each, I could recommend against participation and it would be dropped.

Why not send a nice letter, you know the kind, "Good program, keep up the good work, we are not able to participate at this time, am sure others can help....."

The second choice was more difficult. How can we assist this program to get started? Get the facts - go, see, talk.

On September 6, 1973, I went to the University and met with Dr. Leslie, Charles Shute, and Roger Nelson. I was greeted with "We do appreciate your interest. You are the only company of the 58 to respond." Another reaction "Can 57 companies be wrong?"

What I found was a group of people who were meeting a tough problem head on. They were honest in their assessment of the problems, their solutions and time factors involved. They had reasonable suggestions for planned action to compensate for the individual limitations, adjustment and progress in an industrial environment.

There was emphasis on the fact that they did not know all of the answers and needed help to get some of the people on jobs to see how they could perform. I looked at the test devices and the film of an Australian firm which showed the program had very good potential.

The question that had to be answered was, What would be the best approach to start this program?

First, what questions must be answered. The following is a partial list:

1. Identify areas where handicapped can be used.
2. Check on insurance coverage and potential premium increase, if required. (No significant problem)
3. Check with Health & Safety for their recommendations. (it was negative).
4. Check with the Union for their cooperation. (They would cooperate).
5. How could jobs on 2nd floor be made available - no elevators? (Ambulatory only on 2nd floor).
6. What will happen if they cannot produce as well as other employees in the same classification? Won't others complain if they get the same pay?
7. What will happen to their morale if we are forced into a layoff situation and they are laid off?
8. How will we retrain for another assignment or for upgrading?
9. If machines are modified for the handicapped, what will happen if present employees complain it is more awkward for them to use?
10. How will transportation problem be solved? No public transportation is available to plant area.
11. How will emotional problems be handled?

12. How can supervision be picked that will be sympathetic to the program?

13. On what basis can I recommend the program to assist WSU?

14. Where is the best place to start?

The greatest number of potential jobs were in manufacturing. As a result, the first contact was with the Vice President of Manufacturing. I gave him a detailed description of the proposed program and recommended we try to assist. He readily agreed and requested a meeting on Thursday, April 4, 1973 with his industrial engineers, manufacturing supervisors, and WSU personnel.

There were a series of contacts, and the "Burr Shop" was the area selected. The principal work is removal of sharp edges from parts and material. This is done with power and hand tools.

We requested Dr. Leslie to let us know when he had two candidates. When they were ready, we reviewed the results of their tests. Attachment "B" is a sample. The recommendations of each candidate were also reviewed, and two were selected and started on the job.

Quite early, one individual received a serious hand laceration which required stitches and caused concern about returning to that same job. After a period of time and help from supervision and WSU personnel, the concern was overcome, and they are still on the job today.

Attendance has been normal when compared to others in the same area. Minor injuries have been higher for one than the other. Major injuries have not occured.

Two additional applicants were selected and entered a sheet metal training class. There were problems in using this approach and they did not make it.

Work contracts are also being given to Center Industries to assist in this part of the program.

I asked the question, why don't we have more people on board from this program? The reason seems to be the same thing that causes the loss of a customer in any business. A call was made by GLC to see about additional candidates. The wrong person answered the phone creating a negative reaction, and as a result, we did not follow up as a company. The end result was a break in communication and a break in the program. This has been discussed and corrective action is to be taken.

It appears to me that it all boils down to how wide and deep is our vision. For those who say "I can't place these severely handicapped people" ask what would happen if I ran an ad in the paper offering $1000 for each placement of a handicapped person in a legitimate position for one year. Payment of the $1,000 would be monthly for 12 months as long as the person remains employed up to one year.

How many new ways would be developed to effectively place the severely handicapped that we are not now using?

ECONOMIC ANALYSIS

Allen C. Schuermann, Ph.D.
Department of Industrial Engineering

The economic impact and benefits to be gained from the employment of physically disabled is not fully understood in the United States today. Previous cost-benefit studies have shown that investments in the vocational rehabilitation of physically disabled persons are economically attractive. However, these analyses have usually been performed from the perspective of society in general and not from the disabled individual's viewpoint.

A portion of the research effort at the Cerebral Palsy Research Foundation Rehabilitation Engineering Center is to develop a greater understanding of the cost-benefit relationship by considering three quite different, but closely intertwined viewpoints:

(1) Governmental

(2) Industrial

(3) Disabled individual

The societal impact of investments in rehabilitation of the disabled must reflect the tradeoff between the taxes paid by that rehabilitated individual to the federal, state and local governments; the discontinuance of social welfare payments

when he or she is able to subsist without this aid; and the funds that flow with multiplying force from this worker as he spends his earned dollars; and the investments by our nation in order to effect this rehabilitation.

The industrial viewpoint must consider the economic benefits and associated costs which are incurred by a company when contemplating the employment of the disabled. The company must be provided with a means to intelligently determine the economic effect of government contract incentives, preferential tax treatment for equipment and facility modification, labor mix ratios and equipment and personnel aides for the disabled.

This paper will concentrate on the third viewpoint, that of the disabled individual. The ultimate goal of the research effort, however, will be to analyze all three viewpoints simultaneously in an effort to determine if rehabilitation can be effectively accomplished either with existing or proposed legislation.

The current analysis does not take all relevant factors into consideration, especially those pertaining to the intangible benefits. The benefit scale measures only earnings capability and does not consider such variables as psychological satisfaction, social improvements and long term vocational growth.

The questions posed by this research include the following:

(1) Is employment (and rehabilitation) initially economically attractive to the disabled individual?

(2) Is an employed disabled individual economically motivated to advance?

In order to answer the first question, one must consider the various government programs which impact the employment of the disabled. Some of the major programs which provide support to the disabled individual include the supplemental security income program (SSI) and Medicaid. SSI has introduced a brand new philosophy, since it can quite properly be termed to be a guaranteed-annual-income plan for the disabled. At the present time, SSI provides a guaranteed minimum income of $167.80 per month. In order to measure the economic impact of this program on the decision of a disabled individual to seek rehabilitation and employment, various "income disregards" must be considered. Thus, the disabled individual is not confronted with an immediate loss of these benefits. Figure 1 indicates the magnitude of net monthly income which the disabled person will realize for a given monthly salary. This figure takes into consideration the Social Security, federal and state income taxes the individual will be paying on his employment earnings. In addition, when the individual reaches an income level where he or she is no longer elibible for SSI payments, ($420.60 per month) the Medicaid coverage is also no longer provided. This coverage is a

grant-in-aid program in which the Federal and State governments share the costs of medical care for people with low income and is authorized under Title XIX of the Social Security Act. The services provided under Medicaid include medicines, doctors' fees, eye examinations and glasses, and intermediate and skilled nursing home care. If these services are no longer provided, the employed disabled individual will need to obtain such coverage from a private carrier. Such coverage could either be a fringe benefit of the employer, a shared cost with the employer, or a cost to be directly absorbed by the individual; figure 1 assumes the cost will be shared with the employer. It would appear that this figure substantiates the economic attractiveness of successful rehabilitation and placement in employment.

However, figures 2 and 3 present this same data in a different format and indicate a potential barrier the disabled individual may face when deciding whether or not to seek rehabilitation and employment. Figure 2 indicates the incentive an unemployed disabled individual perceives in terms of the fraction of his monthly salary that will actually result in an increased level on income. As a consequence of the gradual loss of SSI payments and Medicaid coverage, the fraction of monthly salary the disabled person actually realizes is disarmingly small. Because of the risks associated with the decision to enter rehabilitation and subsequent employment, it is understandable how an individual might view such a move with apprehension and reluctance.

Another perspective is the incentive an employed disabled person has to continue his vocational growth in order to increase his income. Figure 3 depicts the fraction of a $10 per week raise that will result in an increased income level for the individual for various current monthly salaries. As the figure clearly indicates, there is currently little economic incentive for the disabled individual to attempt to improve his employment situation.

The economic benefits to be gained from successful rehabilitation and employment are not necessarily shared equally by the disabled person and society. If our society is to help the disabled individual to actively participate in society, we must lead the way to a better understanding of these factors and promote necessary changes in current legislation.

In addition, similar inequities exist in the governmental and industrial sectors which must be more clearly understood so that intelligent alternatives may be posed. The Cerebral Palsy Research Foundation Rehabilitation Engineering Center is dedicated to the development and dissemination of the data which will result in the successful rehabilitation and employment of the physically disabled.

