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WHEELCHAIR BUILDING IN
VIETNAM

A FACT-FINDING AND PROGRAM
DEVELOPMENT TRIP

A Report Prepared by PRITECH Consultant:
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During The Period:
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A fact-finding and program development trip.

July 9, 1993 to July 23, 1993

DRAFT REPORT

The "Draft Report" describes the results of my fact-finding trip to Vietnam. Other documentation associated with this trip includes:

- Trip Log
- Contact List

The report organization reflects my specific responsibilities during the trip, which were to:

- 1) Visit wheelchair manufacturing facilities in Ho Chi Minh City and Hanoi.
- 2) Assess the skills of local designers and manufacturers.
- 3) Make recommendations on how wheelchair design and manufacture could be improved.
- 4) Outline a program of technical assistance and training that would result in expanded production of improved wheelchairs.

I. Summary

A fact-finding and program development trip to Vietnam was conducted by the Wheeled Mobility Center, San Francisco State University, during the period July 9-23, 1993. Meetings were held with wheelchair manufacturers, governmental officials, and bicycle manufacturers. The designs and manufacturing techniques of wheelchair manufacturers in Vietnam were reviewed. Recommendations for improving both the designs and manufacturing techniques for wheelchairs are presented in the following report. An innovative model for dramatically expanding the production of appropriate wheelchairs is also presented.

II. Introduction

For at least 20 million people in developing countries, the disability rights movement is but a dim fantasy. Many would struggle for education, jobs, and self determination except for one critical obstacle: they have no way to move from place to place. It is clear that human beings who can't use their legs need a set of wheels. However, most of the world's people who need a wheelchair currently have no likelihood of getting one during their lifetime.

We must recognize that mobility is a basic need. In Vietnam, education, health care, and skilled technical jobs are becoming more available to the general population. Disabled people need to take advantage of these opportunities, but they cannot until they gain the mobility to get from one place to another.

III. Need

A. Wheeled Mobility Devices

In all regions of the world, people with disabilities need short, intermediate and long-range mobility.

In Vietnam, prostheses provide efficient short and intermediate mobility for amputees. However, double amputees, and above knee amputees with short stumps often have difficulty with medium and long range mobility. Their difficulties are caused by discomfort due to the fitting of their prostheses, or simple the high energy requirements for locomotion using prostheses. For these people, wheeled mobility devices are necessary.

People with disabilities that make them unable to walk usually have no efficient way to move around on their own. These people need wheeled mobility devices. There is a critical need for a variety of wheeled mobility devices.

Manual wheelchairs can be divided into two general categories: chairs which are intended for indoor use in institutions, and wheelchairs which are designed for rough urban and rural outdoor use. We further distinguish between chairs in which a person is pushed by a helper, and those which are self-propelled by the wheelchair rider.

Wheelchairs should be thought of as short-range mobility devices. While they have good indoor maneuverability, they are difficult to push for long distances over poorly paved streets.

Many people can use hand-powered tricycles for intermediate distances (across town, up to several kilometers). Tricycles are effective for transport across dirt or poorly paved roads. When tricycle riders reach a typical indoor destination, they must leave their large tricycles outside and move inside on their own, using crutches or other means.

Many wheelchair riders who own folding wheelchairs employ cyclos (bicycle rickshaws) or taxis to travel intermediate and long distances. Inter-city buses provide most of the long range travel in developing countries. Non-folding tricycles and wheelchairs are generally not allowed on these buses. Folding hand-powered tricycles and wheelchairs are needed for inter-city bus travel. Although rigid wheelchairs are less costly than folding chairs, they restrict riders' ability to utilize inter-city buses.

In summary, it is helpful to consider the following family of manual wheeled mobility devices for use by people with mobility impairments.

1. Manual wheelchairs
 - a. Hospital-type (indoor, often pushed)
 - (1) Rigid
 - (2) Folding
 - b. Rough urban & rural (outdoor, usually self propelled)
 - (1) Rigid
 - (2) Folding
2. Tricycles
 - (1) Rigid
 - (2) Folding

B. Numbers of Persons Needing Wheeled Mobility Products

Statistics on numbers of people needing mobility devices in developing countries are being gathered by a number of investigators. Although statistics are incomplete, they allow us to estimate needs in countries throughout the world. We estimate the number of potential wheelchair riders as 0.5% and 1% of the total population. Vietnam, with a population of 70,000,000 people, is expected to have a need for 350,000 to 700,000 wheeled mobility devices.

C. Costs

While lowering the prices of chairs can make them affordable to a larger group of potential users, there are tradeoffs to consider. Maintenance cost and expected life of the chair are as important as the purchase price in determining the true cost of owning a wheelchair. If we use an estimated price of 50-150 USD/chair, the costs of

providing wheeled mobility products for Vietnam can range from a low of 17,000,000 USD to more than 1,000,000,000 USD. It is clear that Vietnam will need to seek significant international support to fund its wheelchair building program.

IV. Wheelchair Manufacturing Facilities

I visited three wheelchair manufacturers. Detailed descriptions of each facility are contained in the "Trip Log" and are referenced below.

A. Hanoi

1. Tricycle Production Section (TPS) / BaVi Orthopaedic Workshop
Xi Nghiep Co Khi Chinh Hinh
Son Tay, Ha Tay Province
Tel: ?, Fax: ?

Vuong Anh Dung, Deputy Director
Do Viet Tan, Head of Engineering

(Trip Log, page 5)

2. VIHA Bicycle Factory
10 Trang Thi Street
Hanoi
Tel: 84-4-263131

Le Van Thang, Deputy Director

(Trip Log, page 10)

B. Ho Chi Minh City

3. The 2nd Central Vocational School for the Handicapped
9 - Street 1 Phuot Binh
Thu Duc, Ho Chi Minh City
Tel: 84-8-966830

Truong Van Quoi, Principal

(Trip Log, page 15)

V. Skills of Local Designers and Manufacturers

A. Local Production

Our technology transfer model, which stresses local production of wheelchairs, is based on several considerations. First, in most countries, local production can provide wheelchairs at significantly lower costs than importing chairs. Second, when locally made chairs break, they can be repaired quickly without the need for importing expensive spare parts. Third, chairs produced locally are more likely to satisfy the specific needs of wheelchair riders in a particular country.

I am heartened and pleased at the local production of wheelchairs currently being achieved in Vietnam. Any critical comments appearing in the sections which follow should be interpreted in the same context in which they are offered: that of working to improve this valuable resource of currently existing wheelchair production facilities.

B. Design Skills

Wheelchairs produced by all three manufacturers appear to be copies of existing designs from other countries. While all three manufacturers do some design work to modify particular wheelchair parts for manufacturability, the more important issue of improving overall wheelchair design remains largely unaddressed.

The basic issue of improving design issue can be better understood by posing two similar questions. Would a bicycle manufacturer hire a design engineer who didn't know how to ride a bicycle? Would a car manufacturer hire a design engineer who didn't know how to drive a car? None of these wheelchair factories appear to employ workers who are chair riders. None of the non-disabled personnel in these factories regularly ride the chairs they produce.

An example of the results of this problem can be seen in the two wheelchairs produced at Thu Duc. The heavier hospital-model chair has been equipped with pneumatic tires and large casters, while the lighter chair (which is more suitable for self-propulsion outdoors) has been equipped with solid tires and small casters. These decisions make both chairs less suitable for the specific environment in which they operate. I believe that designers experienced in riding wheelchairs would not make these mistakes.

Thus, any low level of design skills reflected by the current chairs is due to a general lack of knowledge and experience with wheelchairs rather than a lack of design ability among the factories' design personnel.

I have not evaluated the design skills reflected by the tricycles produced at BaVi or ViHa. There were no tricycles available at BaVi to examine. At ViHa I was able to examine a tricycle. However, my lack of knowledge regarding the current "state-of-the-art" in tricycle design prevents me from making any accurate statements regarding the quality of this design.

C. Manufacturing Skills

Because of the huge need for wheelchairs in Vietnam, any successful program will require a combination of small, medium and large-scale production. For the purposes of discussing wheelchair production, we define these terms as follows:

Small-scale	less than 1200 units/year (low capitalization costs, labor intensive)
Medium-scale	10,000 - 20,000 units/year (moderate capitalization costs, moderate amount of labor)
Large-scale	20,000 - 200,000 units/year (High capitalization costs, automated production)

Based on the annual production figures presented, all of the three manufacturers visited are currently engaged in small scale wheelchair production. Both BaVi and Thu Duc could double their annual production without having to change their physical plant, but this would leave both of them at the upper end of small scale producers (less than 1200 units/year). Based on its successful bicycle production, I believe that ViHa could be a medium-scale wheelchair producer if a profitable market for its products could be guaranteed.

There appear to be no quality control programs at any of the wheelchair manufacturers. No testing is done to insure that designs have adequate strength and durability. Any inspection procedures utilized were not described to me.

If I had to compare manufacturing skills, I would rate the ViHa factory as having significantly higher manufacturing capabilities and perhaps skills than either BaVi or Thu Duk. In comparing BaVi and Thu Duk, I would say that the level of manufacturing skill may be better at Thu Duk. This last judgement may be more influenced by the higher level of production and the better chair designs that I observed at Thu Duk.

VI. Improvements in Wheelchair Design and Manufacturing

A. Improvements in Wheelchair Design

Historically, all major breakthroughs in wheelchair design have been made by inventors and designers who are also wheelchair riders. Because better chairs enhance their independence, wheelchair riders have a strong motivation to continually improve design and quality of the wheelchairs they produce. A continuous stream of improved wheelchair designs has been the result of involving wheelchair riders in the design and production of wheelchairs. One of the best ways to improve wheelchair design in Vietnam is to actively involve wheelchair users in the evaluation, design, and production of wheelchairs.

