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PRITECH

Technologies for Primary Health Care

USAID WAR VICTIMS ASSESSMENT

VIETNAM SITE VISIT
MAY 15-23, 1992

TECHNICAL REPORT



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TECHNICAL REPORT

**A Report Prepared by PRITECH Consultant:
FREDERICK DOWNS**

**During The Period:
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**USAID War Victims Assessment
Vietnam: Site Visit May 15-23, 1992
Technical Report by Frederick Downs**

In July 1991, Lloyd Feinberg and I first visited Vietnam for USAID for the purpose of determining how best to utilize one million dollars US to increase the quantity and quality of prosthetic limbs in that country. The purpose of the trip in May of this year was to follow-up on those recommendations concerning US Government support for victims of war in Vietnam.

Lloyd Feinberg was team-leader on this trip. He was accompanied by Bill Oldham, MD, and myself. This was my tenth trip since 1987 when I was first assigned as a member of General Vessey's humanitarian mission. We arrived in Hanoi on the afternoon of May 15, 1992. At 1830 hours, we met with Mr. Le Bang, Director of American Department, Foreign Ministry, and his deputy, Mr. Ha Huy Thong, and an assistant, Ms. Doan Nguc Lan. We had already reviewed the schedule for our visit and were concerned that the Ministry of Labor, Invalids, and Social Affairs (LISA) in the person of Mr. Tue was attempting to control our agenda. We had requested weeks ago that we visit rehabilitation centers which are under the Ministry of LISA and other health care facilities including hospitals, all of which are under the Ministry of Health. However, the schedule we were given was all directed towards LISA facilities. Another problem was that we had requested the MFA to accompany us as an impartial escort but contrary to our request, two LISA officials were scheduled to travel with us.

Mr. La Bang promised he would do something and so some modifications were made. We would be able to visit Ministry of Health facilities and Ms. Lan from the MFA was detailed to escort us along with Dr. Tran Dang Nguyen from LISA.

The next day, May 16, we met with Dr. Hop at the Ministry of Health. He requested that we visit Bach Mai, the main teaching hospital in Hanoi and the nation, which is affiliated with the University of Hanoi. A newly created Chair of Rehabilitation had been established at the university. All specialized programs were at the national level. Dr. Professor Nguyen Xnon Nghien, who we met, was Chairman for the Committee for Rehabilitation which included the Community-based Rehabilitation Program. We agreed to visit Bach Mai and Dr. Hop set up a meeting for us at 1330 that afternoon.

At 1000 hours, we drove to the Prosthetic Research Center (PRC) in Hanoi. As always, we were graciously received and given a tour of the facilities. There were a few amputees on hand to demonstrate their new limbs provided by the PRC. One of amputees was a bilateral below knee amputee, a young lady ballet dancer who had fallen under the wheels of a train.

There is no doubt that the PRC provides a high quality, good fitting limb in a short period of time. My feeling is that as a research project, the PRC is an interesting and valuable idea and it is a high volume, short-term solution to fitting amputees under certain, select circumstances. But as a practical, long-range, self-sustaining method of providing artificial limbs to developing countries, it is definitely in the development stage.

The technology, hardware, and software are developmental prototypes. This has led to problems of reliability in machinery and socket fit. The computer, carving machine, digitizer, and socket machine are susceptible to breakdowns, and whereas a limited amount of repairs can be done in-country on the socket machine, practically no repairs can be done in-country on the other equipment.

Mr Loi is really the only person who can operate the computer. Other individuals should be trained in its use but have not been trained as yet. The computer is severely affected by the temperature and humidity.

An early problem with the software was that the socket sizes used in the computer program were for the larger American stumps; this meant that the socket size shown on the screen was too big for the smaller Vietnamese stumps. This particular problem has recently been corrected by a software specialist from the United States.

When they tried to demonstrate the equipment to us, the electricity went out just like it did during our visit last July.

The culmination of all these problems has led to a lack of confidence in the staff.

Component problems are being worked on. The original foot component only lasted a year but a material change was made in January 1992 using antifungal materials which should last longer. There are also experimental "rice-paddy" feet that will soon be fitted.

The cost of all the components - foot, ankle, shank, cosmetic covering, alignment device - is 150 dollars US. Everything is supplied by from the USA and although inexpensive by our standards, the price is exorbitantly high in a country where the salary of a high government official is twenty dollars per month.