FIGURE 1

NET MONTHLY INCOME

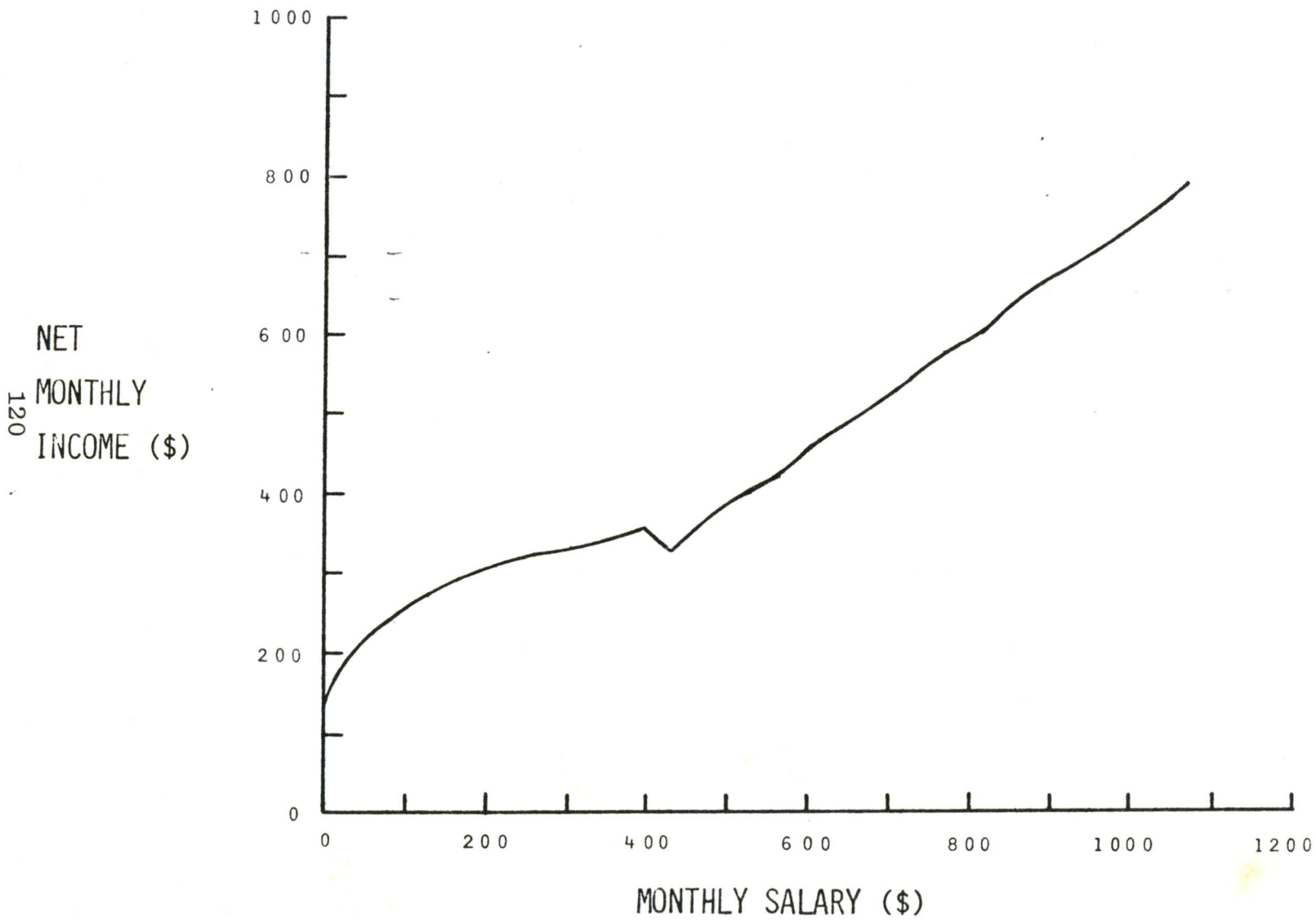


FIGURE 2

ECONOMIC INCENTIVE TO BECOME EMPLOYED

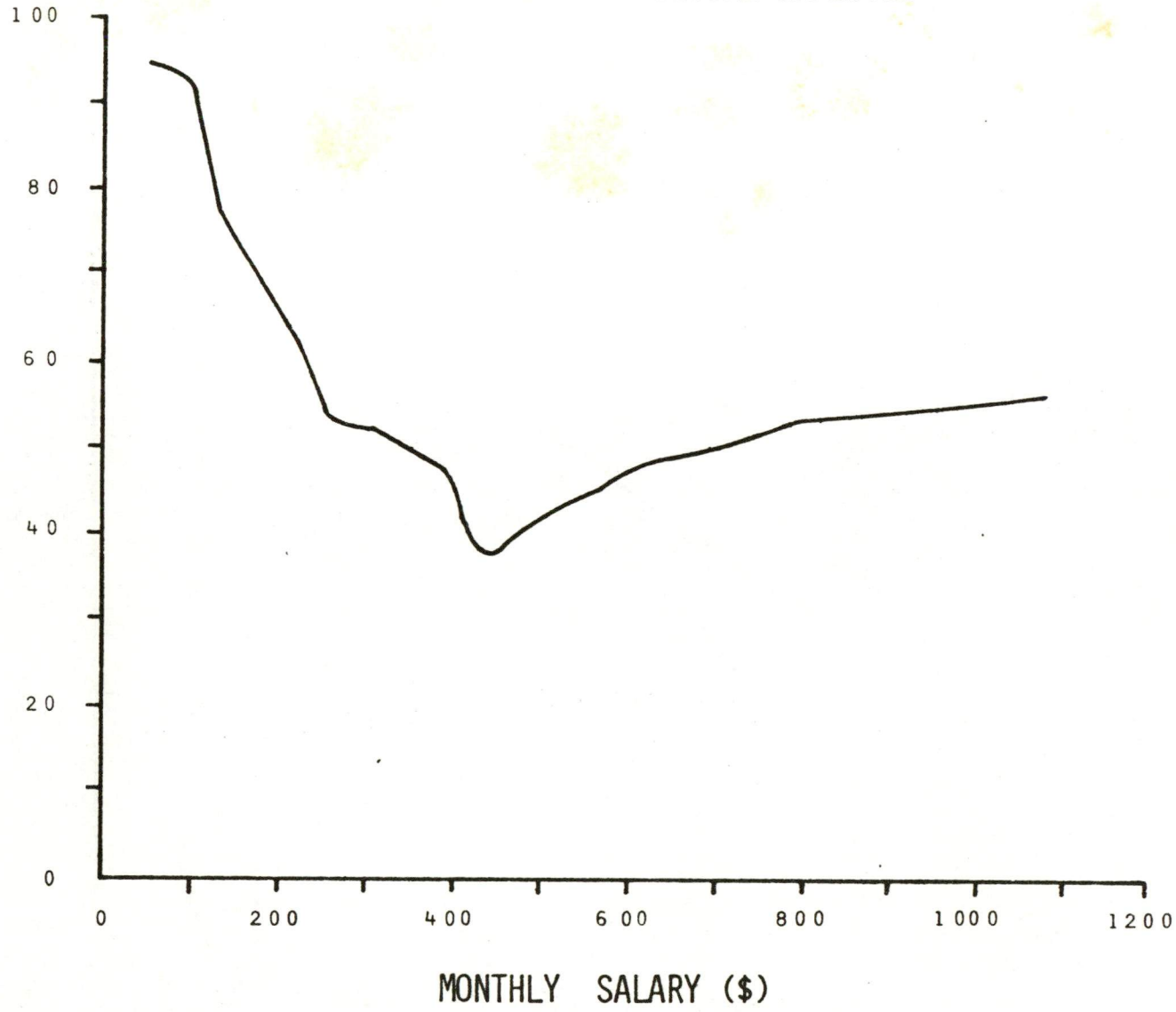
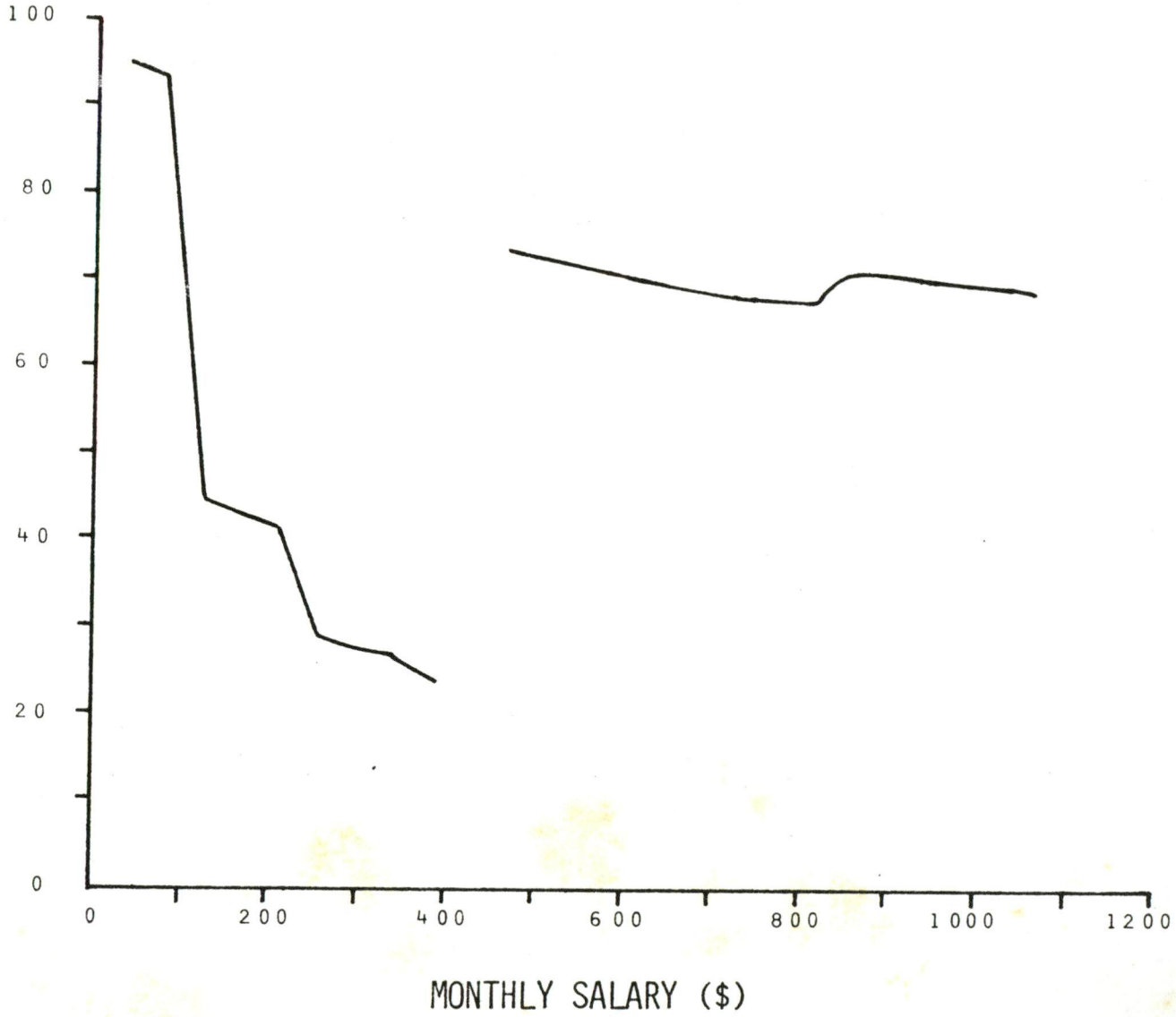


FIGURE 3

ECONOMIC INCENTIVE FOR A $10 PER WEEK RAISE



ATTITUDINAL BARRIERS

Patricia Falta, M.Arch.

> "Normal people, attempting to empathize with disabled people, make assumptions about how people with disabilities behave or ought to behave, which do not at all correspond with how they actually do behave. These assumptions are probably at least as prevalent among architects as they are anywhere else..."
>
> Selwyn Goldsmith:
> Designing for the Disabled

For the past eight years I have observed the environment, both animate and inanimate, from a lower vantage point in the wheelchair. I have observed it both as a human being, and as a design professional. I come to my work as an environmental designer for the disabled because I am trained as an architect, and am myself a paraplegic. I am therefore daily sensitive to and conscious of how the environment presents itself to me, and how people react towards my existance in it.

My professional specialization has been in the field of housing, because I am drawn to this human shelter which forms a basic foundation to which each individual relates, physically and psychologically, and which contributes such an important core to the sense of human belonging and worth. I have therefore turned to the problem of housing for the disabled, and I have done so with strong feelings about what disabled people

truly desire. The goals of the disabled are encompased in the principles of "normalization" and involve the will to freedom, equality, social integration and choice.

Integrated Housing

My major experience in the implementation of normalization is through a demonstration project of integrated housing for severely physically disabled persons. My associates and I have been engaged in developing and coordinating resources which would allow quadriplegics to live independently in the community, in individual subsidized apartment units in standard housing projects, with at-home support services when required. Because our concept was, and still is, somewhat avant-garde in the Canadian context, we have had to cross many attitudinal barriers in discussing the functional feasibility, psychological desirability and economic validity of such a proposal. First, we had to convince the many bureaucrats, planners and designers that even severely physically disabled persons did not wish to or need to live in "special" environments particularly conceived for them, and that they were prepared to accept certain inconveniences, risks and uncertainties in order to enjoy a relatively "normal" life-style, according to their choice.

Not only did we encounter great skepticism and fear on the parts of administrators and programmers, who tend to be over-cautious and over-protective, but we also encountered strong resistance from architects and designers. These people, from

what little they knew of the topic, were reluctant to accept the integrated concept, fearing that the requirements for accommodating the physically disabled would involve undesirably specialized demands and result in excessive costs.

The truth of the fact is that the objectives of "normalization" are quite the opposite. We have tried to demonstrate, and have had success in this, that physically disabled persons can live in independent housing units which are barrier-free, require a minimum of design modifications, and involve negligible additional expense. Instead of relying on special built-in features, we emphasize the roles of occupational therapists and industrial designers to teach specific types of manouvers and develop simple adaptations and equipment which will increase individual functioning.

This type of housing has the advantage that: 1) it can be provided anywhere; 2) it is well within the design scope of any architect; 3) it can accommodate the able-bodied with equal ease; 4) it in no way stigmatizes the unit or its occupant; and 5) it enables the disabled tenants to learn to adapt to almost "normal" accomodations, so that they develop coping mechanisms that enable them to function, as independently as possible, in other barrier-free situations.

These are all essential aspects of the normalizing process. So far we have found few short-comings in this type of approach,

and we have noted an improved self-image of the residents because they are pleased that they are coping and living in a standard fashion. Their personal environment and independent life-style, whatever its accompanying problems and responsibilities, is building initiative to try more and to do better. The residents themselves are amazed at their growing strengths and abilities to manage physically, emotionally and financially. All are proud of their progress and achievements, and have a high self-esteem.

We too are proud and happy with this demonstration, because it provides us with experimental ground on which to study various aspects of normalization. In our experience to-date, we have encountered quite a discrepancy between what the able-bodied population, even that part working on behalf of the disabled, see as the optimum solution for the disabled, and what the disabled really aspire to for themselves. Normalization seems to have different parameters for the two groups, and it will be our goal for the future to reconcile them and find a happy medium.

Parameters of "normalization"

Many of the attitudinal barriers which we encounter among architects and designers are based on pre-conceptions and lack of understanding about what disabled people truly want or need. The most damaging and wide-spread in that disabled people have to, or prefer to, function, live, work, recreate, etc. in special environments that are specifically designed to accommodate

the handicapped, and that consequently are segregated, different, and apart from normal people and normal environments. This is a great myth! Disabled people are not a breed apart! They are persons like everyone else, albeit with some physical limitations, but these can be accommodated in an uncomplicated fashion by the elimination of thoughtlessly-built barriers, by promotion of good industrial design, and by developments of simple adaptive apparatus for severe situations.

Uncertain of what a wheelchair really implies in terms of functioning, or what other physical limitations mean in terms of individual manouverability, designers tend to over-compensate in various exaggerated and unnecessary ways. Often they over-design in terms of size and provide unreasonably large spaces or complex features where standard dimensions and equipment, properly applied, would have sufficed and been more desirable. Or designers become so engrossed with ergonomic elements of the physical aids and manouvers, that they design over-specialized facilities that are oriented more to accommodating the physical limitations than to catering to the human being behind those limitations. Often, too, in order to increase some aspect of safety or manouverability, architects incorporate more barriers and problems than they actually eliminate. Or they are so unsensitive to the disabled as living, feeling people, that in an effort to eliminate any mistakes they create anonymous, undefined and sterile spaces which alienate and diminish human beings.

Double-ended adaptation

The total life experience, for everyone, is the continual adaptation to and interaction between man and environment. Unrealistic performance standards and exaggerated design solutions develop attitudes which reinforce barriers against the acceptance and integration of the disabled minority in the social milieu. Disabled persons are generally prepared to compromise and to adapt to environments that are basically accessible and have no gross functionality obstacles. The direction toward barrier-free environments is the reasonable approach towards achieving such ends.

In order to make room for the physically disabled and to accommodate them comfortably side-by-side with the able-bodied, society has to make primary and major modifications in its attitudes and values, along with secondary and minor modifications in the built environment. It has to provide a greater opportunity to the disabled minority to adapt and to give shape to the normal environment, so as to eliminate a divided society where individuals are expected to function only in spaces and in a manner assigned to them. Maybe the reluctance to embrace barrier-free design stems from the fact that somewhere in the back of their conscious, the able-bodied are willing to let the disabled advance only so far, and no further.