Specific issues with respect to improving wheelchair designs:

None of the chairs that I observed were suitable for self-propulsion in rough urban and rural environments. I would suggest that manufacturers consider producing either the Whirlwind I or II wheelchair for this purpose. The Whirlwind wheelchair has been designed by an international network of wheelchair riders building wheelchairs in over 20 countries throughout the world. Over the past 13 years, members of the Whirlwind network have developed a set of design criteria that they believe their chairs must meet. They consistently strive to make their wheelchair designs better meet the following criteria:

- **Individual fit** for minimum chair width and efficient hand propulsion,
- **Precise control** at moderate speeds (met by using metal hand rims),
- **Maneuverable over obstacles** (satisfied by rear wheel/front caster design)
- **Safe transfer** in and out of the chair (met by open armrests and locking brakes),
- **Compact size** for easy maneuvering in tight spaces,
- **Lightest possible weight** for ease of propulsion and ease of lifting,
- **Exceptional durability** under rough urban and rural use in all types of weather,
- **Low cost**, both initially and over the life of the chair,
- **Efficient production** by disabled people with a minimum of capital investment,
- **Easily customized** for people with special size or disability requirements,
- **Locally repairable** using the skills and materials now available in village settings.

With respect to the Vietnamese chairs which I inspected, obvious improvements to the designs include:

1. **Stronger more durable footrests**

2. Better (larger, stronger and wider front caster wheels for rolling over rough terrain.
3. Improving durability of caster forks

Most importantly, information regarding the failure of chair components must be obtained. All wheelchairs break. A good design is achieved by strengthening components which fail. Information regarding component failures can be obtained through customer surveys or testing of the wheelchairs. Once builders know the critical parts of the chair, it becomes a routine design exercise to improve them.

B. Improvements in Wheelchair Manufacturing

The wheelchair manufacturing that I observed generally looked appropriate to current production levels. If production of wheelchairs is to be increased in Vietnam, a model similar to that currently utilized by bicycle manufacturers should be considered. In this system, many small producers of specialized individual parts for wheelchairs would sell their individual parts in a wheelchair parts commodity market. They would assemble wheelchairs under their own brand name, utilizing their own parts and parts from other small manufacturers like themselves. This system would serve to keep prices low through competition and efficient manufacturing techniques.

An association or cooperative organization of wheelchair manufacturers should be formed. This association would function to:

1. Find markets for wheelchairs.
2. Provides technology transfer to private and government enterprises.
3. Develops sources for the supply of parts and raw materials needed by the industry.

As in the case of the bicycle industry, the government should have a testing laboratory that performs testing of wheelchairs. Recent establishment of international standards (ISO) for wheelchair testing allows Vietnamese wheelchair manufacturers to compare the performance of their chairs with those of chairs from all over the world. Establishment of a strong Vietnamese export market in wheelchairs is possible. However, this market can best be achieved by improving Vietnamese chairs sufficiently to pass the ISO test standards.

VII. A Program for Expanded Production of Improved Wheelchairs

The Wheeled Mobility Center would like to work in cooperation with the government, wheelchair designers and manufacturers, and persons with disabilities in Vietnam to expand the production of improved wheelchairs. There would be advantages to both sides in such a cooperative effort. The Vietnamese wheelchair industry would become part of a global network of wheelchair makers in developing countries. This cooperation would provide significant technical and economic assistance to Vietnamese manufacturers as they work to improve their chairs and production methods.

The Wheeled Mobility Center would also benefit from such a plan. As we work with the creative members of the Vietnamese wheelchair industry, we feel certain that they will contribute to the various wheelchair research and development problems challenging the Center.

The Wheeled Mobility Center, with the advice of the Building Wheelchairs-Creating Opportunities Program Support Group (PSG) (See attached paper entitled "Measuring Success in Third World Wheelchair Building" for a discussion of the functions of the Program Support Group.) has initiated a large program to expand the production of improved wheelchairs in Russia. We would like to propose a similar program for Vietnam. Key features of the Russian program are:

- The lead organization (Novosibirsk Regional Sports Invalids Club) is a disability organization.
- A revolving consumer credit fund is utilized to keep costs to wheelchair riders at an affordable level.
- Competition keeps chair quality high, and costs low.
- Vocational training programs teach marketable skills to persons with disabilities.
- The government can stimulate jobs for people with disabilities by:
 - removing architectural barriers.
 - requiring employers to make jobs and job sites accessible.

I would like to obtain some feedback regarding whether readers of this report feel that such an approach would be appropriate in Vietnam. Towards that end, I have included a project summary for the Russian project as an appendix to this report. If reactions are favorable, I will develop a proposal specific to Vietnam for my final report.

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DRAFT REPORT

APPENDICES

- Appendix A - List of Slides (note: slides have been developed, but not copied. Copies of slides, as well as a list, will be included in the final report.)
- Appendix B - "Measuring Success in Third World Wheelchair Building"
- Appendix C - Project summary of Russian Wheelchair Building Project

MEASURING SUCCESS IN THIRD WORLD WHEELCHAIR BUILDING

Ralf D. Hotchkiss & Peter Pfaelzer
Wheeled Mobility Center, San Francisco State University

ABSTRACT

The wheelchair industry in developing nations is growing rapidly. As the growth of new projects gains momentum, the need to analyze the success of the most effective manufacturers becomes clear. This analysis must be shared with wheelchair enterprises across the globe, and with others, like ourselves, who are involved in technology transfer activities. In this paper we suggest some characteristics common to successful shops. We also present a comprehensive model for technology transfer for wheelchair building in developing nations.

THE PROBLEM

For at least 20 million people in developing countries, the disability rights movement is but a dim fantasy. Many would struggle for education, jobs, and self determination, except for one critical obstacle: they have no way to move from place to place. It is clear that human beings who can't use their legs need a set of wheels. However, most of the world's people who need a wheelchair, currently have little likelihood of getting one in their lifetime.

HISTORY OF THE PROJECT

A program of wheelchair building in developing nations has been going on for the past twelve years. We have worked with wheelchair builders in a variety of countries to develop an indigenously manufactured, lightweight, semi-sports model chair—the Torbellino (Spanish for "whirlwind"). In the last twelve years, twenty-five small-scale manufacturing shops have been established in 20 different countries. Over 150 mechanics have been trained. This pilot project has produced several thousand wheelchairs, and has demonstrated the viability of small shop production in developing nations.

TECHNICAL TRANSFER MODEL

Our technology transfer model - small scale enterprises in which wheelchair riders produce chairs using local materials - is based on several considerations. First, in most countries, local production can provide wheelchairs at significantly lower costs than importing chairs.

Second, when locally made chairs break, they can be quickly repaired without the need for importing expensive spare parts. Third, the general metal-working and manufacturing skills associated with wheelchair manufacturing provide an excellent vocational opportunity for wheelchair riders. Finally, and perhaps most importantly, riders have a strong motivation to continually improve the design and quality of the wheelchairs they produce. Better chairs enhance their independence. A continuous stream of improved wheelchair designs has been the result of this approach.

MEASURING SUCCESS

The wheelchair industry in developing nations is growing rapidly. Over the past twelve years, working with wheelchair builders in developing nations, we have observed some projects succeed while others fail. As the growth of new projects gains momentum, the need to analyze the success of the most effective manufacturers becomes clear. Numerous potential wheelchair builders have asked what makes some factories thrive while others do poorly. People with disabilities have asked for help to raise the quality of work of their local manufacturers, some of whom are making shoddy or overpriced wheelchairs. We define success as the ability to produce large volumes of high quality chairs that are low in price, durable in the field, and that promote independence among wheelchair riders. The following characteristics are common to successful shops:

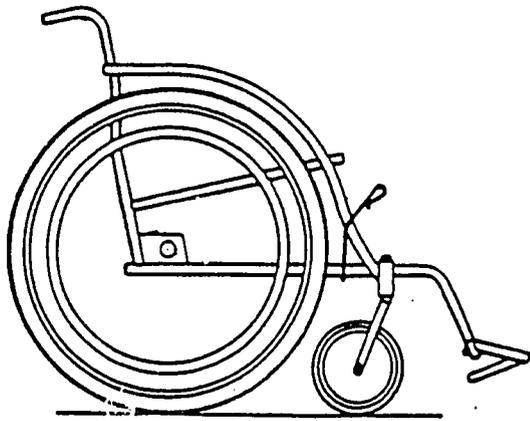
Quality chairs

Quality chairs are well designed. Put quite simply, they work. Their design fits both the population and the environment for which they were intended. Quality chairs are dependable. Good design, fabrication and quality control enables quality chairs to be utilized in the rough urban and rural conditions encountered in developing nations. The mean-time-to-failure for wheelchairs in developing nations is no less than that of chairs used in the industrialized countries. All wheelchairs break down. Quality chairs are repairable. This generally means that parts are designed to be repaired by local craftspeople, rather than replaced. Spare parts are usually unavailable, and/or costly in developing nations.



BUILDING WHEELCHAIRS • CREATING OPPORTUNITIES

The Torbellino II: Preparing for the 21st Century



Narrow elevator doors in Siberia, Centralized manufacture in India with a "one size fits all" mentality, the need for better sports chairs in Nicaragua, the extreme cost of bearings in Peru, the need for children's chairs in Sri Lanka - all have required the development of a new type of multi-purpose chair. After 7 years of design and testing, our network of wheelchair riders-builders is ready to begin the dissemination of the Torbellino II. Its new features include:

- o Self-Narrowing - adapted from the Altimate patent - so the rider can squeeze through narrow doors
- o Adjustable Width - the rider has the choice of 5 seat widths in a single chair
- o Adjustable Axle Position - with choice of 8 positions
- o Sealed Needle Bearings - made of nails/coat hangers
- o Radical Footrest Adjustment - 8" (20 cm) vert. motion
- o The Zimbabwe Wheel - The ride and flotation of a wide front pneumatic with no flats, at very low cost
- o Camber adjustment - separate wheel and sideframe camber adjustments, for custom backrest fitting

Affordable chairs

A successful wheelchair shop not only produces quality chairs, but also sells them. Cost control is the key to keeping the price low. Materials utilized in production are locally available and relatively inexpensive. Batch processing of parts is used to keep labor costs to a minimum. Overhead or fixed costs are controlled and included in the purchase price of the chair. Even with attention to all these details, the purchase price of a wheelchair may be excessive for a person with a disability. In some cases, the manufacturers have cooperated with other organizations or banks to develop innovative financing schemes. Revolving loan funds to consumers have been utilized successfully in Columbia to enable poorer persons with disabilities to purchase a chair. To help the maximum number of people buy wheelchairs, the group in the Philippines uses donated funds to give partial subsidies. Successful wheelchair shops are as skilled in meeting the financial challenges of wheelchair production as they are in solving their technical problems.