The production in the last twelve months is difficult to determine but the number provided to us indicates that the computer specialist and three technicians make an average of 100 limbs per month. In spite of the difficulties encountered with the technical equipment, the production is high because of the pre-made components used in fabrication and the fact that the technicians are "pulling" or making plastic sockets by hand. Of the last 600 limbs produced, they reported that 300 were made by using the computer and 300 were made by hand. Other evidence indicated perhaps 30 percent of the limbs were made by computer. The technicians prefer to use their hands in making the sockets because they feel it is more

exact than those sockets made by computer. Also, they do not know how to use the computer. When it is in use they are dependent on Mr. Loi to make the sockets.

Because of the problems with the computer, digitizer, and carver, these machines are only used 30 percent of the time. The socket former is used continuously. Therein lies the crux of the problem with the PRC computer system. The computer, digitizer, and carver are high-technology pieces of developmental equipment which have problems and which cannot be fixed easily or without American help.

The staff subsequently have lost confidence in the equipment because they have little or no control over the problem. What the Vietnamese technicians have learned to do is to discard the tools of the computer, digitizer, and carver to make the positive cast and make their own positive cast by hand. They wrap the stump, take a positive cast, and use the socket-forming machine to pull sockets. Then they attach the Seattle components to the plastic socket just as they would have done if they had made the socket with the computer.

The high productivity comes from the fact that the casting process and the socket can be made in a few hours and then the componentry, which is ready made, requires only a few hours to measure, fit, make adjustments, and put together.

Conclusion:

The PRC is enabling the Vietnamese to fit an average of 100 limbs per month. This is a good, short-term solution to providing a large number of limbs in a short period of time. However, the project is supported almost entirely by resources outside the country. The center is a research development project to determine if the computer concept is a valid one for providing limbs in developing countries.

There is much development work yet to be done. The developing countries are not in a position to shoulder the expense of such equipment; without continuous support from Seattle, the computer, digitizer, carver and socket-former will fall into total disuse. The continuous support of computer skills, software, and replacement equipment is not present in-country and must come from outside, and it has yet to be determined if the high-tech components can be replicated in developing countries.

In spite of these problems, the developmental project has made good progress in improving the limbs for these environmental conditions and the durability of the limb components.

The center, meanwhile, can continue to fabricate good quality limbs in high volume as long as the NGO (non-governmental organization) agrees to continue support.

The concept is also a good one for providing limbs in an emergency situation until long-range, sustainable facilities are in place and operating.

Recommendations:

The Prosthetic Research Center Group in Seattle should make quarterly reports to USAID/Washington on the status of on-hand inventory costs of limbs, number of limbs fabricated per month including name and address of recipient. Administration at the center must keep excellent records on patients served including address, case notes, and photographs. The format for the report should be agreed to between PRC/Seattle and USAID.

On Sunday, May 17, we drove south on Highway One to visit different rehabilitation centers and hospitals on the way to Da Nang. The road was in abominable condition. There would be times during the three day trip when the average speed was ten kilometers per hour with many full stops to negotiate exceptionally bad spots. Even the nicest sections of the road were like a washboard.

Accompanying us was Ming, the driver, Dr. Nguyen, Ms. Lan, and the World Vision Project technical manager, a certified prosthetist/orthotist named Dan Watkins. I knew of him back in the States where he had a good reputation as a teacher of prosthetics and orthotics for five years at New York University and as a prosthetist/orthotist for nine years in California. He knows his business and is an enthusiastic, sensitive professional. He and I had quite a few discussions about the centers we visited, the technical issues facing the Vietnamese, and the various solution we thought ("we" included Lloyd, Bill, Dan and myself) that were available and/or feasible.

During the road trip we visited the Tam Diep Rehabilitation Center, sub-center of rehabilitation in Thanh Hoa, Vinh Rehabilitation Center, the Polish/Vietnamese hospital, Hue Rehabilitation Center, Da Nang Rehabilitation Center, and Da Nang General Hospital.

We arrived at Tam Diep, Ha Nan Ninh Province, before noon on the 17th. The director of the facility is La Hua Luat and the Director of Rehabilitation is Dr. Docn Van Qui. The center is composed of approximately eight two-story, barracks-like buildings within a walled, two acre, tree-shaded compound. The area and the buildings were clean and orderly. Even though it was Sunday, the one day of rest for Vietnamese, there were some workmen and a few in-patients there for us to see and answer our questions.