Now is the time for myths about the disabled to be replaced by truth and reality. A personal physical limitation does require

adaptive aids and occasional simple help to achieve effective functioning. However, over-compensation and excessive design criteria produce an atmosphere that is uncomfortable for everyone concerned. It builds barriers that interfere with the acceptance of the disabled as valid and useful citizens, and it further restricts the personal expression, human potential and self-actualization of individuals who are thus doubly deprived.

RECREATION

Julian U. Stein, Ph.D.
Consultant, Programs for the Handicapped

Many times problems are approached in terms of obvious symptoms rather than basic causes. Although this process results in elimination of some specific problems, many others are unaffected. Therefore, a dual approach is necessary to result in the most rapid removal of problems and barriers causing less than full participation of impaired, disabled, and handicapped persons in educational, rehabilitation, recreational, social, and vocational activities. These same kinds of problems and barriers limit opportunities and make it extremely difficult for these populations to attain high quality lives worth living.

As individual topics being considered at this workshop are looked at analytically and objectively, it seems that one basic cause permeates them all - attitudinal barriers. Unfortunately too many of us are affiliated with hardened categories that subtly influence our attitudes and ways in which we relate to and interact with impaired, disabled, and handicapped individuals. Limited expectations of what individuals can and cannot do not only affect the general public, generalists in education, and other disciplines represented at this workshop, but parents, and specialists in many of these same disciplines. Obviously persons interested and involved in physical education,

recreation, sports, and related activity areas for these populations are not immune from the influence of this type of negative behavior. It is not the intent or purpose of this presentation to delve into basic causes of problem areas restricting or limiting participation of impaired, disabled, and handicapped persons in recreation programs and leisure activities. Rather various innovative ways in which specific problems, barriers, and inconveniences have been overcome are to be explored. Consideration is to be given to ways individuals with various psychomotor, affective, and cognitive conditions have been able to take part actively in recreation programs and leisure activities. For example:

> Visually impaired ski cross country, downhill and on water, participate in gymnastics, play golf, skin and scuba dive, wrestle, climb the highest mountains, and run in competitions such as the Boston Marathon.
>
> Amputees, paraplegics, and quadraplegics ski, swim, fish, dive, surf, and take part in gymnastics, pool, archery, hockey, weight lifting, football, soccer, karate, basketball, golf, tennis, fencing, track and field.
>
> Bedfast individuals dance, take part in dramatic productions, work with clay, paint, attend camps and parties, and swim.

Basically adaptations and modifications of facilities, equipment, devices, and materials used in recreation programs and leisure activities are designed for therapeutic, educational, training, instructional, rehabilitation, and recreational purposes. As such three basic organizational patterns need to be considered for these programs and activities:

Regular programs or services - individuals who can take part in regular activities, safely, successfully and with personal satisfaction should be guided and encouraged to participate in regular and community programs where they participate with family, friends, peers, and contemporaries.

Intermediate or halfway house type programs or services - many individuals have the potential to take part eventually in regular programs but for the immediate present cannot. Something is lacking - confidence, experience, skills, emotional stability, social awareness, intellectual ability, physical condition, overall control, interest. The intermediate or halfway house type program serves to help the individual overcome such problems.

Special programs or services - some individuals have severe, profound, and multiple conditions so that they need long-range opportunities and experiences in special, segregated, or sheltered programs. Individuals in this group should not be considered permanently confined to special programs and activities - to consider such an approach is inconsistent with concepts advocated throughout this presentation and incorporated in current legislation.

As related to recreation programs and leisure activities, problems, obstacles, and barriers requiring a trans-disciplinary approach transcend housing, transportation, education, facilities, service delivery, and programs including activities, methods, and evaluation. Certainly communication, cooperation, and coordination among individuals representing various disciplines and associations interested and involved in all of these areas are vital. Much is going on in these areas individually and collectively throughout the world. Interaction and exchange stimulated by workshops such as this one are invaluable for promoting more effective and efficient delivery of services. Since most of these topics are being delt with in other presentations

at this workshop, emphasis of this presentation is to be on general factors for developing and producing devices related to facilities, activities, and methods for recreation programs and leisure activities. It seems appropriate to define the many facets of recreation. Recreation is defined as:

> Activities engaged in voluntarily during an individual's uncommitted time for personal fulfillment, health and fitness, creative expression and aesthetic appreciation, socialization, enjoyment, pleasure, and fun, and to fulfill leisure skills and interests.

Specific elements in a comprehensive recreation program include:

> Leisure education - a process by which individuals learn about recreation and leisure activities, opportunities, facilities in general and how to use and apply them in their own communities.
>
> Therapeutic recreation - a special service within the broad area of recreational services that involves a process which utilizes recreation services or progressive intervention in some physical, emotional, and/or social behavior to bring about a desired change in that behavior and to promote growth in that individual.
>
> Recreation conducted in community settings - a large majority of impaired, disabled, and handicapped persons can take part in recreation programs and leisure activities in their own communities right along with their families, friends, and peers. Basic aims and objectives of programs and activities conducted in these settings are the same for all participants and lead to amusement, diversion, relaxation, and re-creation. However, it should be noted that all programs conducted in community settings may not be of an integrated or mainstreamed nature. Special and intermediate type programs are also appropriate for community settings. The community resources and facilities can be used in many ways to stimulate active participation by these populations in recreation programs and leisure activities.

As an ultimate objective of recreation programs and leisure activities at any of these levels, maximum degrees of independent, self-actualizing behavior is stressed. Many individuals, regardless of type or severity of handicapping condition, simply need minor modifications or adaptations of facilities, equipment, devices, or materials to be able to take part in ongoing recreation programs and leisure activities. However, individuals and groups which are responsible for designing, developing, producing, and distributing such equipment, devices and materials need to be aware of, recognize, and deal with problem areas such as:

Recognizing pros and cons of custom-made and mass produced items.

Determining when homemade adaptations are more practical, functional, and feasible than commercial produced items.

Obtaining input and involving directly individuals with various handicapping conditions in process of developing and designing facilities, equipment, devices, and materials.

Basing adaptations and modifications in these areas on individual needs rather than diagnostic labels or traditional categories.

Emphasizing flexibility and adaptability of facilities, equipment, devices, and materials so that individual participant needs can be best and most appropriately met through universal use items.

Approaching design of needed items in ways that emphasize simplicity rather than over-sophistication and complexity.

Keeping expense of items reasonable so that they are readily available to individuals who need them the most.

> Recognizing all that has and continues to go on in this field in general and as related to active participation in recreation programs and leisure activities by impaired, disabled, and handicapped persons in particular so that continual rediscovery of the wheel can be eliminated.
>
> Developing and maintaining ways by which personnel interested and involved in disciplines and specializations related to rehabilitation engineering have regular and planned opportunities for dialogue to exchange information, communicate ideas, and attack mutual problems.
>
> Applying technical know how more effectively in development, refinement, and distribution of equipment, devices, and materials for use in recreation programs and leisure activities.

Architectural barriers, despite federal, state, and some local legislation requiring that all facilities be accessible, and attitudes of many people toward special facility and equipment needs are among greatest and most pressing problems in these areas. Many communities and states still emphasize isolating special populations in special facilities. Groups still superimpose their wishes on special populations whether these approaches and procedures are appropriate or desired by the group. Many facility and equipment modifications are not wanted or needed. On the other hand, basic accessibility still remains a major problem. Simple, common sense adaptations can make inaccessible facilities functional and usable by even the most severely involved individuals.

Special projects, task force groups, advisory panels, planning committees, and countless groups explore problems of

facilities and equipment for special groups. Unfortunately, very few of these groups involve or even ask input from or opinions of those who are to be most directly involved -- consumers and their families. As a result:

> Some playgrounds designed for severely and profoundly mentally retarded adults can best be used by Marine Commandoes!
>
> Braille trails go unused by the blind!
>
> Totally accessible facilities are found to be far from totally accessible!
>
> Countless millions of dollars are used to build special facilities not needed or wanted by the group for which they were designed.
>
> People are ripped off unmercifully by guarantees that don't exist and expensive devices that can be obtained free or made inexpensively!
>
> Individuals are prostituted by special programs, unique aids, and scientific sounding programs, activities, and devices that are not special, unique, or scientific!

Much extensive equipment and expensive special facilities are unnecessary. Participants want to take part in programs conducted in facilities that are as little different from those used by their peers and contemporaries as possible. Basic accessibility is the key to use by even the most severely involved person. Legal, moral, and ethical reasons exist to take this tact and follow this approach. So many of the most practical, functional, and realistic adaptations have been initiated by consumers themselves. Consumers must be involved -- professional providers of services, legislators, and decision-

makers must listen and heed what consumers say.

In addition to these problem areas, a number of specific facility, equipment, device, and materials needs require consideration, exploration, and development by rehabilitation engineers:

Refining wheelchairs for use in specific sports and athletic activities.

Developing new and additional equipment, devices, and materials for use in various physical education, recreation, sports, and athletic activities.

Developing new and additional equipment, devices, and materials for use with populations consisting of severely and profoundly mentally retarded, and seriously multiple involved individuals.

Developing and refining equipment, devices, and materials for aquatic and swimming activities involving pool heaters, solar heating of pools, ways to retain heat in pools, pool resting platforms, improvised ramps, flotation devices, pool design itself, and inexpensive ways to change and heat water quickly and inexpensively.

Developing of aquatic activities for use with various populations in regular, intermediate, and special settings.

Developing more effective multiple use facilities, equipment, devices, and materials for use in all aspects of physical education, recreation, sports, aquatic camping, outdoor education, and related activity areas involving impaired, disabled, and handicapped participants.

Emphasizing facilities, equipment, devices, and materials that enable impaired, disabled and handicapped persons to participate in least restrictive environments - - in regular program settings - - to the maximum degree possible.

Considering ways to eliminate conditions in facilities that accentuate, aggravate and irritate sensory difficulties while at the same time emphasize and make maximum use of sensory abilities of participants.

Giving some priority to ways and means of increasing and improving mobility of individuals with various sensory difficulties especially those with severe and multiple conditions so that they can attain more and higher quality opportunities for participation and comprehensive recreation programs and leisure activities.

Developing ways that camps and outdoor education recreation facilities - - including wilderness areas - - can be more effectively and easily used by impaired, disabled, and handicapped persons, especially those with severe and multiple conditions.

Exploring ways in which winter activities can be made more available and accessible to these populations, especially those with most severe and multiple conditions.

Developing materials for prosthetic devices that will make it possible for individuals with various types and levels of amputations to participate actively in sports such as football.

REHABILITATION ENGINEERING

Douglas A. Hobson, P. Eng.

I have been asked to discuss the role and contribution of rehabilitation engineering as it relates to service delivery, vocation, architecture, education, transportation, recreation, and societal attitudes - - and do it all in ten minutes. I suppose I could ramble through a series of slides depicting Captain Marvel with his flashing lights and computer print-outs doing all kinds of "far-out" things - - with some of them even benefiting patients; but I do not think that would serve to impress anyone in this audience. I'm sure that most people in this room have few doubts that the judicious application of science and technology has tremendous potential for enhancing many aspects of the lives of the physically handicapped population.

I would rather spend the short time I have, discussing with you some basic issues about the field of rehabilitation engineering most of which are relative to the focus of this workshop. I should say at the onset that some of the views I will be expressing will not entirely be mine, as some will be opinions contributed by others at the recent workshop in Knoxville, (1) or at previous workshops held under the auspices of CPRD (2). The factual information I have manipulated from several references that I have listed at the end of the paper.

Brief Background

Over the past twenty years a variety of Federal programs have attempted to direct advances in technology to the needs of the physically handicapped population. To date, the greatest successes have been made in the fields of prosthetics and orthotics. These advances have come largely as a result of the close coordination, consultation, evaluation and dissemination efforts carried out by the formed Committee of Prosthetics Research and Development, of the National Academy of Sciences. A major commitment to research and development in the fields of prosthetics and orthotics by federal agencies such as the Veteran's Administration (VA) and the Rehabilitation Services Administration (RSA) Department of Health, Education and Welfare provided the funding base necessary to achieve these advances. This effort was further supported by the strong prosthetics and orthotics industry that has a well established service delivery system. In general, progress in other areas involving the application of technology to the severely handicapped have not experienced similar successes.

Throughout the 1960's, attempts were made to transfer sophisticated technology developed by the National Aeronautics and Space Administration (NASA), the computer industry, and other space-age technical spin-offs into the clinical setting. This effort was abondoned after eight years as no significant success was achieved. The major difficulties stemmed from the inability of the involved disciplines to communicate effectively, and from the fact that there was not a mechanism within the clinical environment

that could integrate the technology in a manner that was acceptable to patients. A more realistic approach has placed engineers, physicians, and related professionals together in a clinical setting to work directly on patient problems. This approach has been termed rehabilitation engineering, and received a major program commitment by DHEW in FY, 1972, and also more recently by the VA.