Consumer involvement

Active consumer involvement in production has been vital to the most successful wheelchair enterprises. Chair design and durability must be evaluated by experienced riders who understand the production process. Persons with disabilities have a strong vested interest in producing a quality product and running a successful business. Disability movements in developing nations also benefit from consumer involvement in production. As employees, persons with disabilities serve as role models. They inspire their peers to fight for the jobs they deserve. A self-help, or independent living model for persons with disabilities can replace the charity model which is prevalent in developing nations. Furthermore, as a large number of consumers become mobilized, and enter a variety of occupations, capital can be infused into the local disability movement.

Quantity of chairs

To be successful, a wheelchair shop must operate efficiently. The production capability of individual shops varies greatly depending on the initial capital investment and the production model which is utilized. Small scale, low capital, labor intensive production is appropriate in countries with low labor rates. Even if it takes a week for a person to make a chair, the labor cost is still not a large percent of the chair's total cost. In areas with larger markets to be served, medium scale production requires more sophisticated planning and management as well as more investment in tools and fixtures. All wheelchair components must be standardized and interchangeable for medium scale production.

A GLOBAL APPROACH

In a paper presented at the 1990 RESNA Annual Conference entitled "Third World Wheelchair Manufacture: Will It Ever Meet the Need?", we estimated that 20,000,000 wheelchairs were currently needed in developing nations. While our 12 year pilot project has been successful by many measures, only five to ten thousand wheelchairs have been produced by shops with which we've worked. Clearly, a bolder, more comprehensive, long term, global plan must be developed.

Mr. Henry Hof, a senior economic affairs officer in the United Nations' Department of Economic and Social Development and a wheelchair rider himself, is coordinating a committee which is designing a global plan. Central to this plan is a substantial increase in the current growth rate of wheelchair production in developing nations. The long term goal of producing and distributing tens of millions of wheelchairs in developing nations, if it is successful, will take 20 to 30 years.

The goal for the initial three year phase of the project is to develop an infrastructure in several marketing regions in different parts of the world. A measurable goal three year project is a significant increase in the current growth-rate of wheelchair production in each region. The plan specifies the initiation of small scale enterprises which will employ men and women, including those with disabilities, in meaningful and productive positions of responsibility.

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Third World Wheelchair Building

The global plan envisions a network of regional resource and training centers throughout the world. These centers will be responsible for providing assistance to both new and existing wheelchair manufacturers in their regions. A Program Support Group (PSG) will be available to assist the regional resource and training centers as well as local producers.

THE PROGRAM SUPPORT GROUP

The Program Support Group will assist with:

- Statistical information on the need for wheelchairs in specific countries.
- Capitalization of small shops and larger factories.
- Training of wheelchair builders.
- Creating financing plans for consumers.
- Training of rehabilitation professionals.
- The promotion of mobility and independence for persons with disabilities in developing countries.
- On going evaluation and refinement of the regional and local projects.

The Program Support Group will provide governments and organizations in developing nations with a single comprehensive package to carry out both economic and social development. The United Nations' Department of Economic and Social Development, working with UNDP, ILO, and UNIDO, will be responsible for directing the activities of the PSG. The PSG will assist local executing and cooperating agencies during the infrastructure development period. The PSG will also be responsible for global coordination of the project. After final approval by the boards of the respective organizations, the roles they will assume within the PSG include:

- For Technical Assistance and Training: The Wheeled Mobility Center, San Francisco State University, San Francisco, California
- For Business Assistance: Appropriate Technology International (ATI), Washington, D.C.
- For Consumer Financial Assistance: Appropriate Technology International (ATI), Washington, D.C.
- For Advocacy Assistance: Rehabilitation International, New York, New York; and Disabled People International, Winnipeg, Manitoba
- For Statistics and Evaluation: United Nations Statistical Office, DESD, New York

MODEL FOR PROJECT IMPLEMENTATION

Implementation of the project reflects the United Nations' new emphasis on local execution. Government ministries, in association with interested local non-governmental organizations, will be the executing and cooperating agencies in each country. The participation of local organizations of persons with disabilities will be required. In each country, local nationals will have ultimate responsibility for the project. Collaborating local agencies will work with the previously described Program Support Group to realize the project goals in their particular countries. The project will seek local and international funds to support activities in each country.

Full approval and funding for the overall plan is targeted for mid-1992. If you would like to explore the possibility of securing support for wheelchair building in your country, contact:

Mr. Henry Hof
Department of Economic and Social Development
United Nations
New York, NY 10017, USA
Phone: (212) 963-7168

or

Ralf Hotchkiss & Peter Pfaelzer
Division of Engineering
San Francisco State University
1600 Holloway Avenue
San Francisco, CA 94132, USA
Phone: (415) 338-2878



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PROJECT SUMMARY

I. THE PROGRAM

This project will expand upon an effort which the Wheelchair Mobility Center of San Francisco State University began in Novosibirsk, Russia in 1990. This project will develop the Novosibirsk Regional Sports "Invalids" Club (NRSIC) into a provider of a wide-range of services for people with disabilities. We have devised a creative blend of private and public sector ventures that will provide multiple revenue streams to the NRSIC and also provide a direct social benefit to the NRSIC constituency by supplying crucially needed wheelchairs throughout the region. We will support three private sector wheelchair building shops, several NRSIC-owned and managed wheelchair repair shops, and an NRSIC/private sector co-venture in specialty parts manufacturing that will be a supplier to the three private sector wheelchair building shops. These ventures will empower the NRSIC constituency by providing the mobility the members need to become full participants in the economic and social life of the NIS. These ventures will also provide long term financial stability to the NRSIC through a combination of profit participation, loan principal repayment, and loan interest. They will also provide jobs and job training to local disabled persons.

Wheelchair Building Shops: Because competition will act to keep prices low and quality high, we will enhance the existing wheelchair manufacturing operation at the helicopter repair factory (established by WMC in 1990), support the expansion of SibMedDesigns into wheelchair production, and establish a third new shop. We have chosen to set up three shops because competition cannot be created with just one facility. Establishing two shops will create only minimal competition and does not provide a margin of safety if one of the facilities fails. These shops will be capitalized from USAID grant funds through loans to the shop owners. The principal and interest will be paid back by the shop owners to the NRSIC to provide ongoing funding for new ventures or for other NRSIC program and operating costs. In effect, the NRSIC will recoup the entire cost of capitalizing the shops, plus interest and can then use these funds for development of other services for the organization. Eligibility for a loan from this fund may be made conditional on participation in a vocational training program for disabled people, employment of people with disabilities, and cooperation in activities with other shops, such as wholesale parts and materials purchasing. In cooperation with the Center for Citizen Initiatives in San Francisco, we will bring four people from the wheelchair factories and the NRSIC to California for a one-month business internship with a comparably-sized wheelchair manufacturer.

Specialty Parts Manufacturing Subsidiary: With Russian industrial production still in state hands and operating largely within the framework of an overall plan, certain parts, especially bicycle wheels, are difficult to obtain regularly and in sufficient quantity. To solve this problem we will set up a specialty parts manufacturing operation as a profit-making subsidiary of NRSIC. The NRSIC will seek one or more financial partners for this co-venture, including private investors and the wheelchair shop owners, but the majority equity position will be held by the NRSIC to prevent anyone from gaining a monopoly on the production of a key component in wheelchair manufacture. We will encourage and assist the specialty parts subsidiary to seek contracts for the sale of wheels to bicycle manufacturers and to produce wheels of varying sizes for other markets besides the wheelchair shops. The subsidiary may obtain space at the helicopter repair facility in Novosibirsk. This venture will be a long term source of revenue for NRSIC through profit participation.

Wheelchair Repair Shops: We will set up one or more wheelchair repair shops, owned and run by the NRSIC. These shops will be capitalized from A.I.D. grant funds. Profit from the shops will be a revenue source for NRSIC. The shops can provide several services to NRSIC's constituency and the general community including warranty repairs for the factories, bicycle and other repair services to the general community, and employment of disabled people as part of a vocational training program.

Revolving Consumer Credit Fund: The Revolving Consumer Credit Fund will make loans for wheelchair purchase. This fund will be capitalized in part with A.I.D. grant funds, and will be managed by NRSIC. The Fund may also guarantee private bank loans for wheelchair purchases. There will be a continuing replenishment of the fund's capital through this repayment program. The fund will promote the highest quality and lowest cost wheelchairs through competition in the marketplace, and will empower wheelchair users by giving them a choice of wheelchairs.

Vocational Training Program: The Vocational Training Program (VTP) will recruit and train people with disabilities, especially wheelchair riders, in wheelchair design and fabrication and provide them with skills which are transferrable to other industries. Successful graduates of the VTP can work in wheelchair repair shops run by the NRSIC. They can also do bicycle repair and manufacture, and work in a number of other industries in which metal working skills are needed. The VTP will assist graduates in finding work with state and private employers. The NRSIC will conduct a survey of employment opportunities in the Novosibirsk region to determine which jobs wheelchair riders and other disabled persons could perform with appropriate training and accommodations. The VTP will be crucial to the success of the Revolving Consumer Credit Fund by providing many of the borrowers with the skills and jobs to enable them to repay their loans.

II. THE ORGANIZATIONS

Our partner NGO in Novosibirsk is the Novosibirsk Regional Sports "Invalids" Club (NRSIC), which was established in 1990. The NRSIC is a regional membership organization of disabled people, originally formed to sponsor wheelchair sports teams and to foster educational, recreational and other social activities for its members. The club will be expanded into a multi-service NGO that will be a center for programs for disabled people in the region.

The Wheeled Mobility Center at San Francisco State University (WMC) exists to promote the development and manufacture of the Hotchkiss Whirlwind Wheelchairs in developing countries. The WMC's goal is to set up wheelchair building enterprises which require a minimum of initial capitalization in order to provide low cost, high quality, easily repairable wheelchairs and vocational training to people with disabilities, as a first step in promoting their full integration into society. WMC will subcontract with the University of San Francisco's McLaren School of Business (USF) for business management training, initialization and development of the vocational training program, and organizational development. WMC will also coordinate its activities with the World Institute on Disability (WID), and Disabled Peoples International (DPI), as outside fundraising permits, to provide program and services assistance to the NRSIC. We will also network with the many other organizations attempting to assist Russia's transition to a market economy.