Specific areas of concern have been delineated for rehabilitation engineering which distinguishes this RSA program from the biomedical engineering program of the National Institutes of Health (NIH). The RSA plan called for the establishment of a network of rehabilitation engineering centers throughout the country. Since its inception in July 1971, seven rehabilitation engineering centers have been established within complexes that combine medical and engineering resources with a commitment to rehabilitation services, research, and training programs. Each center has been charged with a core-area of research with an obligation to function as a cooperating member of the center network for the purpose of information exchange, evaluation and education.

Objectives of Rehabilitation Engineering

Rehabilitation engineering is a new and rapidly developing sub-specialty of medical engineering. The field is in a very dynamic state of growth, and at this time no clear picture emerges as to the ultimate scope and boundaries of the field. However,

the objectives of rehabilitation engineering are fairly clear and have not changed substantially since its inception in 1971. I wish to present a few definitions to you, the first of which was developed in 1971 at CPRD workshop (2), and the second was derived at the recent Knoxville meeting. (1)

A) "Rehabilitation engineering strives to enhance the lives of the physically handicapped through clinical involvement in a total approach to rehabilitation combining medicine, engineering, and related sciences and technology."
(CPRD-1971)

B) "Rehabilitation engineering is the application of science and technology to improve the quality of life for the disabled." (Knoxville - 1976) I personally prefer the 1971 definition as it contains key words - - "Clinical involvement" and "total approach to rehabilitation ." Rehabilitation engineering like any other discipline needs a base or nucleus from which to develop. It is my view that the clinical setting is the appropriate environment in which Rehabilitation Engineering should grow its roots, and then develop from that experience to encompass the total rehabilitation process. It will be through a basic commitment to solving patient problems that the field will best develop its identity and strength. And upon this foundation can be based the ongoing justification for a national delivery system, educational programs, research activities, and last but certainly not least - the necessary financial support.

Justification

The hallmark of our contemporary society is on one hand the high and accelerating level of science and technology, and on the other, the basic concern for the welfare of the sick and the disabled. The challenge of rehabilitation engineering is to marry the advances of the former with the needs of the later.

A conservative estimate is that at least 10 million of the country's 20 million (3) physically handicapped can benefit from some form of technology in their daily lives. Prosthetics and Orthotics have been the primary source of technology for the physically handicapped over the years. Recent studies conducted by the Committee on Prosthetics Research and Development (4) indicate that approximately 4 million individuals directly benefit from prosthetic and orthotic services which are provided primarily by the private sector. By deduction, this means that there are approximately 6 million individuals who stand to benefit directly from additional types of technology that are generally unavailable to them.

In many cases, it is possible to change a disabled person from a ward of society to a contributing member, thereby providing a direct economic cost/effectiveness measure which justifies rehabilitation engineering. However, when measures of improved quality of life through reduced dependency and increased life activities are used, rehabilitation engineering, to the extent that it is successful, is totally justified aside from cost. Therefore, it

would be totally immoral to decide on the social worth of rehabilitation engineering on the basis of financial cost/effectiveness alone - - although costs must, and always will be, of major concern.

Current Status

At the present time there are seven rehabilitation engineering centers established within the RSA network, and approximately an equal number of clinically based programs functioning within the VA structure. The strength of these programs is their legislated support which provides a stable financial base for both manpower and program development. Each center within the RSA network has adopted a core area of research, and in total there is probably in excess of 150 research projects actively being carried out; with an additional 50 projects being supported as individual research projects. Throughout these projects, there is in excess of 150 engineers, therapists, research scientists, prosthetists, orthotists, and other professionals working on projects "to improve the quality of life for the physically handicapped." It is unfortunate that at this time there are probably less than six engineers working as functioning members of clinic teams, with the direct responsibility for delivery of newly developed, or available technology to solve patient problems - - the stated objective of rehabilitation engineering. Nor do we have an educational process by which individuals can gain the training and experience necessary to perform this fundamental activity. Nor do we have a clear plan developed for the evolution of a delivery system that is necessary to "package"

technology in a manner that is acceptable to consumers.

I do not mean to imply that the present research activities being conducted under the umbrella of Rehabilitation Engineering lack potential for solving many of the problems experienced by the handicapped population--as many are excellent projects. However, I do mean to imply that a partial shift in emphasis is necessary, which will result in a greater commitment to design and development combined with an ongoing dedication to solve patient problems - if the essence of rehabilitation engineering is to be justified in this decade. The point is, that many of the every day problems experienced by the handicapped population have solutions within the armamentarium of available technology. The challenge that is before us is to identify and modify this technology in a manner that will result in concepts and devices that will offer immediate benefit for the handicapped. Failure of those within the present network to respond to this need for an identifiable clinical component, combined with community outreach activities that can directly benefit those in need, will greatly reduce the effectiveness and basic justification of rehabilitation engineering in the years ahead.

Challenge for the Future

I have outlined in a general way the status of the field, the deficiencies as I see them; and now I would like to conclude by discussing what I feel are our challenges for the future; particularly as they relate to the theme of this workshop.

I am most pleased to say that many positive steps have been taken in the last year or so; that if realized will resolve many of the concerns that have been mentioned above. For example, more emphasis has been placed on research and development projects that have immediate prospects for patient application. Some of these developments are now finding their way to manufacturing and distribution and are becoming available to others on a national basis. The Knoxville workshop has produced strong recommendations for a pilot education project in rehabilitation engineering, which could form the basis for the development of a national training program that will provide the manpower necessary to get the job done in the years ahead. Plans are underway for the establishment of a number of demonstration service delivery models, complete with identification of potential third-party payment for services.

Now, as we identify new needs and visualize the growth of rehabilitation engineering to encompass community based problems of, home and work environment modifications, transportation problems, recreational needs, architectural attitudes, and education of the handicapped--my plea is, let's be realistic.

Let's not forget rehabilitation engineering has only been formally recognized for five years; and its foundation is still weak and uncertain, its 'bench strength' is lousy, and an organized system to "deliver the goods" is non-existent. Let's not repeat the mistakes of the 1960's by dumping technology on the lives of handicapped with the implication that the onus

is on them to be grateful and accept it even if it generates more problems than it solves. Let's not forget that technology, as it relates to the needs of the handicapped, generally requires some moderating influence; which may be in the form of a clinic team approach, an involved consumer advocate, or a setting in which the consumer himself can make his or her needs and desires clearly understood. As we gaze into the future, let's from time to time touch base with the lessons of the past, let's make sure we are working from an ever strengthening foundation, and move forward to embrace these new challanges with enthusiasm; and above all with a true concern for those we have pledged to serve.

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AGING

Ronald Lipskin, Program Manager
V.A. Prosthetics Center

Editors Note: The following paper is a reproduction of the actual presentation as tape recorded February 7, 1977

Over the past several years, I've been predominately involved with the technological support of the VA Spinal Cord Injury Services. When I first started the program, I made a perfect fool of myself for about six months to a year, until I began to develop a handle for the problems. It wasn't more than about ten days ago that Piezer asked me to start all over again, this time with the aged. Again I found myself in a very uncomfortable situation because I don't even have an idea of what the problem is. So everything that I am going to talk about in the next ten or so minutes is something off the top of my head, and don't expect it in a very serious way at this time.

When we talk about the aged, I think we have to break them up essentially into two categories. 1. The aged person who became disabled, quadriplegic through trauma, multiple sclerosis, or what-have-you, at an earlier point in life, and

has just gotten old. 2. The other type is a semi-disabled individual who has gotten old. He is essentially healthy, but fragile, and frail. He might get out of bed to go to the bathroom in the middle of the night, trip, break a leg, a hip, and before you know it pneumonia and then six feet under. So he is healthy, but he is old. He is physically and mentally worn down. But is he really worn out? When we talk about the aged, the first thing, of course, that comes up is the hospital care for the aged person who really has a medical problem. Then of course, we may talk about the aged in the nursing home or extended care center which is increasing in size within the Veterans Administration. In some cases the family is unable to handle the aged veteran. In other cases they just don't want to handle them. We really have some problems. What I would like to do now, is just show several slides demonstrating different approaches which we may or may not present to the aged population.

Many of the elderly veterans, of course, have a problem in mobility, transportation, being able to get around from point A to point B. Certainly the conventional wheelchair may not be the answer, in fact there may be some resentment against using a powered wheelchair. Perhaps using something like a powered cart or something more asthetic or appealable may be an answer to them. I mentioned before that the elderly may sometimes go to the bathroom; trip, fall or whatever and can become seriously injured. Ed Peizer, I believe, came up with the idea of a mobile bed that perhaps can be folded up, sitting on a powered conveyer

of some type, and the veteran, the aged person, wouldn't have to get out of bed. The thing is that this device itself can create its own architectural barrier.

One of the more exciting introductions into technology into the disabled community is the mobilizer. A very interesting device that can transport an individual to another area, another bed, a carrier, whatever. It sort of creeps in underneath him and transports him. Very, very nice, except that we are talking about a $7000 or so piece of equipment that is quite large and again a rehabilitative item developing its own architectural barriers. And so engineers need to pay close attention, lets not get carried away with our technology. A lot of people feel, perhaps, that the aged and infirm can't move around, certainly if they are disabled they could use something like this, an environmental control for those with partial paralysis to be able to operate radios and TV's, the telephone and so on. But to the elderly guy, who essentially is healthy; does he really need an environmental control? I think it is a question of overkill. Perhaps there may be an easier way for modifying the environment to extend, in a sense, the range of mobility. When we talk about the behavior, the old veteran at home, I've heard stories of some veterans over a hundred years old who really don't want to go to a hospital or nursing home care center because they want to be out with the average normal population doing their own thing. They want to live at home and do their shopping; and why not, I think it's a great idea if they can do it. However, the

veteran or non-veteran who becomes injured at home, who had an accident or whatever, he lives alone, what does he do? This device, is called a phone care, it is quite interesting. It can be operated in one to two modes. 1) You can cycle it automatically to go into an alarm condition once every 15 minutes or every two hours, whatever you like. If you fail to deactivate it at that particular time, it then automatically dials preselected telephone numbers with a message going to a hospital, police department, or what have you, advising them that this person has had an accident and needs help immediately. To the left you see a little box, that is the telemetry or wireless actuator, just press it with the button and immediately it goes in to the alarm mode. This shows you how it plugs into the regulator telephone line.

Rehabilitation Engineering has other potential solutions to offer the aged community. For example, physiological monitors, even telemetric physiological monitors, so the old person can walk around constantly monitoring his heart rate, respiration rate and so on, for some sort of potential nursing care system. I think something called biofeedback might be useful for the elderly, especially when their muscles become somewhat impaired through lack of use or atrophy or what have you. I've heard that the elderly get to be a difficult person to stimulate, to become active in his environment, and perhaps we should look at something called biorhythm. We might just pick him up at certain peaks of the month or whatever, in order to stimulate

him and then start moving. Even though my background is engineering, I somehow have vibrations that the major thrust in caring for the elderly does not come to be from engineering, I think it is going to be something that the director of my center, Anthony Staros, commonly calls TLC, tender loving care, which may have to be dispensed by the physical therapist, occupational therapist or a new discipline which I first heard about two years ago, called recreational therapist, psychologist; all of these things basically are on a one to one relationship. When we talk about this, we are talking about substantial amounts of money, and with it the legislation, and I don't know if we can support it at this particular time.

I would just like to conclude, by saying that I understand Groucho Marx once said, "getting old isn't so bad when you consider the alternatives."

VOCATIONAL

Tom Bergers, Director
Vocational Training Center

On behalf of the Board of the Dutch Society for the Rehabilitation, I thank the College of Engineering, as well as the Cerebral Palsy Research Foundation for the invitation to attend this Conference.

I am the Secretary of this Society which is coordinating various activities in the field of rehabilitation and is promoting the rehabilitation of the handicapped. Members of this umbrella organization are organizations from and for the handicapped. The body is for a large part subsidized by the Dutch Government in order to further activities in this field, and to obtain a good connection between the 150 member organization.

My daily job is director of the Vocational Training Center for the Severely Physically Handicapped Youngsters from 12 to 20 years. I have taken a film of 22 minutes from home and if time is available, you will get the opportunity to see what we are doing for them. In our opinion, the best thing is to send every well person to a normal school. However, we have to accept that, if the person is too severe and there are other problems, for example, nursing, social circumstances, or misbehavior, it is necessary to have a choice for next to the best.

Teaching, training, preparing youngsters for their entrance into society, we have much experience about the subject we discuss as well as we can obtain a good advancement in the future by teaching our students how they can have more influence in their future lives and/or especially how they can improve their way of life.

How many persons are handicapped in our country? Our Government has asked the Central Bureau to have an investigation and the research was based on a sample of 55,000 persons older than 4 years. We have translated the results to the population of a small town of 100,000 inhabitants older than 4 years.

Of these 100,000 inhabitants, some 8,700 would be handicapped by one or more disturbances. When categorizing these handicaps, the following approximate numbers would ensue:

3,900 people would have a disturbance in staying power, mainly caused by a disturbance of heart and lungs. They have, in general, trouble with all sorts of activities like climbing stairs.

3,700 people would have a disturbance in leg function. Some 900 of them would not be able to walk at all outside their home, or only with the help of another person.