At the start of the project, WMC will meet with the NRSIC and with sub-contractors to develop a detailed workplan for the two-year program. We plan to involve the NRSIC in the development of each aspect of the program and to train their staff in the decision making process, strategic planning sessions and delegation of authority. A combination of formal training seminars and the invaluable experience of actually setting up and running services will provide NRSIC staff and management with hands-on practical experience. We will recommend that the NRSIC staff learn English to strengthen their capacity to attract further international assistance.

Below is a description of the principal activities to be carried out during each quarter of the program. Of course, certain activities will develop over several quarters. This description indicates the major focus of work for a specific quarter.

First Quarter: Information gathering, planning and preparation for the program as a whole. Assess and develop appropriate methods and types of training needed in the areas of wheelchair building, business management, and organizational development. Develop workplan for the program with the NRSIC and with the North American based subcontractors. Research specialty parts manufacturing. Conduct first management/organizational training in Novosibirsk.

Second Quarter: Hire a business manager and technical manager at the NRSIC. Formalize relationship between the first two wheelchair shops and the NRSIC. Upgrade the technology for the first shop, train staff for the second wheelchair shop and equip and start production on second shop. Equip and start production for Specialty Parts Manufacturing shop.

Third Quarter: Business/management and organizational development training workshops for the NRSIC and the shops held. Potential service programs and the vocational training component further detailed in conjunction with the USF consultants. Consumer purchase funds in operation, marketing program pursued. Develop revolving loan fund by-laws, reporting system.

Fourth Quarter: Third wheelchair shop established, NRSIC-run repair shop established and staff trained. Business training in San Francisco held for wheelchair shop and NRSIC managers. NRSIC to visit with local NGOs, shop managers to work in mid-sized wheelchair manufacturer in California. The mid-term evaluation and audit will be conducted during the last month of this quarter.

Fifth Quarter: Review mid-term evaluation and annual audit. Determine areas in need of improvement and develop new training strategies to address needs. Revise workplan for new year. Establish new service program for members of NRSIC.

Sixth Quarter: Focus on sales of wheelchairs, effect of consumer purchase fund and loan repayments from wheelchair producers. Broaden vocational training program, work on

attracting clients and job placements. Management and business training held, focussing on problems identified during first year.

Seventh Quarter: Begin phase out of PVO/NIS project assistance. Analyze user financing scheme and prospects for sustainability. Assess financial recovery ability and service provision of vocational training and other new programs. Develop strategy for long term revenue development. Focus on areas in need of improvement.

Eighth Quarter: Assist NRSIC as needed with development of long term workplan beyond PVO/NIS program. Hold exposition to showcase program for replication in other regions and republics. Final audit conducted.

REVOLVING LOAN FUNDS ADMINISTRATION

The Novosibirsk Regional Sports "Invalids" Club will administer two loan funds during the 2-year grant period and afterwards. The first fund is the Revolving Consumer Credit Fund for the purchase of wheelchairs. The second fund is an Equipment Capitalization Fund for the three privately owned wheelchair factories and the Specialty Parts Joint Venture.

The Revolving Consumer Credit Fund will have the following four parts:

1) a self-perpetuating loan program, funded by A.I.D. and matching grants -- The repaid principal and interest will be used solely to make new loans for wheelchair purchases. The loan service will be administered by the NRSIC staff, who will handle loan applications and monitor repayment schedules; 2) Loan guarantees -- Loans from private, commercial sources will be underwritten by the Fund. The administration of the loan will be done by the third party lender who has agreed to make the guaranteed loan; 3) Grants -- Government monies will be used to provide non-repayable sums. This will be administered by the NRSIC. Recipients will be required to repay part of the loan in cash and/or by volunteer work for the NRSIC. However, this part of the Consumer Credit Fund will need to be replenished from outside sources; 4) Equipment Loans/donations -- Charitable Organizations seeking to donate equipment can do so through this part of the fund. The equipment can be loaned out or given to people unable to make repayment, as in 3) above. This will be administered by the NRSIC.

The Revolving Consumer Credit Fund will be designed after a thorough needs assessment. The criteria to be developed include application requirements and process, responsibility for controlling the fund and authorizing loans, and methods of monitoring and ensuring repayment. The NRSIC's administration of the Revolving Loan Fund will be overseen by a board of directors. Initially, this board of directors will include members of the NRSIC, Wheelchair Mobility Center, our field representative, Valerian Ivanchenko, representatives of the wheelchair factories, and private companies and charitable organizations who contribute to the fund. The composition of the board will change according to the interest and participation of the above-named, and other parties.

The Equipment Capitalization Fund will have two parts. One part will make initial loans to the three wheelchair manufacturers. The Second Part will make the initial loan to the Specialty Parts Joint Venture. The loans to the wheelchair manufacturers will be administered by the NRSIC. The NRSIC could use the repayments in a variety of ways, depending on the organization's needs. Monies could be added to the Revolving Consumer Purchase Fund, used to support NRSIC programs and services, or loaned back to the wheelchair shops for additional capitalization. Initially, the NRSIC's administration of this fund will be overseen by WMC, through our field representative, Valerian Ivanchenko.

The loan to the Specialty Parts Joint Venture will also be administered by the NRSIC. However, since the Specialty Parts Division exists to guarantee supplies of wheelchair parts, the first priority for repaid monies will be to ensure the sustainability of the Specialty Parts

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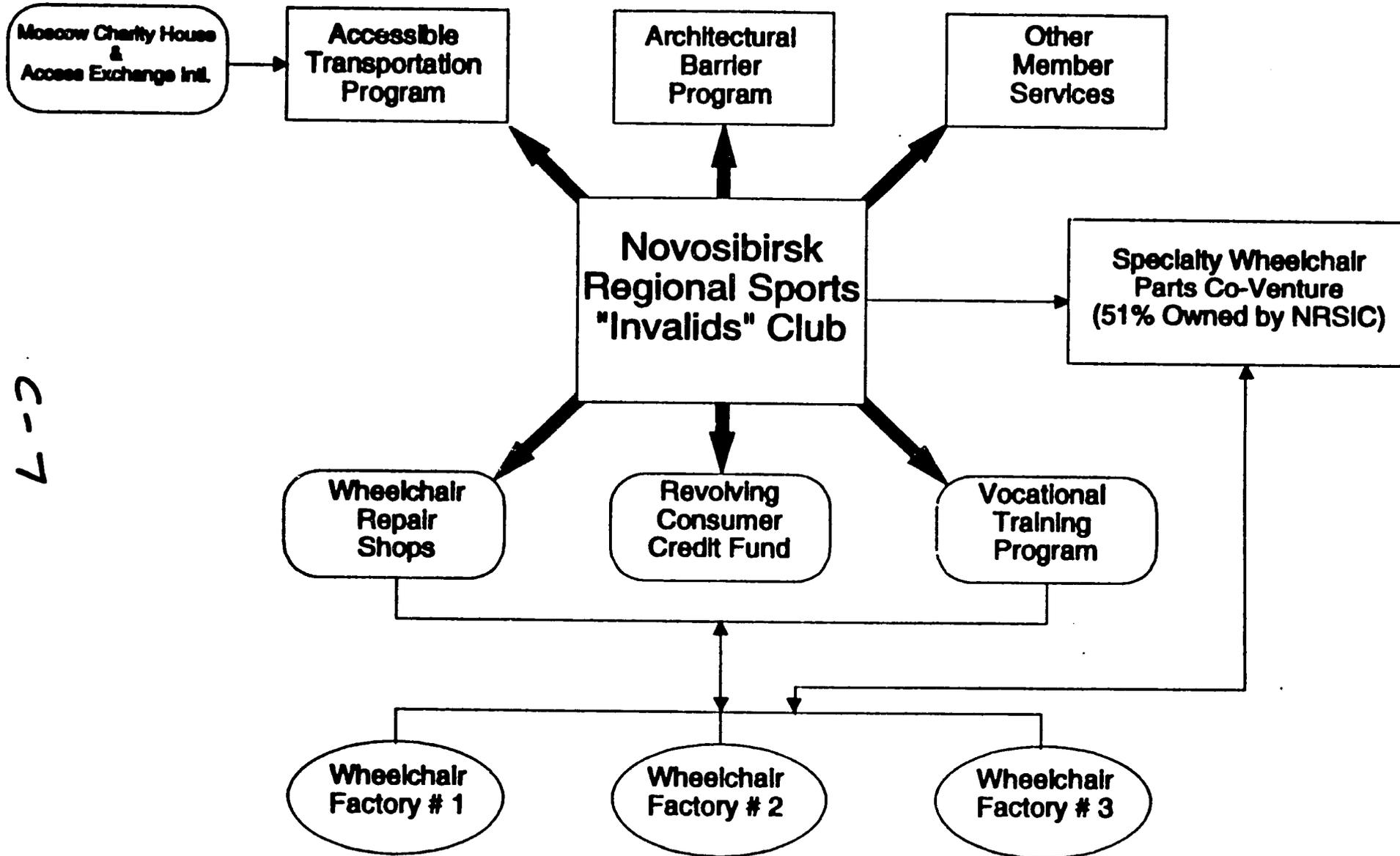
Division. Once that is assured, the monies could be used to support the NRSIC's programs and services. Initially, the NRSIC's administration of this fund will be overseen by WMC, through our field representative, Valerian Ivanchenko.

The loan funds will have by-laws, and acceptance of these by-laws will be a contractual provision with which the NRSIC will be expected to comply. We will watch the performance of the revolving funds closely during the project and will audit the funds twice - once before the mid-term evaluation and also an unannounced audit closer to the end of the project. Besides specifying uses for the revolving funds, the contract with the NRSIC will require audited annual reports on the funds for two years after the end of the project.

Wheelchair Building in Novosibirsk, Russia

Wheeled Mobility Center

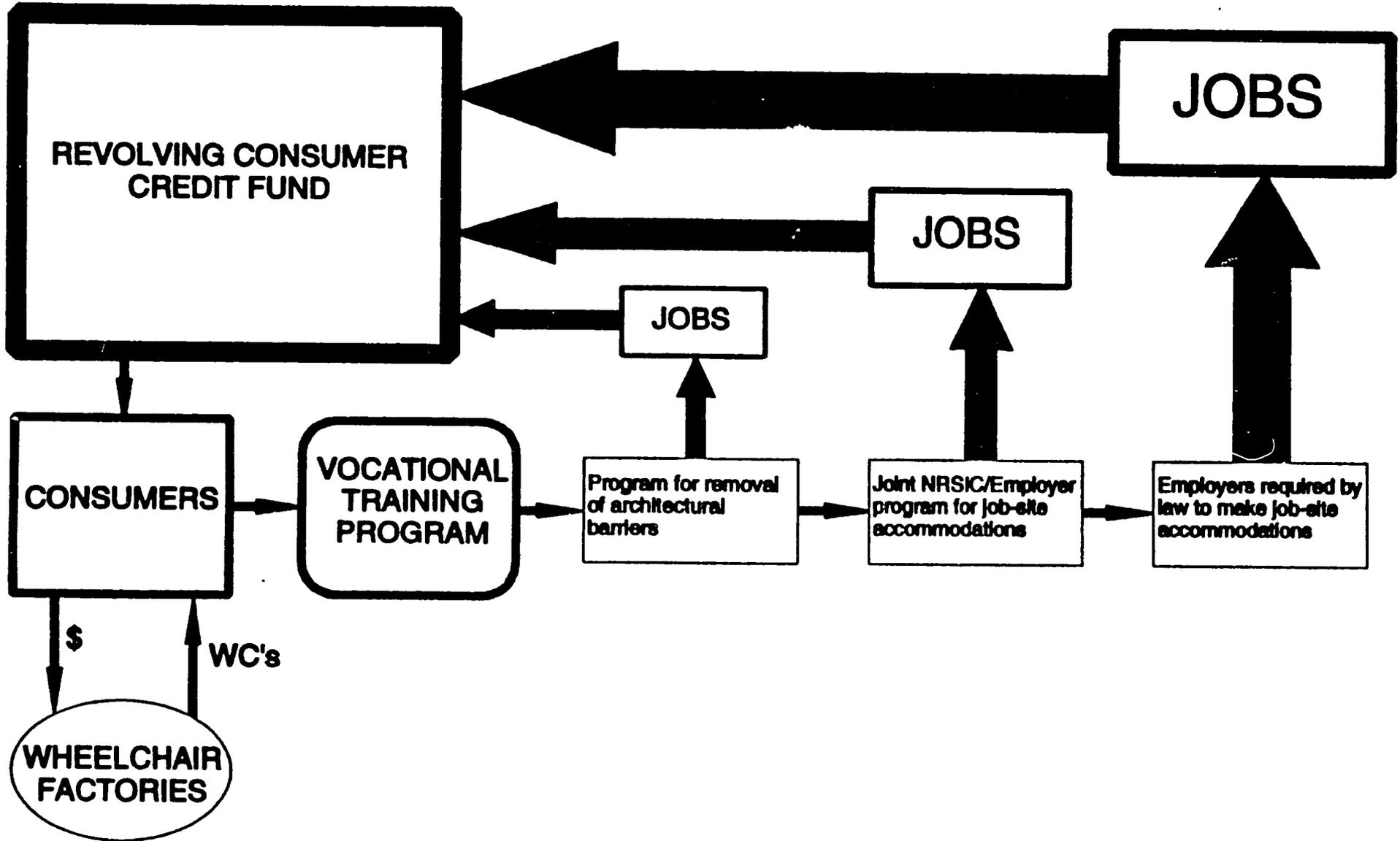
San Francisco State University



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Wheelchair Building in Novosibirsk, Russia Sustainable Revolving Consumer Credit Fund



WHEELCHAIR BUILDING IN VIETNAM

A fact-finding and program development trip.

July 9, 1993 to July 23, 1993

TRIP LOG

The "Trip Log" is a chronological report of activities performed as part of my fact-finding trip to Vietnam. Other documentation associated with this trip includes:

- Report (currently in draft form)
- Contact List

7/9/93, Friday

Traveled from Oakland to Los Angeles

Attended a Vietnamese fund-raising dinner in Garden Grove. It was for The Asian-American Senior Citizen Association Senior Citizen's Center. I met several interesting people at my table. They included:

Tran Quock Thang - Community Outreach Project Coordinator from the Senior Center. He was trained as a civil engineer, and is interested in returning to Vietnam and getting a cooperative program going with the University in Ho Chi Minh City.

Tri T. Lam, President, AmerAsia Investment Corporation

Timothy Kuo, Gen.Mgr Far East Div., "

Nothing much to report except that there is a lot happening regarding business in Vietnam. Once the embargo is lifted, I would guess that there will be lots of US investments and trade.

Steve Johnson, Attorney, 2821 SE 48th, Newton, Kansas, 67114, (316) 283-9297
Is going to Vietnam to investigate possible trade. Interested particularly in developing contacts around two products: skim milk, and innovative concrete blocks.

Ca Tran needs to send us all press releases in which he uses Wheeled Mobility Centers (WMC's) name. I read a release dated 7/4/93. The release talked of our trip and mentioned the WMC @ SFSU. It also told something about Ca's background. Interesting. He was a translator for the Marines. He appears to want to make sure

that Vietnamese who were sympathetic and/or worked for the US aren't discriminated against by the current regime. The politics of post war Vietnam are as interesting and complex as I had imagined they might be.

7/10/93, Saturday

Today was a travel day. A long 17 hour trip to Bangkok with a stop in Japan. I met Ca Tran in Narita Airport. There I also met two gentlemen from Vietnam. They were:

Ha Huy Thong, Deputy Director, Department of the Americas, Ministry of Foreign Affairs

Phan Ba Phap, Vietnam Electronics Import-Export Co, Representative to Paris

I will be in Bangkok late Sunday night.

7/11/93, Sunday

Lost Sunday to the International Date Line. We arrived in Bangkok at approximately 11 PM Sunday night.

7/12/93, Monday

A day in Bangkok spent getting ready to go to Hanoi. We moved up our departure a day, due to Ca's obtaining visas easily. Met with Susan Palmer, a local AID contact suggest by Allen Randlov.

Susan V. Palmer
PVO Grants Manager
USAID
37 Soi Petchburi Road
Bangkok 10400
Phone: 66-2-255-3650
Fax: 66-2-255-3730

APO Address

USAID/Box 47
APO AP 96546-7200

We had a good orientation meeting. I briefed her on work that the Wheeled Mobility Center had been doing in its international program. She discussed a recent trip that she had made to Vietnam with a prosthetist/consultant. She had some great pictures of wheelchair manufacturing at Thu Duc. It looks like they are producing quite a lot of chairs. I am quite excited to think about visiting and making connections with fellow wheelchair builders. In our discussion she reminded me of two issues which need to be taken into account with any program that we design. They are:

1. Currently, there are only two sources for USAID project funds in Vietnam. They are the War Victims' fund, and a program for displaced children and orphans.
2. AID programs for Vietnam are currently reviewed and administered out of Bangkok. Although she seemed very receptive to the idea of wheelchair projects, she suggested that we communicate with Randlov directly because he is really the primary source of USAID funding until the embargo is ended. She could not speculate how things would be handled when/if the embargo is ended.

7/13/93, Tuesday

A travel day. In the morning, I helped the rest of the delegation with getting their visas, and changing the day of their flight. Mr. Ca Van Tran was leading our delegation. Following are the other members:

Tri T. Lam
President, AmerAsia Investment Corporation
2361 Campus Drive, Suite 211
Irvine, CA 92715, USA
Tel: (714) 222-1900
Fax: (714) 222-1913

Timothy Kuo
General Manager, Far East Division
AmerAsia Investment Corporation
(Same as above)

Henry Diep Van Hung
Henry Continental Inc.
9431 Shadwell Drive
Huntington Beach, CA 92646, USA
Tel: (714) 963-5196
Fax: (714) 964-9170

Steve Johnson, Attorney
2821 SE 48th Street
Newton, KA 67114, USA
Tel: (316) 283-9297

We arrived in Hanoi late in the afternoon and were Met by Cuong (a government official), who took us to our hotel.

A good hotel in Hanoi

Binh Minh Hotel
27 Ly Thai To Street
Hanoi
Tel: 84-4-266441 (266442, 267096)
Fax: 84-4-257725

The Binh Minh is located very close to MOLISA offices. Its rates were \$40/night for a single room. Very adequate and clean.

7/14/93, Wednesday

My first day actually working in Hanoi. The phone system doesn't work too well, which makes setting up appointments a bit tedious.

UNITED NATIONS
Jo Ann Schop
Assistant Resident Representative, UNDP
27-29 Phan Boi Chau Street
Hanoi
Tel: 84-4-257495
Fax: 84-4-259267

Ms. Schop explained that UNDP in Vietnam was solely involved in long range infrastructure planning. They were not doing implementation programs. She suggested that there were other possibilities such as UNIDO, UNICEF, WHO. She also suggested talking to the various NGO's working in Hanoi.

Made two referrals to UNIDO

Preben Hjortlund (Danish person on leave until Aug 1)
Patrick Gilabert (French person)

I met briefly with Mr. Gilabert, and we scheduled a longer meeting for Friday.

Ministry of Labour, Invalids, and Social Affairs (MOLISA)
12 Ngo Quyen
Hanoi

Mr. Nghiem Xuan Tue
Vice-Director Department of International Relations
Tel: 84-4-269534
Fax: 84-4-254728 & 84-4-269556

Mr. Nguyen Manh Cuong (acted as interpreter)
NGO's Project Assistant, Department of International Relations
Tel: 84-4-254728

We had a good introductory meeting. Most of it was taken up with discussions regarding the business people in the delegation. It sounds like the economy of Vietnam is developing nicely. Economic planning has centered on shifting from a planned economy to a market economy. GMP has been growing at about 8%, and inflation has been kept under control at about 15%/year. Minimum wage for is set by the Ministry. I believe that this may only effect joint ventures, not domestic jobs. In 1991, the minimum wage was \$50/mo. Now it is \$35/mo.

Mr. Nghiem has a very good understanding of our program. He supported the idea of people paying something for the chairs, and the concept of a revolving loan fund. He liked the project that we were proposing for Russia, and asked for copies of what we had discussed during our meeting. These were prepared and forwarded to Mr. Nghiem via Mr. Nguyen.

Mr. Nghiem emphasized that Vietnam must spend its hard currency on high tech items which Vietnam was not currently capable of producing. Thus, there is a need to seek external funding for any wheelchair projects in Vietnam. I discussed the possibilities of getting funds from either USAID (after the embargo), or the UN through other donor nations. Either or both of these alternatives seem like realistic possibilities.