1,400 people would have a disturbance in hearing. Of this group some 540 persons would not hear at all, or only with a special hearing aid.

820 people would be blind or partially sighted. Of this group, some 290 persons would be blind, or could not

move outside the home without a helper or special aids.

These are the main disturbances. There are, however, other disturbances where environmental barriers play an important role, such as those in arm and hand functions, in equilibrium, etc.

These handicaps would have the following repercussions on integration:

2,500 people would have difficulties when visiting public buildings

3,100 people would have difficulties in using public transport. Of this number about 1,400 would not be able to use this at all, and would have to rely on other means of transportation. Some 300 people would, outside their home, have to rely entirely on rolling transport such as a car, (electric) wheelchair, or a special invalid carriage.

This report was published in 1976. In the next few years we can expect a further development in the field of rehabilitation. However, the last 2 years our society, as well as our government, improved the situation for the handicapped.

At the moment, there are building regulations. In 1973 we published an extensive loose-leaf book, which gives the main details of barrier free design in general building, housing and facilities for open-air recreation. The criteria of this

publication are accepted by all bodies, such as the government, building societies, architects, etc.

The technical commission of Rehabilitation International has asked us to publish the main part of this book on their behalf. This booklet: "Architectural Facilities for the Disabled" has had a world-wide distribution by ICTA: Fack S-161 03 Bromma, Sweden.

Up to now the Netherlands has no general "imperative" legislation as regards making building accessible. The municipalities are, however, in the process of taking over the criteria of "barrier free design." These are laid down in the "model building regulations," which were established in 1975 through negotiations between the Society of Municipalities and the Netherlands Society for Rehabilitation. These regulations are "imperative" for public buildings, with the exception of privately owned shops and offices. Rules exist for making the subsidized sport halls, swimming pools and communal centres accessible. There are already some 1,000 fully accessible buildings that have received the international symbol after careful inspection. We have some 120 volunteers who inspect these buildings. These are mostly handicapped people.

Last year some ten million dollars was spent on the adaption of public buildings under the scheme of combatting unemployment. Efforts are being made to obtain funds from the government for

the carrying out of a complete program of adaptation of existing buildings. Research has been carried out to ascertain the priorities in the demands of the handicapped.

Housing

There is a great demand for housing for the handicapped. The government subsidizes the extra cost, necessary for adaptation. In principle an adapted house should be available for all handicapped who are in need of it. There is, however, still a shortage in this field. The time people have to wait for such a house is often too long. Adaptations are being made to existing houses as well as to new houses. The aim is to obtain a greater "flexibility" in housing, so that necessary adaptations can be more easily attained. Efforts have to be made to build a certain percentage of housing in a form that serves the interests of various groups. As an example of this is given in the type where the ground floors of two standard dwellings are being transformed into one dwelling for a wheelchair-user and his family, and the two first floors into two small flats for single persons or households of two persons. In this way the integration of the handicapped, as well as the single person, is furthered. In this scheme little extra cost is involved if the planning is made from the outset. The classification of requirements is laid down in the brochure "Housing", which has been written in conjunction with the film of the same title.

The Netherlands has a variety of collective living conditions

for the physically handicapped. They vary in size between the internationally well known "Het Dorp" with about 420 inhabitants and the small settlement for about 20 persons. Various experiments are being carried out.

Although there is still a shortage in this field, we believe that the situation in the Netherlands is comparatively fairly advanced. This is also due to the extensive (and expensive) system of social insurance in our country.

Transport

The Dutch railways are cooperating with the Netherlands Society for Rehabilitation, by making stations and trains as accessible as possible. All the main stations have now "leaf-bridges" on wheels, so that a wheelchair-user can ride into the train. The difference in height and distance between the platforms and the trains is about 50 cm.

The Dutch railways provide assistance at most stations to handicapped people who need help. Those handicapped who need an escort on their journey can obtain a special legitimation card, on which the escort receives free transport.

The Dutch railways publish an annual guide in which all facilities are described.

Transport by air is comparatively easy; Schiphol airport is adapted.

The Amsterdam metro, which will be opened in about 9 months, will be fully usuable by wheelchair-users.

Buses are not adapted. There are, however, buses for wheelchair users in use in a number of cities. Most of them are owned by (small) private companies or institutions for the handicapped. Efforts are being made to obtain a system for public transport that should equal the Swedish example.

Under the scheme of social insurance, cars and other means of transport such as (electric) wheelchairs and special carriages are being provided. Allowances are given towards the running of these cars or for the running of privately owned cars.

This pertains to people who need transport for their work or for enabling them to partake in social contact, recreation, etc. A scheme of adapted facilities along the highroads is being established. An annually published map of the relevant restaurants and filling stations that have a toilet for wheelchair users gives the detailed information on this subject.

There is a fairly large number of fully adapted sport halls and swimming pools. It is felt, however, that a much larger number of handicapped people could partake in sports.

The Netherlands Society for Rehabilitation publishes an annual guide in which all the special camps, holiday accommodation such as hotels, bungalows, tours, etc. are described. There is still a lack of adapted facilities for holidays for the handicapped. It is often not very easy to obtain the correct information.

The Netherlands Society for Rehabilitation has recently concluded an agreement with the main tourist organization (the ANWB, comparable to the British A.A.) to take over the activities in the field of giving information for holiday possibilities for the handicapped, just as they provide it for their non-handicapped members.

Mr. Chairman, Ladies and Gentlemen, I hope that I have given you an idea of our research in the field of rehabilitation. It is difficult to tell within 10 minutes about this large field in the small country. For those persons who are interested, I am likely prepared to give more detailed information later on.

WORKSHOP SESSIONS

HOUSING

ECONOMIC

LEGISLATIVE

Instructions

Guidelines

Documentation

WORKSHOP INSTRUCTIONS

In developing a workshop format, in order to address the many issues associated with the problems of the physically disabled, the following items should be kept uppermost in mind when discussing specific questions included herein.

1. Target groups or elements of the handicapped population should be identified as related to the questions and issues raised in the workshop.
2. The sheer magnitude of the problem should be defined both on the basis of present estimates and on the basis of future projections or trends.
3. Available knowledge should be identified as it relates to research developments affiliated with the physically handicapped in a clinical environment as well as those research developments which affect the physically disabled client as related to his/her home or industrial environment.
4. Gaps in available knowledge as related to the appropriate client population should be identified and, if possible, quantified.
5. Specific areas of fundamental and applied research dealing with environmental barriers for the physically disabled should be identified on both a short range and long range basis and priorities developed as well as funding sources identified and quantified.

6. Information dealing with the broad area of environmental barriers and the physically disabled should be identified and disseminated to user organizations both from an informational point of view and from a training point of view so that professionals can be trained in the field.
7. Service delivery strategies should be developed in order that services resulting from rehabilitation engineering research can be delivered to the user population.

In discussing these issues, it should be realized that all facets of a disabled person's life should be considered, i.e. from infancy through adolescence and adulthood to his senior years.

WORKSHOP GUIDELINES

Housing/Economic/Legislative Workshop #1

The following series of questions or guidelines should be considered in addressing the issues facing the various physically disabled target groups; they are not all-inclusive and should not be considered as such.

1. HOUSING
   a. What is the current state of the art as far as housing programs and systems designed specifically for the severely physically disabled?
   b. In the area of architectural barriers, what is currently being done to alleviate or eliminate barriers in both public and private facilities?
   c. What is the level or magnitude of funding required to provide adequate housing for the severely disabled?
   d. Is HUD's approach to the problem of providing housing for the disabled effective?
   e. How can architects be exposed to the problems of the handicapped during their academic and professional training?
2. ECONOMIC ELEMENTS
   a. Is the employment of the severely disabled cost effective? What criteria of measurement should be utilized to determine the cost effectiveness of applying rehabilitation engineering to a broad host of problems in dealing with the severely disabled?
   b. What is the optimum arrangement between welfare programs

and a job opportunity situation for the physically disabled?

c. What legislation would be required on a national, state and local level to encourage incentives for employment rather than provide a disincentive for employment?

d. How do costs associated with various infant programs and adolescent programs compare as far as a cost analysis in later years when an individual is unproductive either in a work or independent living environment? What are the cost tradeoffs of providing services in the early years and then not utilizing the talents of the severely disabled in their adult and later years?

e. What elements of cost should be taken in consideration in developing housing, transportation, recreation and employment systems for the physically disabled? Should cost be considered in those cases in which extensive modification may be required? Should an effort be undertaken from an ethical or moral point of view and cost not be a primary factor?

f. What are the cost options associated with institutionalization versus an independent lifestyle?

3. LEGISLATIVE ELEMENTS

a. How can rehabilitation engineering interface with the concept of independent living for the severely physically disabled in a community based program?

b. Can specialized rehabilitation engineering centers be

developed to deal with employment systems, recreational systems, housing systems, transportation systems, etc.? Can the role of the rehabilitation engineering center be redefined and be developed to the extent that a better working relationship can be created with rehabilitation agencies? Can existing and new rehabilitation engineering centers better interface and better communicate with those professionals working in the field of rehabilitation? Should rehabilitation engineering centers be involved in the rehabilitation and/or habilitation of the whole person from birth to death? Can long and short term objectives as associated with various funding services be developed in order that the rehabilitation engineering center interface with the physically disabled throughout his or her life?

c. Can better channels of communication be developed between and among rehabilitation engineering centers and those professionals in the rehabilitation engineering movement such that information is disseminated to the user groups?

d. Legislation is extremely important as it deals with the whole idea of rehabilitation and rehabilitation engineering. A closer examination, particularly of community programs, will indicate that legislation as primarily constituted is not working now. What new designs have to be developed and legislative programs created to assist in assuring that housing, transportation, and

employment opportunities are available to the physically disabled and that these programs are community based programs? At the present time, community based programs related to the physically disabled are not adequately funded, if funded at all.

e. Does present legislation support an independent, meaningful lifestyle or a form of institutionalization?

It soon became evident that these topics related closely to each other. In considering housing and urban development funds for housing for handicapped people, the following issues arose:

a. There seems to be considerable confusion over the type of architectural standards to be maintained.

b. There is little enforcement of existing standards.

c. Section 202, demonstration projects, are funded but there is little information available about them. It would be helpful to research what worked, what didn't work and make this information available to assist others in planning.

d. It was agreed that the ANSI standards should be incorporated into the HUD standards. Follow up is necessary to assure that this does happen.

In general, the group agreed that an effort should be made to pull together more information about architectural barrier removal in housing, identify models which have been unsuccessful, and assure that such becomes easily available to those planning similar projects.

One great barrier to the removal of architectural barriers as well as to cost effectiveness in building barrier free accomodations was identified as mass production. Mass production tends to breed inflexibility.

It is recommended that efforts be made to effect change at the level of mass production by changing standards

(door size, bathroom fixtures, etc.) for all people.

It was pointed out that many modified apartments go unused by handicapped people because:

a. They cost too much to live in.

b. Handicapped people are unaware they are available since they are not advertised as such.

Apparently able-bodied people are quite satisfied with the modified living quarters.

It is recommended that communities develop some type of central registry of housing available for disabled people.

It was agreed that the life safety code was something of a disaster. Interpretations of the code vary from community to community, state to state. The group recommends that efforts be made to make the code more clear cut. Many also felt that a structured system of appeals to a state authority would assist in overcoming the problems with a diversity of interpretations at the local level.

The group felt an effort should be made to disseminate information regarding tax credits for builders making buildings accessible. It was mentioned that some states allowing such tax credits found they were not utilized since no one was aware of them.

It was agreed that in planning housing for the disabled, efforts must be made to provide flexibility in options so that handicapped people have the opportunity to make choices. In pursuing this, we can improve living conditions for everyone

through a re-evaluation of all human needs in residential models.

In the area of economics, the committee observed that disabled people often are faced with disincentives to work. Back-up financial assistance should assure that the disabled person does not lose money by working.

The special needs of handicapped people which result in substantial personal care costs should be funded through some type of assistance to assist the individual in finding employment and greater independence in community living.

It was noted that historic funding through medical model Title XIX funds tended to be exclusionary--for institutional care.

Problems are arising because there is little precedent for funding community services. Funding sources are fragmented--Title XX, SSI, Voc. Rehab., Dept. of Transportation, HUD, etc. Community agencies are forced to juggle combinations of funding services to stay alive. The sources sometimes appear contradictory and at odds with each other.

It was agreed that planning should be done at the local level but observed that funds sent to the state and local governmental units tended to slide off to administration and other areas in their journey leaving little for the people for whom they were intended.

It was agreed that the fragmentation in funding should be ended through a consolidation of the funding sources. This will require effective legislative advocacy at the federal level.

It was felt in general, that inflexibility at all governmental levels tends to strangle, not stimulate access to services. Agencies and departments need to coordinate efforts. Definitions must be agreed upon and responsibilities met. The problems of fragmentation and isolation of federal funding sources must be met and grappled with.

Finally, supplemental security income was identified as a major barrier of services to the disabled in that it is expected to meet the needs of disabled people, but in reality does not. SSI should be revised to meet, in fact, the needs of the handicapped people for whom it is intended. We have struggled with it long enough.