7/15/93, Thursday

Spent the day at the BaVi Orthopaedic Workshop (BOW).

Tricycle Production Section (TPS) / BaVi Orthopaedic Workshop
Xi Nghiep Co Khi Chinh Hinh
Son Tay, Ha Tay Province
Tel: ?, Fax: ?

Was taken there by car accompanied by:

Tran Van Xuyen

Director, Dong Anh Vocational Training Center for Displaced Children.

91 Ngo Dong Tam

Duong Gai Phong (Home address for Mr. Tran because he is moving offices,
and doesn't have phone or address)

While at the BOW, I talked with:

Vuong Anh Dung, Deputy Director of BOW

Do Viet Tan, Head of Engineering, BOW

The BOW is a well equipped factory which focusses on the production of wheelchairs, tricycles, and prosthetics for persons with disabilities. I visited the portion of the factory responsible for wheelchair and tricycle production. The factory was set up for wheelchair and tricycle production in 1981 with help from Poland. Recently, Mr. Joep Verweij, a Dutch engineer working with Delft University spent time working at BOW to improve tricycle production. Delft University has obtained additional funding from SITA to continue its work with BOW in the area of improving tricycle production.

BOW is manufacturing four types of wheeled mobility devices at the present time. These include:

- A hospital-type wheelchair (single width)
- A one-arm, lever-drive tricycle with tiller steering (one width)
- A two-handed, hand-cranked tricycle steered by turning the crank assembly (two widths)
- A child's two-handed, hand cranked tricycle (single width)

I saw one of the wheelchairs, but only saw pictures of the two adult tricycles. No photograph was available for the child's tricycle. Although parts of the tricycles were under production in the factory, no completed tricycles were available to look at. Thus, I was unable to evaluate the tricycle products.

The production rates at the factory averages 400 to 500 units per year. (Approximately 10 units/wk.) No breakdown on the production rates of the four types of wheeled mobility devices was available. BOW employs a total of 75 workers, with 15 of them involved in the production of wheeled mobility devices.

The factory was described as being half government and half private enterprise. This was described as being typical of ownership policies for all factories in Vietnam. (I remain somewhat unclear in my understanding of ownership practices for factories in Vietnam.)

Prices for products produced at BOW are:

Hospital wheelchair	\$85
Lever-drive tricycle	\$140
Hand-cranked tricycle	\$180
Child's hand-cranked tricycle	\$150

Domestic sales of wheeled mobility devices are to MOLISA or humanitarian NGO's. In both of these cases, they are then donated to people with disabilities.

BOW has been making some export sales. They have made an unspecified number of sales to a Thai import/export company. They have also sold 58 units (wheelchairs, I believe) to a Red Cross (or Crescent) Society (country unknown).

BOW could double its production rate to a maximum of 80 units/month if demand for wheeled mobility products increased.

Some comments on the wheelchair produced at BOW:

1. The chair is typical of many wheelchairs produced in developing countries. It is a copy of an old hospital-type wheelchair design. While adequate perhaps for indoor institutional use, it lacks the durability for the rough urban and rural environment found in Vietnam.
2. BOW personnel indicated that the axles of the main wheels broke on occasion. The wheel/axle assemblies are obtained from a bicycle manufacturer. They appear to be intended for use on a cyclo, and I am surprised that they are not adequate for use on wheelchairs. Perhaps the quality control of heat treatment of the axles is poor at the bicycle manufacturer.
3. On the wheelchair that I rode, the caster wheel was interfering with the footrests when the caster wheel was rotated about the caster barrel axis. It was not clear to me whether that was due to deformation of the caster fork, the footrest, or the footrest bracket.
4. Several pieces of the wheelchair sideframe are assembled mechanically rather than welded together. The reasoning behind this design decision is not clear (perhaps limitations in the size of assemblies that can be chrome plated). I believe that these mechanical connections significantly reduce the durability of the frame assembly. I recommend that BOW consider a welded sideframe design,

The spacious factory was quite well equipped with machinery appropriate for medium and large scale production. This included a number of large punch presses in addition to the usual complement of lathes, milling machines, welders and other

machine tools. I was particularly interested in looking at the jigs and fixtures which were used in the production of the wheelchairs. Despite returning after lunch, I was unable to observe these because the person responsible for them was not working at BOW that particular day.

There is not testing or quality control program in the production of wheelchairs or tricycles. BOW personnel indicated that they did receive some feedback from their customers (particularly MOLISA), were non-specific when questioned about the nature of these complaints.

Workers with disabilities (wheelchair and tricycle riders) are generally not employed at BOW.

7/16/93, Friday

Vu The Phiet, Chairman
Hanoi Sports Club for the Disabled
1B Le Hong Phong Street
Hanoi
Tel: 84-4-232287
Fax: 84-4-253172

The Hanoi Sports Club for the Disabled was established in 1990. It has about 100 members, with the following distribution of disabilities:

Spinal cord injuries	20%
Polio	20%
Amputees	60%

The club offers seven types of sports and competitions for its members. They include: archery, table tennis, w/c tennis, badminton, swimming, weight lifting, and w/c racing. (I believe they may also play basketball.)

The club was active in helping to arrange Vietnam's first w/c race, a 10 km road race which was held in conjunction with the 1993 Vietnam marathon. Mr. Phiet indicated that 60 (40 from abroad) w/c athletes competed in the race.

He indicated that the Vietnamese athletes felt that they were hampered by poor equipment (heavy chairs), and that they had great interest in importing state of the art equipment from abroad. He has a plan to order wheelchairs from an American company, Magic in Motion (they have offered a 20% discount on purchases to the Sports Club. I encouraged Mr. Vu to try to stimulate Vietnamese production of high performance wheelchairs, rather than relying on imported chairs.

A good article on the Sports Club appeared in a recent publication of the following organization:

FESPIC: Far East & South Pacific Games Federation for the Disabled.

FESPIC is sponsored by the following Japanese company:

Japan Sun Industries
Dr. Kazuo Hatada, Vice-President of Sun Industries, and President of FESPIC
Kamegawa, Beppu, Oita
874-01, Japan
Tel: (0977) 67-0277
Fax: (0977) 67-0453

We discussed possible collaboration between WMC and the sports club in w/c building. Mr. Vu indicated that the Sports Club would be interested. He indicated that if large numbers of wheelchairs are to be produced, then low price is essential. He liked the idea of developing a vocational training program for persons with disabilities. He indicated that Japan Sun Industries had also talked of such an idea. There could be collaboration between WMC and Sun in this endeavor.

Mr Phiet thought that there was a need for about 500,000 wheelchairs in Vietnam today.

Mr. Phiet had arranged for me to meet with two w/c athletes with spinal cord injuries. Both were using racing-type tricycles. These were excellent chairs. They were built by Viha Bicycle Factory in Hanoi. They appeared to weigh about 16 kg, and were powered using conventional handrims. Racing-type steering was used. The cost of the tricycles was estimated at \$100. One of the riders uses the tricycle as his everyday chair, and likes it very much. He uses the tricycle to get between home and the club, about a 3 km distance. Both riders tried the Whirlwind II wheelchair. Both preferred the specialized athletic w/c's that they used to the Whirlwind. One of the riders thought that the Whirlwind was too unstable (tippy). I explained to him that the axle position could be adjusted. He liked that.

I also observed a Japanese lightweight chair that they used for tennis. This is an excellent imported lightweight sports chair. I do not know the cost of this chair in Vietnam.

Mr. Vu indicated that he would be coming to New York for the N.Y. Marathon in November. He would accompany two athletes with disabilities, who would run the marathon with prostheses. I indicated that it would be nice if sponsorship could be obtained to bring a couple of w/c racers over.

The trip is being sponsored by:

Achilles Track Club

(212) 354-0300

Dick Traum, President

Chris Stewart (He had been in Vietnam, and was making arrangements for the trip.)

I suggested that we try to have some meetings regarding wheelchair building, while Mr. Phiet is in New York. I believe that he will arrive on November 14, 1993.

VIHA Bicycle Factory

Le Van Thang, Deputy Director

10 Trang Thi Street

Hanoi

Tel: 84-4-263131

The VIHA Bicycle Factory produced the excellent road racing tricycles used by the Hanoi Sports Club. Their primary mission is to produce bicycles, but they have gotten into producing wheelchairs as charitable work. Mr. Thang believes that they have lost money on all their wheelchair work.

At the factory, I observed the following three different wheeled mobility products:

A large, heavy hospital type chair that had a reclining back. I would estimate the weight of the chair at about 27-30 kg. 600 of these chairs have been exported to Algeria. The cost of the chair is \$100. 200 of these chairs are in use in Vietnam. The quality of the chair looked quite good. In contrast to the BaVi wheelchairs, the sideframes were fully welded and looked very robust. When asked about failures to the chair, Mr. Thang indicated that the only complaint had been regarding the paint on the chairs. I wasn't able to clarify this further.

A copy of a Japanese adjustable width light weight wheelchair was also produced. Its weight is 22 kg. 200 of these chairs have been sold. Sales price is \$80.

The 18 kg racing tricycle is only produced as a special order. I was not able to get a price for the trike (The Sports Club said that it cost \$100), or any figures regarding total production.

The VIHA Bicycle Factory appeared to be a well run medium to large-scale producer of bicycles. Mr. Thang is an engineer, and appears to thoroughly understand the

issues involved in wheelchair design and production. He was very interested in the design aspects of the Whirlwind II wheelchair. I left him with a complete set of plans for the chair.

Mr. Thang indicated that VIHA would be very interested in participating in a national program for wheelchair production, particularly if external funding helped to guarantee a market for wheelchairs in Vietnam. He indicated that Viha would be willing to hire wheelchair riders, particularly if they had already been trained in a vocational training program.

Mr. Thang gave me the name of a bicycle factory in HCM City. It is Kien Tuong Enterprise (I am unsure of spelling.) I tried unsuccessfully have MOLISA in HCM City arrange a visit to this factory.

UNIDO United Nations Industrial Development Organization
Patrick Gilabert, Programme Officer
27-29 Pho Phan Boi Chau
Hanoi
Tel: 84-4-257495
Fax: 84-4-259267

Mail Address: c/o UNDP (Vietnam)
One UN Plaza
New York, NY 10017, USA

I had an excellent meeting with Mr. Gilabert. He felt that the type of work that the WMC was trying to promote could be endorsed by UNIDO in Vietnam. He stressed the need to get support from the government of Vietnam. He indicated that the breadth of our program was both an advantage and a disadvantage. Currently, UN agencies have quite limited roles. Although there is supposed to be a disability focus group to handle interagency cooperation, to date, this concept has not proved to be very successful. He was pleased to hear of our current cooperation with various agencies within the UN. He is expecting a draft of my report, and would like an official letter from Henry Hof seeking possible UN cooperation. I suggested that perhaps Henry Hof could write this letter. I will talk with Henry about this on my return.

Mr. Gilabert will be in Vietnam for at least two more years, and will try to cooperate in any way possible.

7/17/93, Saturday

A travel day. Trip between Hanoi and Ho Chi Minh City

Staying at Hotel Majestic (Cuu Long Hotel)
1 Dong Khoi Street
Ho Chi Minh City
Tel: 84-8-295515 (or 295517)
Fax: 84-8-291470
(Approx \$50/night room rate)
Quite nice

7/18/93 Sunday

Spent most of the day at Thu Duc. I will describe the vocational school at Thu Duc in more detail under my entry tomorrow. The purpose of my visit today was to observe the distribution of prostheses at the school. This distribution was arranged to correspond with the visit of a high level American delegation visiting Vietnam to discuss POW/MIA issues. The visit to the Thu Duc Prosthetics Clinic was arranged to provide an opportunity for both the Vietnamese and American governments to highlight an example of cooperative humanitarian aid. An expansion of this sort of cooperation is anticipated after the embargo is lifted.

Viet-Nam Assistance to the Handicapped, a US-based NGO has a prosthetic clinic within the Thu Duc Vocational School. Mr. Ca Tran Van, a Vietnamese-American, is the president of VNAH, and was present at the distribution of the prostheses. Ca Tran visits Vietnam regularly to monitor the production and distribution of prostheses.

Viet-Nam Assistance for the Handicapped
Ca Van Tran, President
1307 Dolley Madison Blvd., Suite 4A
P.O. Box 6554
McLean, VA 22106
Tel: (703) 847-9582
Fax: (703) 448-8207

About 300 BK prostheses were distributed this Sunday. The prostheses appear to be high quality and seemed to fit well. However, I am not expert in this field.

Of great interest to the American delegation was the fact that many of the people being served by VNAH at the Thu Duc Clinic were former South Vietnamese soldiers. Currently, the Vietnamese government distinguishes between veterans of

the war that served in the North and in the South. It appears that veterans who served in the South Vietnamese Army do not obtain the same benefits as those that served the North.

Political speeches were made by representatives of both governments. Mr. Truong Van Quoi, Principal of the vocational school, and Mr. Ca Van Tran also addressed the group. The event was very well organized. The event was attended by Ms. Susan Palmer, USAID, Bangkok. The school and clinic were both very well prepared for the visit.

Everyone present was impressed with the humanitarian aid work of the clinic, and the contribution of Mr. Ca Tran.

A reporter from a US based Vietnamese news program was present. She was:

Nguyen Nam Tran
KSCI Channel 18 (Vietnam Program)
10842 Noel St. #101
Los Alamitos, CA 90720
Tel: (714) 761-2477
Fax: (714) 761-0563

Ms. Nguyen spends every other month working in Vietnam.

7/19/93 Monday

Ministry of Labour-Invalids and Social Affairs (MOLISA)
Le Thien Huong, Director of Representative Office
168 Hai Ba Trung Street
District 1 - HCM City
Tel: 84-8-290091
Fax: 84-8-224115

I had initially met Ms. Le at Thu Duc on Sunday.

At this meeting, a Mr. Tien from the MOLISA office was translating.

I made a presentation describing the WMC's international program, and what I had observed to date during the current trip to Vietnam.

Ms. Le indicated that, as far as she knew, the vocational school at Thu Duc was the only government enterprise in the south that was producing wheelchairs. She had visited some private enterprises 8 years ago to study problems of wheelchair production.

Ms. Le described MOLISA's dissatisfaction with the performance of some imported chairs from India. About 200 w/c's were imported using funding from an organization called NEED. NEED purchased chairs produced by a Bombay wheelchair maker that we are familiar with. I indicated that I did not think that the chairs were durable enough for use in Vietnam. She corroborated this opinion. She indicated that most of the chairs broke down after only 1-2 months, and that they were difficult or impossible to repair.

I was interested in meeting with organizations of persons with disabilities. I discussed this in some detail with Ms. Le. She indicated that currently there were no organizations of persons with disabilities that she knew of. I asked about disabled veterans groups. She indicated that there is no special category for those veterans with disabilities within the government veterans' organization. The government is currently developing a governmental association to represent the interests of persons with disabilities. The name of this association is "Disabled People Sponsorship and Orphan Children Association in Vietnam (I think). I think that they have an office in Hanoi (address: 2 Ngo Thi Nham St.) Ms. Le indicated that there would be a central committee for this organization in Hanoi, and a local committee in each of the 53 provinces of Vietnam. She thought that the central committee was composed of 13 people. Ms. Le gave me two names connected with this association. They were (I am not certain that this information is correct):

Professor Pham Thieu (Head of Central Committee of Association)
Mrs. Hoang Lan (Head of Local Committee in HCM City)

Ms. Le indicated that she was unaware of any people with disabilities involved in the governmental association or within the wheelchair industry in Vietnam.

Ms. Le suggested that I talk with Dr. Huynh who is (I think) the Assistant Director of the Rehabilitation Institute in Hanoi the next time that I am in the North.

I requested Ms. Le assistance in trying to set up the following appointments for me during my stay in HCM City:

1. Meeting with Lixeha (a cooperative or association of bicycle factories).
2. Meeting with the director of the local committee of the government disability organization.
3. Meeting with any intellectuals in HCM City that were persons with disabilities.

We agreed to meet again at 8 am the following morning.

The 2nd Central Vocational School for the Handicapped
Ministry of Labor Invalid and Social Affairs
Truong Van Quoi, Principal
9 - Street 1 Phuot Binh
Thu Duc, Ho Chi Minh City
Tel: 84-8-966830

Mr. Truong is an engineer. I also met with Pham Quang Binh, the director of the wheelchair factory. The school offers vocational training in a variety of areas. During my visit the previous day, I observed the prosthetics shop. The purpose of the visit today was to discuss wheelchair design and production.

I examined the two wheelchairs which were being produced at Thu Duc. They were:

A folding hospital model chair which weighed 21 kg. This was a robust chair which seemed to be of good overall quality. The chair was available in one width (18" I believe). Sideframes were all welded construction in contrast to the chairs that I had observed at BaVi. The factory produced 200 of these units a year. Sales price was \$150.

An adjustable width copy of a Japanese (lightweight) chair which weighed 19 kg. While this chair's width could be adjusted, it can be folded only with difficulty. Four bolts and nuts must be removed. Thus, folding for transportability is not a convenient option. Again, the chair seemed to be well constructed. The factory produces about 300 of these chairs per year. Sales price \$160.

Some comments on chairs. The hospital chair is equipped with pneumatic large tires and 8" solid front casters, while the Adjustable width Japanese type chair was equipped with solid 26" tires and 5" solid casters. I believe that this is probably a poor choice of tires for the two chairs. The Japanese type chair which is a bit lighter and has a somewhat axle position for independent mobility should be equipped with pneumatic drive wheels for mobility and comfort. Larger casters would also improve mobility on this chair.

When asked what parts of the chair fail, Mr. Trong indicated that the factory was having failure problems with the stamped steel caster forks. This is not surprising given the 400 pound frontal impact forces commonly encountered by casters. The stamped metal caster forks cannot be repaired, and thus must be replaced when they break. The lack of access to replacement spare parts in general, and to the stamped caster fork in this particular case, can leave the disabled person without mobility for a significant period of time.

Another problem area for the chairs may be the cast aluminum footrests. Footrests of this type typically break during rough urban and rural use. Because they are

castings, once broken they are difficult to repair. Without the availability of spare parts, the rider is left with a chair that is unrideable. Mr. Trong has not encountered significant numbers of failures of this part. However, that may be due to the significant number of amputee riders of his chairs rather than any inherent strength in the footrest of his particular chairs.

Mr. Trong indicated that MOLISA was the primary customer for wheelchairs produced at the Thu Duc factory. Thu Duc has produced chairs for export, but the uncertainty of the export market make it difficult to plan production. MOLISA appears to front the money for supplies, materials, and labor costs for chairs which are exported, and then gets reimbursed when the customer is invoiced for the shipment.

The factory at Thu Duc is a well organized factory with the space and machine tools appropriate for small and medium scale wheelchair production. In addition to lathes, drill presses, grinders, manual tubing benders, and a plate and tubing roller, the factory also has two small punch presses and a small aluminum foundry. There were no wheelchair riders working at the factory during either of my two visits.

The vocational school for the handicapped has 200 students. About 50% of the students ride wheelchairs. Unfortunately, the students were on summer vacation during my visit. Thus, I was unable to talk to them during my visit. None of the factory employees appeared to be persons with disabilities.

The Whirlwind wheelchair was demonstrated to Mr. Trong and other people at Thu Duc. They were impressed with the chair in general. They particularly liked the fact that all the bearings used in the Whirlwind chair could be fabricated by the workshop rather than purchased. Although I was told that ball bearings can be purchased for about \$0.50/ea. in Vietnam, Mr. Pham (the w/c factory director) felt that they could make the roller bearings for less than they could purchase commercial ball bearings. The roller bearings have the advantage of being repairable in the field without the necessity of securing replacement commercial bearings.

Mr. Trong indicated that the factory would have no difficulty producing the Whirlwind wheelchair if we could guarantee a market for any chairs they produce.

7/20/93, Tuesday

Second meeting at MOLISA (HCM City) with Ms. Le Thien Huong (see previous day for address, etc.) Ms. Le had made arrangements for me to meet with representatives of both Lixeha, and the government Association for people with disabilities.