ATTITUDINAL

SERVICE DELIVERY

EDUCATION

Instructions

Guidelines

Documentation

WORKSHOP INSTRUCTIONS

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2. The sheer magnitude of the problem should be defined both on the basis of present estimates and on the basis of future projections or trends.
3. Available knowledge should be identified as it relates to research developments affiliated with the physically handicapped in a clinical environment as well as those research developments which affect the physically disabled client as related to his/her home or industrial environment.
4. Gaps in available knowledge as related to the appropriate client population should be identified and, if possible, quantified.
5. Specific areas of fundamental and applied research, dealing with environmental barriers for the physically disabled should be identified on both a short range and long range basis and priorities developed as well as funding sources identified and quantified.

6. Information dealing with the broad area of environmental barriers and the physically disabled should be identified and disseminated to user organizations both from an informational point of view and from a training point of view so that professionals can be trained in the field.
7. Service delivery strategies should be developed in order that services resulting from rehabilitation engineering research can be delivered to the user population.

In discussing these issues, it should be realized that all facets of a disabled person's life should be considered, i.e., from infancy through adolescence and adulthood to his senior years.

WORKSHOP GUIDELINES

Attitudinal/Service Delivery/Education Workshop #2

The following series of questions or guidelines should be considered in addressing the issues facing the various physically disabled target groups; they are not all-inclusive and should not be considered as such.

1. ATTITUDINAL BARRIERS

   a. Define what is meant by an attitudinal barrier and discuss how these attitudinal barriers are developed and fostered. Additionally, some thought should be given to the possibility of reduction or elimination of attitudinal barriers through media activity, educational programs in the schools and other educational environments.

   b. Can legislation similar to that associated with various minority groups be effectively utilized to control attitudinal barriers or is it a problem primarily existing in people's minds?

   c. In what ways can the removal of attitudinal barriers parallel the removal of racial barriers which has been experienced in recent years?

2. SERVICE DELIVERY SYSTEMS

   a. What are service delivery systems, define them. How can service delivery systems be developed and integrated to provide support for the physically disabled in all areas?

   b. Who should take the lead in developing the administration and funding of these service delivery systems? Should they be federal, state or local programs or should they be

affiliated with independent rehabilitation agencies?

c. How can rehabilitation engineering help in the development, implementation and maintenance of service delivery systems for the physically disabled?

3. EDUCATION

a. What is being done on an elementary school level and high school and college levels to promote educational opportunities for the physically disabled? Are continuing education opportunities open to the disabled population?

b. Can educational programs be conducted to educate the able-bodied population in the needs and requirements of the physically handicapped?

c. Is the entire spectrum of educational opportunities for the physical disabled equivalent to those opportunities associated with the able-bodied population, and if not, what elements are weak and need to be strengthened?

d. What are the vocational education opportunities for the disabled and how can rehabilitation engineering be involved?

e. Should education for the handicapped be specific or generalized, i.e., liberal arts vs. professionally oriented?

DOCUMENTATION

Workshop #2

I. INTRODUCTION

Initially the members of Workshop II concentrated on the problems of the less severely handicapped physically disabled. However, it was generally accepted that the physically disabled are not a homogeneous group with identical attitudinal, service delivery and educational barriers but constitute a range of handicapping conditions differing in severity. We assumed that the solutions to the barriers will vary depending on individual needs and the severity of the handicapping condition. We agreed that solutions for all three barriers should be designed for the most severely handicapping conditions thus increasing the probability that the needs of all the handicapped will be met rather than just meeting the needs of the less severely involved physically handicapped.

II. BARRIERS

A. ATTITUDINAL

I. DEFINITION

The members of the workshop agreed that attitudinal barriers could be described by examples rather than defined. However, a general consensus was that attitudinal barriers are those attitudes which increase the likelihood of the handicapped achieving less than their full potential. Also it was agreed that the handicapped do not want special treatment, protection, and/or pity etc., but simply want to be treated as the non handicapped. That is, they want

the right to succeed or fail as any other person and to determine their own destiny.

2. PROBLEMS

A. Professionals

1. Those who are principally involved in habilitation

a) For example, PT, OT, Social Workers, Speech Pathologists/Audiologists who still treat the physically disabled as handicapped.

b) Rehabilitation engineers and architects do not really have an understanding of the physically disabled or handicapped.

2. Those who provide services

Medical and Dental - Some will not treat the handicapped due to a lack of understanding, ignorance or misconceptions.

3. Barriers to a team approach

a) Attitude of each discipline (professional) that they are the most important and critical discipline involved in rehabilitation.

b) Failure to include the physically disabled (handicapped) as integral members of the team.

B. General Public

1. Emphasis in America today is on the physically healthy not on the handicapped. This begins in early childhood and is related to all human activities.

2. Failure to understand physically disabled as humans. For example, some do not wish to be "helped" and some do. Also, the general public does not understand that there is a wide

range of personality traits in the physically disabled and thus guilt feelings about disliking or disagreeing with a given physically disabled person are inappropriate.

3. MEDIA

A. Historically have pictured handicapped children and the volunteer dollar has been raised on the basic emotion of pity, for example, Easter Seals, March of Dimes, etc.

B. Do not present physically handicapped as human

1. No commercials showing physically handicapped as having similar problems in health maintenance; a wheelchair handicapped person needs to use soap for dirty hands as much as a mechanic, no toothbrushing or deoderant commercials with handicapped.

C. Has not considered the handicapped adult and in the few instances where they have always presented the "super" handicapped person. For example, Helen Keller is not the average deaf person.

D. Present unrealistic picture of the physically disabled i.e., TV detective is never shown having physical barriers or meeting them.

E. Refuse to allow the development of normal attitudes toward physical handicapped. For example, Norman Lear will not allow physically disabled to be the object of Archie Bunker's humor.

4. SOLUTIONS

A. Legislation

1. Federal and state mandates are currently the best method

of changing attitudinal barriers. These should parallel the attempt to remove racial barriers.

2. Although we cannot legislate and/or mandate attitudes or feelings you can require non discrimination on the basis of sex and race.
3. Federal mandates apparently are more effective than state and/or local mandates.

B. Financing

1. We agreed that the larger amount of money a program deals with, the more attention and thus the more effective from an educational standpoint is that program.
2. Legislation without adequate financing while not effective for immediate achievement of short term goals provides a system through the legal processes of achieving long term attitudinal change.

C. Education

1. The most effective method of educating professionals is through the professional organizations and societies.
2. Special programs should be instituted in the training programs of the various professions which would allow the student to understand the problems of the physically disabled. For example, one program requires an in depth understanding by forcing the engineering student to face the problems of the physically disabled and then to work for solutions.
3. The media must be encouraged or pressured to present the

adult handicapped as a human being and to educate the public.

4. Manufacturers of all types of products must be encouraged to use the physically disabled in their commercials, etc.

C. SERVICE DELIVERY

1. DEFINITION

The definition of service delivery was expanded to include all the areas of human services rather than restricted to the specific needs of the physically disabled. In our discussion, we asserted that service delivery systems focus on human beings, include the community at large, and are designed to provide a "normalized" life for all humans which specifically includes the physically disabled.

2. PROBLEMS

A. Have architectural barriers which prevent physically disabled from meeting the daily living needs.

B. Some solutions for removing architectural barriers for some physically disabled individuals increase the barriers for others. For example, curbs are needed for the blind, yet are barriers for the disabled in wheelchairs.

C. Too often the physically disabled have not been included in the initial planning stages to remove the physical barriers or improve the delivery of services and goods; for example, wheelchair design and construction.

D. Although we have some barrier free apartments currently available, resident managers are frequently unaware which apartments are architecturally barrier free. Consequently, they are not being rented to their intended

residents.

E. There is some evidence that barrier free apartments do not cause any specific inconveniences for the non-physically handicapped.

F. One of the major problems in all areas of service delivery systems is the modification of existing structures including public and private facilities to meet the needs of the physically handicapped. The problem is obviously related to available funding for structural modifications and who is responsible for providing these funds.

G. Related to funding, the question arose as to whether engineers could be adequately compensated in the field of rehabilitation engineering.

H. Another problem is related to public and private transportation facilities. We assumed that topic would be discussed in another workshop.

3. SOLUTIONS

A. We recommend that additional federal legislation is needed to provide support for general education of the public and specific education, for example, to resolve the problem discussed in (D) above.

B. Additional workshops, seminars, etc. should be scheduled and financed to discuss and make recommendations on the following topics: (Note: It is imperative that the physically disabled be included as essential participants in these workshops).

1. Methods of financing structural changes for the physically disabled in existing structures.
2. Design of equipment for the physically disabled.
3. Comprehensive long range planning for the physically disabled and/or handicapped from birth through adult. Would include all governmental agencies at state and national levels, for example HEW, VA, DOT, RSA, etc.
4. Financing rehabilitation engineering services.
5. Assessing the quality of rehabilitation engineering programs.

D. EDUCATION

1. DEFINITION

The members of the workshop agreed that improvements in education for the physically disabled would improve the quality of education for the "normal population." Included in our discussion was the topic of the education training of the rehabilitation engineer.

2. PROBLEMS

A. Severely handicapped spend time in hospitals and treatment centers for rehabilitation programs. Should special educational systems be established to catch these people up to date?

B. Need additional educational services for severely involved non-verbal handicapped.

C. Regarding mainstreaming - when is the best time to mainstream. For example, during early formal educational experience, during on the job training, etc.

D. Do we have enough trained professionals, programs and devices to educate handicapped in a "normalized" atmosphere.

E. Junior Colleges appear to be incorporating the handicapped or physically disabled person into their systems better than colleges and universities.

F. There is a need for improvement in career counseling and vocational counseling in the handicapped and/or physically disabled.

G. In training rehabilitation engineers should the emphasis be in the basic liberal arts, psychology of the handicapped or engineering training?

3. SOLUTIONS

A. There is a need for communication among the various federal and state agencies to insure an integrated program of education and vocational training for the physically disabled.

B. Additional programs such as the national service systems available for library services and education should be identified and implemented for the physically disabled.

C. There is a need for increased funding of practical research programs designed to meet the needs of the physically handicapped.

D. There is a need for a national conference on the education and training of rehabilitation engineers to identify optimal training programs.

E. Additional information and subsequent use of career possibilities should be identified for the physically disabled.

SUMMARY

Participants realized that the topics assigned and subsequently the problem areas identified were too broad to adequately discuss and resolve within the time allocated. Also it became evident early in the workshop that all three of the topics are not independent but are dependent not only on the topics discussed by the other groups but also on other topics such as civil rights for both normal and physically disabled persons.

Perhaps the identification of needed legislation and, more importantly, adequate financing was the major accomplishment of this workshop. However, we also think that we have made considerable progress within the last few years and although we have a long way to go, at least we are beginning to identify some of the problems. Consequently solutions are now possible.

TRANSPORTATION

RECREATION

AGING

Instructions

Guidelines

Documentation

WORKSHOP INSTRUCTIONS

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4. Gaps in available knowledge as related to the appropriate client population should be identified and, if possible, quantified.
5. Specific areas of fundamental and applied research dealing with environmental barriers for the physically disabled should be identified on both a short range and long range basis and priorities developed as well as funding sources identified and quantified.
6. Information dealing with the broad area of environmental

barriers and the physically disabled should be identified and disseminated to user organizations both from an informational point of view and from a training point of view so that professionals can be trained in the field.

7. Service delivery strategies should be developed in order that services resulting from rehabilitation engineering research can be delivered to the user population.

In discussing these issues, it should be realized that all facets of a disabled person's life should be considered, i.e., from infancy through adolesdence and adulthood to his senior years.

WORKSHOP GUIDELINES

Transportation/Recreation/Aging Workshop #3

The following series of questions or guidelines should be considered in addressing the issues facing the various physically disabled target groups; they are not all-inclusive and should not be considered as such.

1. TRANSPORTATION
   a. Are present transportation systems, both from the standpoint of public and private transportation, adequate for the severely physically disabled?
   b. What elements of the transportation system that currently exists are inadequate and what suggestions should be made for improvement?
   c. What are the levels of funding required to provide adequate transportation for the physically disabled?
   d. What is the role of rehabilitation engineering in providing transportation systems for the disabled? How are MTA's addressing this issue?
2. RECREATION
   a. Define the recreation problems associated with the physically disabled population.
   b. What research is currently being conducted in the development of recreational opportunities for the severely disabled?
   c. What is the cost associated with providing recreational opportunities for the severely disabled population?

d. Define the recreation opportunities for the handicapped in light of the related transportation barriers inhibiting their movement.

3. AGING

a. What elements of disability in the aging process are similar to those in the person that is handicapped from birth or due to trauma? Can these elements be identified and consistent approaches be developed?

b. In dealing with the aging handicapped population, what problems are unique as compared to the middle aged or young handicapped population?

c. In developing strategies associated with the physically disabled in the aging population, what cooperative arrangement can be made between and among rehabilitation engineering centers and the Veterans Administration to insure an adequate interchange of information?

d. What elements related to housing, recreation, transportation and service delivery systems are peculiar to the aged or disabled aged?

e. Define the problems of aging as they relate to the Veterans Administration.