LIXEHA - Union of Hanoi Bicycle and Motorcycle Factories
Bui Hung Ky, Representative in the South of Vietnam
B304-14 Vo Van Tan Street
District 3-HCM City
Tel: 84-8-231755 (230226, 230889)
Fax: 84-8-296604

Mr. Bui is a engineer. He serves as the representative in the southern region of Vietnam for both the Director in Chief of LIXEHA, and the President of VINACYCLE. Mr. Bui gave me information regarding additional contacts and organizations which I will describe below.

Vietnam uses a cooperative approach to bicycle production similar to that utilized in the Indian bicycle industry. Many small producers of specialized individual parts for bicycles, sell their individual parts on the market. They assemble bicycles under their own brand name, utilizing their own parts and parts from other small manufacturers like themselves. This system serves to keep prices low through competition and efficient manufacturing techniques. In Vietnam, several trade associations or groups serve the needs of the small manufacturer, or the wholesaler. These groups are:

LIXEHA - Union of Hanoi Bicycle and Motorcycle Factories
Mr. Bui described LIXEHA to me as an association of government run bicycle factories.

VINACYCLE - Vietnam Association of Bicycle and Motorcycle Production
Mr. Bui described VINACYCLE as being a combination of government and private factories.

I have the following contact for both of these organizations:
Nguyen Cao Tieu, Engineer
Director in Chief of Lixeha
President of Vinacycle

Head Office (of both Lixeha & Vinacycle?)
231 Ton Duc Thang Street
Hanoi
Tel: 84-4-233282 (233283, 257617)
Fax: ?

Ex-Import Center of Lixeha
27 Trang Tien Street
Hanoi
Tel: 84-4-252598
Fax: 84-4-253525

In addition to these two associations, Mr. Bui is the director of an organization called HAPROGEJCO - Lixeha-Provinces General Joint Venture Co.

HAPROGEJCO
Head office
7 Yen The Street
Hanoi
Tel: 84-4-235083
Fax: ?

HCM City office
B304-14 Vo Van Tan Street
District 3 - HCMC
Tel: 84-8-99604 (94989, 30226)
Fax: 84-8-94504

HAPROGEJCO was described as a government association that will soon be converted to private. Mr. Bui described the function of this association as three-fold:

1. Finds market for assembled bicycles and motorcycles
2. Provides technology transfer to private and government enterprises.
3. Develops sources for the supply of parts and raw materials needed by the industry.

The relationship between these three associations is a bit unclear to me at this point. I will be sending this draft report to various people in Vietnam. Perhaps the interrelationships will be clarified by them before publication of the final report.

The government has a testing laboratory that performs qualification testing of bicycles. It is unclear to me how much testing is done. I am curious to know if the government laboratory performs just qualification testing, or whether it does quality control testing as well.

We have always found the idea of cooperative bicycle manufacturing an interesting model to try with wheelchair production. Thus, we were pleased to find the Indian model of cooperative bicycle production being very successfully utilized in Vietnam. It is provocative to imagine a trade association in the Vietnamese wheelchair industry providing some of the same functions to individual wheelchair manufacturers as LIXEHA OR VINACYCLE provides bicycle manufacturers.

Mr. Huynh Van Cang
Vice Director of MOLISA - Ho Chi Minh City
159 Pasteur Street
3rd District, HCM City
Tel: 84-8-297137
Fax: ?

Mr. Huynh is a Vice-Director of the Labor Department. He is also the local leader of the Disability Sponsorship and Orphan Children Association in Vietnam. The local chapter in HCM City is circulating applications among people with disabilities and currently having "operations meetings".

Mr. Huynh described the association as having high-level sponsorship. There is a central government association that is based in Hanoi. This association is composed of 29 people. The HCM City chapter is headed by Ms. (Madame Me (a former vice-minister in MOLISA). Fifteen people are on the local committee, and another 10 will be recruited. As far as I could tell, Professor Ly Hoa (a former faculty member at the local university) is the only person with a disability on either committee.

The local HCM City association has 200 members. More are being recruited. Mr. Huynh gave me the following disability statistics for the area surrounding HCM City (I am not clear how large an area this encompasses).

War injured (Non-ARVN)	18,000
War Injured (ARVN)	20,000
Congenitally disabled	10,000
Blind	5,000

The goals for the local association are to investigate the situation of persons with disabilities and to develop suitable policy for them. He is very interested in getting information regarding disability policy from other countries. He indicated that he is the person who will be responsible for creating the policy for HCM City.

We talked about the model which we have proposed for revolving loan programs and vocational training programs for our project in Russia. He thought that the ideas were "smart", and that he hopes that it will be possible for the Vietnamese government to develop good policies for people with disabilities.

7/21/93, Wednesday

During the morning, I worked on writing up my notes from meetings. I delivered the Whirlwind wheelchair and a complete set of plans to the Thu Duc Vocational School in the afternoon.

7/22/93, Thursday

A travel day: Ho Chi Minh City to Bangkok. When I reached Bangkok, I checked in with Susan Palmer of USAID. She is looking forward to receiving a draft report of my visit.

7/23/93, Friday

A travel day: Bangkok to San Francisco. Worked on writing up meeting notes during the plane trip. Arrived in San Francisco at approximately 9 AM.

WHEELCHAIR BUILDING IN VIETNAM
A fact-finding and program development trip.
July 9, 1993 to July 23, 1993

CONTACT LIST

The "Contact List" contains people and organizations contacted during my fact-finding trip to Vietnam. Other documentation associated with this trip includes:

- Report (currently in draft form)
- Trip Log

Contacts are listed in the following categories:

- Wheelchair Manufacturers
- Government of Vietnam Officials
- Disability Organizations
- International Funding Sources
- Other Contacts

Further information regarding contacts is contained in the "Trip Log" on the indicated pages.

I. WHEELCHAIR MANUFACTURERS

- A. Tricycle Production Section (TPS) / BaVi Orthopaedic Workshop
Xi Nghiep Co Khi Chinh Hinh
Son Tay, Ha Tay Province
Tel: ?, Fax: ?

Vuong Anh Dung, Deputy Director
Do Viet Tan, Head of Engineering

(Trip Log, page 5)

- B. VIHA Bicycle Factory
10 Trang Thi Street
Hanoi
Tel: 84-4-263131

13

Le Van Thang, Deputy Director

(Trip Log, page 10)

- C. The 2nd Central Vocational School for the Handicapped
9 - Street 1 Phuot Binh
Thu Duc, Ho Chi Minh City
Tel: 84-8-966830

Truong Van Quoi, Principal

(Trip Log, page 15)

II. GOVERNMENT OF VIETNAM OFFICIALS

- A. Ministry of Labour- Invalids and Social Affairs (MOLISA)
12 Ngo Quyen
Hanoi

Mr. Nghiem Xuan Tue
Vice-Director Department of International Relations
Tel: 84-4-269534
Fax: 84-4-254728 & 84-4-269556

Mr. Nguyen Manh Cuong (acted as interpreter)
NGO's Project Assistant, Department of International Relations
Tel: 84-4-254728

(Trip Log, page 5)

- B. Ministry of Labour-Invalids and Social Affairs (MOLISA)
168 Hai Ba Trung Street
District 1 - HCM City
Tel: 84-8-290091
Fax: 84-8-224115

Le Thien Huong, Director of Representative Office

(Trip Log, page 13)

- C. Ministry of Labour-Invalids and Social Affairs (MOLISA)
159 Pasteur Street
3rd District, HCM City

Tel: 84-8-297137
Fax: ?

Mr. Huynh Van Cang, Vice Director

(Trip Log, page 19)

III. DISABILITY ORGANIZATIONS

- A. Hanoi Sports Club for the Disabled
1B Le Hong Phong Street
Hanoi
Tel: 84-4-232287
Fax: 84-4-253172

Vu The Phiet, Chairman

(Trip Log, page 8)

IV. INTERNATIONAL FUNDING SOURCES

- A. United States Agency for International Development (USAID)
37 Soi Petchburi Road
Bangkok 10400
Phone: 66-2-255-3650
Fax: 66-2-255-3730

APO Address: USAID/Box 47, APO AP 96546-7200

Susan V. Palmer, PVO Grants Manager

(Trip Log, page 2)

- B. United Nations Development Program, (UNDP)
27-29 Phan Boi Chau Street
Hanoi
Tel: 84-4-257495
Fax: 84-4-259267

Jo Ann Schop, Assistant Resident Representative

(Trip Log, page 4)

- C. United Nations Industrial Development Organization, (UNIDO)
27-29 Pho Phan Boi Chau
Hanoi
Tel: 84-4-257495
Fax: 84-4-259267
- Mail Address: c/o UNDP (Vietnam); One UN Plaza; New York,
NY 10017, USA

Patrick Gilabert, Programme Officer

(Trip Log, page 11)

V. OTHER CONTACTS

- A. Viet-Nam Assistance for the Handicapped
1307 Dolley Madison Blvd., Suite 4A
P.O. Box 6554
McLean, VA 22106
Tel: (703) 847-9582
Fax: (703) 448-8207

Ca Van Tran, President

(Trip Log, page 12)

- B. KSCI Channel 18 (Vietnam Program)
10842 Noel St. #101
Los Alamitos, CA 90720
Tel: (714) 761-2477
Fax: (714) 761-0563

Nguyen Nam Tran, Director

(Trip Log, page 13)

- C. LIXEHA - Union of Hanoi Bicycle and Motorcycle Factories

Bui Hung Ky, Representative in the South of Vietnam
B304-14 Vo Van Tan Street
District 3-HCM City
Tel: 84-8-231755 (230226, 230889)
Fax: 84-8-296604

Nguyen Cao Tieu, Director in Chief of Lixeha
231 Ton Duc Thang Street
Hanoi
Tel: 84-4-233282 (233283, 257617)
Fax: ?

(Trip Log, page 17)

- D. VINACYCLE - Vietnam Association of Bicycle and Motorcycle
Production
231 Ton Duc Thang Street
Hanoi
Tel: 84-4-233282 (233283, 257617)
Fax: ?

Nguyen Cao Tieu, President

(Trip Log, page 17)

- E. HAPROGEJCO - Lixeha-Provinces General Joint Venture Co.
7 Yen The Street
Hanoi
Tel: 84-4-235083
Fax: ?

HCM City office
B304-14 Vo Van Tan Street
District 3 - HCMC
Tel: 84-8-99604 (94989, 30226)
Fax: 84-8-94504

Bui Hung Ky, Director

(Trip Log, Page 18)