DOCUMENTATION

The group was assessed as to interest and experience relative to the three assigned topics. Transportation seemed to be the topic of greatest interest so it was taken up first with recreation and aging following in that order. The time allocation followed a similar priority. In summary, the group agreed that transportation seemed to be an important element to persons in the whole range of disability needs. Solutions to problems of transportation enable other problems to be solved.

TRANSPORTATION

Private Transportation. This was defined as transportation for individuals and small groups. Examples named were privately owned automobiles and vans as well as wheelchairs and motorized carts.

1. Wheelchairs

   Some problem areas which were cited relative to wheelchairs were durability, strength, weight and size (currently companies are marketing wheelchairs which are 2 inches wider than necessary for persons to fit into). The group agreed that there was no lack of research and development or technological capability available to solve these problems.

   Cost of initial purchase and maintenance of wheelchairs was noted as a major problem to disabled persons. This item was pinpointed as being one of the areas meriting technological design efforts. It was suggested that incentives be legislated for wheelchair manufacturers to improve their product

in both quality and economy. Further, it was suggested that a consumer agency be developed to provide feedback from users to manufacturers of wheelchairs.

Availability of maintenance and repair of wheelchairs was cited as a problem. Again, incentives to manufacturers was suggested as a means of helping to solve this problem.

Problems called out above were considered to apply similarly to electrically powered chairs.

II. Automobile or Van Transportation

Persons who must remain in their wheelchair while being transported in a van are subject to severe injury in case of even a minor traffic accident. Wheelchairs to be thus used need major redesign.

Persons who can transfer from their wheelchair to a regular automobile seat are in no more danger than an able-bodied person in the same seat.

Disabled persons who drive their own cars are in need of better designed adaptive devices for their automobile controls. In addition, modified seating and improved restraints are needed. For both of these needs, more information, evaluation and testing can be provided by rehabilitation engineering.

Overall automobile design and entry-exit needs for disabled persons need to be examined. It was suggested that a vehicle be designed specifically for the needs of the orthopedically handicapped. This could be a commercial stock vehicle which could be modified with specially designed alterations for the disabled.

One general suggestion was for Rehabilitation Engineering

facilities to conduct testing and evaluation of adaptive devices for disabled drivers. The installation of such devices would be done by persons licensed and regulated through the Department of Transportation.

Concern was expressed for the discrimination which exists for handicapped persons in the area of licensing to drive and insurance. The group consensus was that disabled drivers are generally safe drivers. Driver training activities sponsored by the State Motor Vehicle Departments were suggested as a help in this area. State supervised driver training would result in licensing capable disabled operators of motor vehicles. Disabled persons so licensed would be enabled by law to purchase car insurance at the same rates allowed to able-bodied persons.

III. Busses and Trains

Federal legislation requires these systems be integrated for both the handicapped and able-bodied. This should be implemented with taxing or other financial incentives. If it is acceptable to the disabled population, then it is acceptable to the normal population (e.g. baby carriages, shopping carts and etc.)

IV. Planes

The problem cited in this mode of transportation was that physically disabled persons are sometimes denied the privilege of airline transportation. It was suggested that if a physically disabled person requires an aide, the airline will be required by legislation to provide such an aide or to allow the handicapped person's own aide, to travel without paying a fare. This free aide

privilege should be extended to the seeing eye dog which some airlines have required to pay a fare.

RECREATION

For transportation of disabled persons to recreational facilities, Mr. Stein suggested a continuum of services from recreation being transported to the homebound disabled, to recreation vans taking activities to group homes, to transporting disabled persons to existing recreational facilities. The group assented to this concept.

It was pointed out that legislation relative to access was sometimes in conflict with other laws such as fire safety. It is to be hoped that governmental regulatory agencies can resolve such conflicts. Generally, solutions to disabled persons gaining access to recreational facilities were seen to be available if current legislation were implemented; this is recommended.

It was pointed out that a conflict exists between laws of access for disabled versus their right to go in to undeveloped public recreation areas. It was recommended that no proprietary limitations be placed on disabled persons who choose to utilize undeveloped areas.

It was recommended that handicapped persons be included in policy development and program implementation of recreation.

It was recommended that persons trained as professional recreation leaders have included in their courses of study, training to integrate disabled persons in regular public recreation programs.

Attitudes toward disabled persons' recreational participation

were discussed. It was suggested that media presentations could focus on disabled persons' capabilities in recreation rather than their disabilities.

Further, professionals working with handicapped persons should plan activities in which disabled persons are encouraged to participate in public available recreation programs. These same professionals need to counsel directly with handicapped persons to integrate recreation into their life styles.

The resistance of owners and operators of commercial recreation facilities to admitting disabled patrons was cited as a problem. Likely, current laws of non-discrimination exist which apply to this and need only to be enforced.

Adaptive devices for use of disabled persons in recreation were discussed. Rehabilitation Engineering was conceived of as being able to deliver devices suitable for mass production. Disabled persons themselves may well participate in design of devices to meet individual unique needs.

In the area of psycho-social development and leisure activities, it was conceived that handicapped persons themselves might be the best teachers of similarly handicapped persons.

AGING

We agreed that legislative and regulatory restrictions were placed on the elderly persons. The group recognized the difference between chronological and physiological age and suggested an overhaul of current legislation. Most laws and regulations were considered to be unreasonable. Examples included marriage between elderly persons resulting in reduced benefits, forced

retirement, etc.

To improve legislation and to make it more meaningful, we recommend an investigation into the effects and identification of chronological and physiological age.

We observed a difference between elderly physically "normal" and disabled persons.

The physically "normal" individual experiences medical problems which can be handled more effectively by improvement of delivery or services. Knowledgeable prescription and development of adaptive devices should be improved.

Progressive loss of capabilities with old age can be met with better care during early years to retard the aging process. A more stimulating environment for the elderly person was recognized as useful.

Unemployment, with resultant economic and social consequences, was addressed. Legislation and financial incentives were recommended to retain elderly persons in the work force.

Social isolation facilitates the effects of aging. Alternative life styles should be available, for instance, integrated housing through HUD. Families should be encouraged to retain the elderly as active members through financial incentives and by extending exemptions to supporting families.

The elderly probably have a lack of knowledge of "rights" and available devices and services. This problem may be alleviated by improving social and rehabilitation counseling and individual advocacy.

Attitudes towards the elderly can be improved by education, training and public relations.

The old, physically disabled person requires the same care as the younger, physically disabled person as well as services available to and required by the elderly, normal population.

A FINAL COMMENT

The group also agreed that information and dissemination is a problem which touches upon all problem areas which relate to the disabled. We did not have time to deal with this larger question. However, Rehabilitation Engineering Centers should team up with Veterans Administration facilities whose goals and interests are similar. An annual conference and/or workshop, dealing with solutions, should be conducted and results published through a joint Veterans Administration-Rehabilitation Services Administration committee.

EMPLOYMENT

REHABILITATION ENGINEERING

Instructions

Guidelines

Documentation

WORKSHOP INSTRUCTIONS

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WORKSHOP GUIDELINES

Employment/Rehabilitation Engineering Workshop #4

The following series of questions or guidelines should be considered in addressing the issues facing the various physically disabled target groups; they are not all-inclusive and should not be considered as such.

1. EMPLOYMENT BARRIERS

   a. What are the barriers for the employment as associated with physically disabled? Are they associated with the productivity element or are the barriers primarily associated with service delivery systems required to sustain employment opportunities?

   b. Should rehabilitation engineering be associated with the development of machinery and process modification in order that the physically disabled can be made industrially productive?

   c. Roughly, what percentage of the physically disabled population could be eligible for employment and what are the specific quantitative means of evaluating this eligibility?

   d. What is the effect of governmental legislation such as Wagner O'Day on the employment opportunities of the physically disabled? How does the role of the Small Business Administration affect the employment of the

physically disabled both in a mainstream and a workshop environment?

e. Rehabilitation engineering would appear to be a means of providing engineering services to mainstream industries as well as the sheltered workshop. How should this engineering be provided? Should consultants possibility be considered in providing engineering talent and expertise to workshops and mainstream industry desiring to employ the physically disabled?

f. In mainstream employment, what steps can be undertaken to overcome able-bodied worker apprehension and competition from their physically handicapped counterparts?

g. What can be learned from employment strategies and systems utilized abroad, i.e. Centre Industries of Australia, programs in the Netherlands and Scandinavia?

h. Discuss the "projects with industry" concept. Are severely disabled persons being placed through this program?

i. What are the advantages and limitations of the Center Industries concept as presented in Wichita, Kansas?

2. REHABILITATION ENGINEERING

a. Define the role of the rehabilitation engineer.

b. What areas dealing with the physically disabled as related to this conference should be under the control of rehabilitation engineers?

c. As the role of rehabilitation engineering is expanded to cover the areas of employment, recreation, transportation

and housing, what college training should be involved in developing a rehabilitation engineering curriculum?

d. How should rehabilitation engineering services be provided in areas other than medical restoration? Should this be the role of the federal government, state agencies, rehabilitation agencies, etc.?

e. In training rehabilitation engineers, what element of internship should be required outside of the medical environment?

DOCUMENTATION

The approach taken in the workshop was to have 3 individuals present their views as to the major problems or barriers that seemed to prevent the integration of the severely handicapped into the work force. These problems seemed to fall into three groups: Problems experienced directly by the handicapped individuals themselves, problems or lack of assurance felt by the prospective employer and problems encountered by those attempting to provide support services, such as vocational rehabilitation counseling or Center Industries, etc.

A. Problems Experienced by the Handicapped.

1) A tremendous gap in community-based services exists for the severely handicapped often discharged from post-acute rehabilitation facilities until the point that he can somehow organize his life sufficiently to become a candidate for vocational placement.

2) Very few community-based services exist for those that do not possess the potential for vocational placement due to the extent of either their congenital or acquired disability.

3) Very few programs exist that provide both institutional and community based programs that are designed to commence the habilitation management in early age and follow a child through his developing years, on through his educational endeavors, with the goal of maximizing independence with acquired skills that will make an individual a competitive candidate in the job market.

4) Handicapped individuals have a variety of very basic

problems that prevent their acquiring independence in many fundamental activities of daily living.

RECOMMENDATIONS

1) That a service delivery system be developed within the Rehabilitation Engineering concept that will apply available technology in an attempt to resolve the dependency problems that reduce the voactional potential of the severely handicapped.

2) That, in addition to the present institutional-based activities, the concept of rehabilitation engineering be broadened to provide community-based services, that through a team approach can provide community-based services, that through a team approach can provide technical resources; beginning in early age, extending on into the home, recreational, educational environments and provide support to the vocational placement process or a life of enhanced independence--whatever may be appropriate for the individual.

B. Hesitations Experienced by Prospective Employers

Hesitation resulting from a feeling of inadequacy on the part of the employer to deal with the unknowns presented by the severely handicapped individual, combined with uncertainties projected by the handicapped individuals themselves, present barriers of sufficient magnitude that most employers opt for the easy way out.

RECOMMENDATIONS

1) New and innovative ways must be developed to increase the

assurances and remove the risk to employers. Methods of tax incentives, or streamlining of existing assistance or trial-training programs are suggested possibilities. Experience in Center Industries indicates that the availability of engineering resources greatly adds to the credibility of placement inquiries and can serve to significantly reduce the risks to the employer.

2) Programs like Center Industries can provide the necessary "buffer zone" in which the handicapped individual can acquire the skills and confidence necessary to move on into the mainstream of employment opportunities. In order to be effective to larger numbers of handicapped individuals, it is recommended that the Center Industries concept should develop the resources and industrial contacts necessary to assure that "through-put" will occur and that only a few individuals will not become permanent placements within the existing program.

C. Difficulties Encountered by the Supporting Services.

New and innovative approaches are required to tap the interest and the resources of industry to create environments that are conducive to the dignified employment of the handicapped. A deficiency exists in methods of quantitatively exaluating the potential of the handicapped and relating that to the potential job opportunities. A difficulty in communication between the socially oriented vocational counselor and the industrial employer can create communication problems. Technical resources are generally not available to the V.R counselor and often he does not have access to what may be available. The credit system currently used to gage the success of V.R. activities is not

conducive to "chance-taking" by the individual counselors relative to expending limited resources and equipment in training of the severely handicapped.

RECOMMENDATIONS

1) That the present policy that stresses either total independence with employment, or total dependence with 100% social assistance, be modified to include a concept that would encourage the acquisition of partial dependence with commensurate earnings for the handicapped and equivalent merit points for the counselor.

2) That technical people be trained and made available as a part of a comprehensive delivery system in which they can respond to the needs of the other supporting services in terms of providing basic technical resources in areas of A.D.L., independence, education and vocational placement.

3) That cost effectiveness should not be the only criteria for measuring the social worth of Rehabilitation Engineering but also enhancement to quality of life be given equal recognition.

APPENDICES

Appendix A

AGENDA

Environmental Barriers Workshop
February 6-8, 1977

WELCOME

The Cerebral Palsy Research Foundation Rehabilitation Engineering Center and the College of Engineering at Wichita State University would like to take this opportunity to welcome you to the city of Wichita. Additionally, we are delighted that you could find time in your busy schedules to attend this most important conference.

PURPOSE

This conference entitled, "Environmental Barriers and the Physically Disabled", is designed to determine short term and long term game plans for an integrated approach to the solutions of the problems of the severely disabled through the media of rehabilitation engineering. The theme of the conference is devoted to developing a meaningful lifestyle for the severely disabled, again through rehabilitation engineering.

The scope of the conference is such that we will deal with the following eight aspects of rehabilitation engineering as it relates to the solution of the problems of the severely disabled.

1. Attitudinal Barriers
2. Architectural Barriers
3. Barriers to Effective Transportation
4. Housing and Service Delivery Barriers
5. Vocational or Employment Barriers
6. Barriers to Effective Education
7. Barriers to Meaningful Recreation
8. Barriers Encountered by the Aging

All of the presentations scheduled for Monday morning will address various aspects of the topics as they relate to the disabled population and the rehabilitation engineer.

The presentations are to inform and stimulate your thinking so that you may actively participate in the Monday afternoon workshop groups.

SPONSOR

This conference is being sponsored through a grant from the Rehabilitation Services Administration (RSA). RSA is extremely concerned that a near term and long term rehabilitation engineering strategy be developed to recognize all facets of the problems associated with the severely disabled. It is to this end that this conference is dedicated.

The following pages present a detailed agenda of the conference. All attempts will be made to adhere closely to the agenda and still give the attendees, as well as the speaker, ample opportunity for an appropriate dialogue such that all of us will receive from the conference new ideas that we can apply specifically to our field in dealing with the diverse problems affecting the physically disabled.

AGENDA

Sunday, February 6

Time	Room	Function	Personnel
6:00 PM		Dinner/Planning	Cluff, Moses, McLaurin, Jonas, Leslie
7:30 PM	Gallery	Registration (Badge) (Expense sheet) (Notebook) (Information)	Hilborn, Brandt, Smith
8:00 PM	Gallery	Introductions Purpose Format Keynote Intro. Keynote	Cluff, Moses McLaurin Leslie Jonas Yuker, Harold E.
8:50 PM	Gallery	Instructions	Cluff, Moses
9:00 PM	Gallery	Social Time	Pugh, Headrick

AGENDA

Monday, February 7

Time	Room	Function	Personnel
8:00 AM	Gallery	Opening Remarks	Cluff, Moses
8:15 AM	Gallery	Housing	Ron Mace
8:30 AM	Gallery	Transportation	Ira Laster
8:45 AM	Gallery	Education	Max Mueller
9:00 AM	Gallery	Service Delivery	Jane Staub
9:15 AM	Gallery	Employment	Rob Gregg
9:30 AM	Gallery	Coffee	
9:45 AM	Gallery	Vocational	Thomas Bergers
10:00 AM	Gallery	Economic Analysis	Allen Schuermann
10:15 AM	Gallery	Attitudinal Barriers	Patricia Falta
10:30 AM	Gallery	Recreation	Julian Stein
10:45 AM	Gallery	Rehabilitation	Doug Hobson
11:00 AM	Gallery	Aging	Ronald Lipskin
11:15 AM	Gallery	Remarks	Cluff, Moses
12:00 PM	Palm (25th)	Lunch	
1:00 PM	Palm	Workshop instructions	Cluff, Moses
1:15 PM	Terrace (25th)	Workshop #1	
	Drawing Room (B)	Workshop #2	
	Dining Room (1)	Workshop #3	
	Center Industries	Workshop #4	
4:00 PM		Free Time	
6:00 PM	Palm (25th)	Dinner	Cluff, Moses
7:30 PM	Mid-America All-Indian Center		Buses load at 7:15 pm
	Century II	Home Show	

AGENDA

Tuesday, February 8

Time	Room	Function	Personnel
8:15 AM	Gallery	Opening Remarks	Cluff, Moses
8:30 AM	Gallery	Workshop presentation	#1
9:00 AM	Gallery	Workshop Presentation	#2
9:30 AM	Gallery	Workshop Presentation	#3
10:00 AM	Gallery	Coffee	
10:30 AM	Gallery	Workshop Presentation	#4
11:00 AM	Gallery	General Discussion	Cluff, Moses
12:00 PM	Palm (25)	Lunch	
1:00 PM	Palm	Issues/Answers	Cluff, Moses
2:00 PM	Palm	Adjournment	Cluff, Moses
2:30 PM	Director's Room	Editorial Committee	Colin McLaurin
4:00 PM		Close	

Appendix B

STEERING COMMITTEE

Environmental Barriers Workshop

February 6-8, 1977

Mr. Thomas Moses
General Manager
Reedy Creek Improvement
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Florida 32830

Mrs. Pamela Cluff
A. W. Cluff & P. J. Cluff
Architects
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Dr. John H. Leslie
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Mr. Joseph Traub
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Department of Health,
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Appendix C

CHAIRPERSONS/HOSTS

Environmental Barriers Workshop

February 6-8, 1977

CHAIRPERSONS:

Mrs. Pamela J. Cluff
MEMBER
A. W. Cluff & P. J. Cluff
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Mr. Thomas M. Moses
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HOSTS:

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Appendix D

SPEAKERS

Environmental Barriers Workshop
February 6-8, 1977

HOUSING:	Ronald L. Mace, AIA PRESIDENT BFE Inc. P. O. Box 3446 Fayetteville, North Carolina 28305
TRANSPORTATION:	Ira Laster PROGRAM COORDINATOR Office of Evironmental Affairs Department of Transportation 400 7th Street S. W. Room 9422 Washington, D.C. 20590
EDUCATION:	Dr. Max W. Mueller, PhD Chief Research Projects Branch Division of Innovation & Development U. S. Office of Education 400 Maryland Avenue S.W. Washington, D.C. 20202
SERVICE DELIVERY:	Ms. Jane I. Staub, M.A. PSYCHOLOGIST Ontario Crippled Children's Center 350 Rumsey Road Toronto, Ontario M4G 1R8
EMPLOYMENT:	Mr. Rob R. Gregg MANAGER Administrative Engineering Gates Learjet Corporation 8220 West Harry Wichita, Kansas 67209

SPEAKERS (cont'd)

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Dr. Allen Schuermann
ASSISTANT PROFESSOR
Department of Industrial Engineering
Wichita State University
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ATTITUDINAL BARRIERS:

Patricia Falta, M.Arch.
ENVIRONMENTAL DESIGNER
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RECREATION:

Dr. Julian U. Stein, PhD
CONSULTANT
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AGING:

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V.A. Prosthetics Center
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VOCATIONAL TRAINING:

Mr. Tom Bergers
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Werkenrode, Nijmeegsebaan 9
Groesbeek (Holland)

Appendix E

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Environmental Barriers Workshop
February 6-8, 1977

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WILCOX, Warren, Director of Training & Education, Evaluation Research Training Unit, Cerebral Palsy Research Foundation, 2505 South Custer, Wichita, Kansas, 67217

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ZUKAS, Hale, Director of Community Affairs, Center for Independent Living, 2539 Telegraph Avenue, Berkeley, California, 94704

Appendix F

WORKSHOP ASSIGNMENTS

Environmental Barriers Workshop
February 6-8, 1977

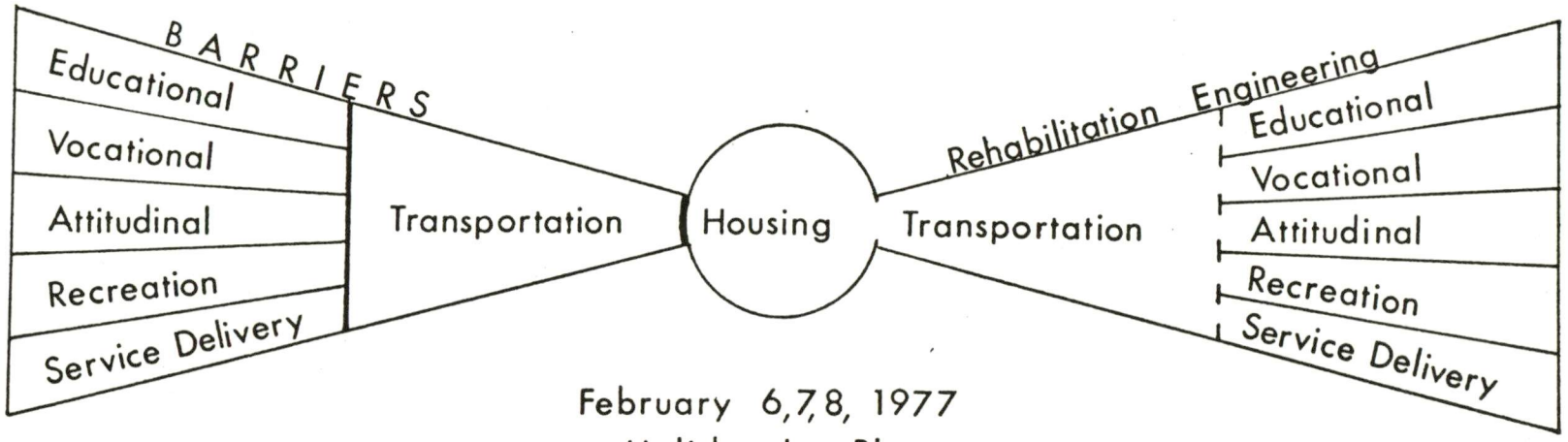
Workshop	Barrier/Subject	Participants
1	Housing/Economic/Legislative	R. Charbonneau C. Colvin P. Davis J. Drake K. Frank A. Fricker G. Harris D. Hommertzheim R. Mace M. Mallisee P. Malassigne A. Schuermann B. Scott M. Smith J. Strickler * B. Svoboda
2	Attitudinal/Service Delivery/ Education	S. Berrol J. Carney P. Falta J. Green R. McGaughey M. Mueller M. Perry D. Popp J. Preston M. Quinn R. Rosenberger * J. Scheuer J. Staub G. Vanderheiden H. Yuker H. Zukas

3	Transportation/Recreation/ Aging	C. Berger M. Brodie L. Frieden D. Harden F. Hoge J. Kelly C. Laenger I. Laster R. Lipskin * P. Lowe S. Minassin J. Stein
4	Employment/Rehabilitation/ Engineering	T. Bergers J. Brolin D. Burton H. Clements J. Daugherty J. Forrester R. Gregg M. Hall D. Healy D. Hobson * J. Leslie D. McNeal K. Mallik R. Norris G. Warren W. Wiebe

Workshop Chairmen *

CPRFK
REC

Environmental Barriers Workshop



February 6,7,8, 1977
Holiday Inn Plaza
Wichita, Kansas

SPONSORS: Cerebral Palsy Research Foundation of Kansas

College of Engineering, Wichita State University

PHONE: 316-683-5627
316-689-3425

after 5, 316-838-8600

Appendix H

REHABILITATION ENGINEERING CENTERS

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Project Director
Rehabilitation Engineering Center
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2232 Webster Street
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Telephone: 415-563-2323
PGN 23-P-57590/9
Core Area: "Sensory Aids"

Dr. Clinton Compere
Project Director
Rehabilitation Engineering
Center
Northwestern University
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PGN 23-P-55898/5
Core Area: "Internal
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Dr. Richard Herman
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Kruzen Research Center
Moss Rehabilitation Hospital
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Telephone: 215-221-3645
PGN 23-P-55518/3
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Control Systems"

Dr. Colin A. McLaurin
Dr. Warren G. Stamp
Co-Directors
Rehabilitation Engineering
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Charlottesville, Virginia
22901
Telephone: 804-924-5551
PGN 23-P-57995/3
Core Area: "Spinal Cord
Injury"

Dr. James Reswick
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Telephone: 213-922-7167
PGN 23-P-55442/9
Core Area: "Functional Electrical Stimulation of Paralyzed Nerves and Muscles"

Dr. William A. Spencer
Project Director
Rehabilitation Engineering Center
Texas Institute for Rehabilitation and Research
1333 Moursund Avenue
Houston, Texas 77025
Telephone: 713-797-1440
PGN 23-P-57888/6
Core Area: "Effects of Pressure on Tissue"

Dr. William Berenberg
Project Director
Rehabilitation Engineering Center
Children's Hospital Medical Center
300 Longwood Avenue
Boston, Massachusetts 02115
Telephone: 617-734-6000 ext. 2866
PGN 23-P-55854/1
Core Area: "Sensory Feedback Mechanisms"

Mr. John F. Jonas, Jr.
Dr. John H. Leslie, Jr.
Project Co-Directors
Rehabilitation Engineering Center
The Cerebral Palsy Research Foundation of Kansas, Inc.
4320 East Kellogg Street
Wichita, Kansas 67218
Telephone: 316-683-5627
PGN 23-P-57960/7
Core Area: "Vocational Aspects of Rehabilitation"