The director informed us that there were three sections at the center: 1) medical rehabilitation, which involved surgery of approximately three cases per week (other major trauma surgery was done at the general hospital); 2) orthopedic workshops; and 3) administration.

It was reported to us that the orthopedic workshop fabricated 1300 prosthetics last year. Their plan was for 1500 so they fell short by 200. I believe it is more accurate to state that

the shop made 1300 units last year of which an undeterminate number were artificial limbs and the others were braces, shoe modifications, and repairs. We were told that there were 16 workers in the workshop with specialties in limbs, braces, or shoes. The center had received no assistance in the past except for a few pieces of equipment and some supplies provided by the American Friends Service Committee (Quakers).

The shop makes a few plastic limbs but the amputees do not like them. They complain that the plastic is too hot and irritates the skin. It is possible that the workman are not properly mixing the resin and hardener in the right proportions or that the resin is not suited for human skin.

The majority of limbs at this center are made with an aluminum shank, leather socket, and the Vietnamese rubber and wood sach-foot made at Ba Vi. The foot rots quickly and breaks easily but the amputee can fix it himself. The below-knee limb is the PTB type with leather straps. The above-knee limb is the Quad Socket made with wood. The amputees prefer the wood sockets because the prosthetists make more comfortable sockets out of wood than plastic. The wood will last for 20 years in some cases and in all cases, the amputees says the wood is cooler.

The meager supplies were kept in tightly locked rooms secured with six locks and bars in a building at the back of the lot. There were a dozen or so sheets of aluminum and a burned glob of aluminum that looked like it could have come from a crashed aircraft. There were a few 55-gallon drums of resin and other odds and ends.

Tam Diep is a center that has been doing the best it can with what it has and will benefit greatly from attention. The workshops have minimal equipment and bare essentials. It is poor in materials and supplies and that needs to be corrected. The workers need to change from the resin they have used for years and go to polypropylene. The workers need to receive training in new materials for fabrication and in prosthetic and orthotic techniques.

Our next stop was the Thanh Hoa Rehabilitation Center, Thanh Hoa Province. We arrived in the middle of the afternoon on the 17th after driving from Tam Diep. This center consisted of three small, one-story buildings on a small lot.

The director of the center, Mr. Xyen, and the director for LISA in that province met with us. They told us that the two major tasks of the center were to (1) fabricate artificial limbs and to repair limbs, wheelchairs, and shoes; and (2) to provide physical therapy. This was a new workshop. Up until June 1991, amputees received their artificial limbs from Vinh or Tam Diep. In June 1991, this workshop was started. The People's Committee provided the grounds and buildings; LISA provided equipment and materials. This center has also received some help from other centers.

It was also reported to us that Thanh Hoa was the most populated province in Vietnam; there are 23 districts and three towns within the province.

We were told that there are 23,000 disabled of which 5,400 are lower extremity amputees and 1,925 are upper-arm amputees. There are 1,000 disabled who have a short leg and need orthopedic shoes. I do not know how they established these numbers but it is a place to start. I am particularly interested in the high number of upper-arm amputees. This is unusual.

Twenty people work in the center; twelve of them are workshop technicians trained at the Ba Vi Rehabilitation Center north of Hanoi.

The workshop has the most basic of equipment and few supplies. A greater problem is the lack of trained workmen. The Ba Vi training must be supplemented with more training. The workshop needs to be better equipped with machines and tools plus an adequate supply of materials. If this is to be a functioning rehabilitation center, the physical therapy department also needs to be upgraded.

We drove all the rest of the day and arrived at the town of Vinh at sundown. We stopped at the Vinh Rehabilitation Center, Nghe Tinh Province and arranged a morning meeting. On May 18, we visited the center right after breakfast. We met with the director of the center and the director of LISA in that province.

The center is in a walled compound containing one long, narrow building housing the workshops and one new, two-story administration building which was completed within the last month.

Vinh has the best equipped workshop in Vietnam. The East Germans had promised to fully equip all the workshops but unification eliminated East Germany. The West Germans fortunately lived up to the promise made by the East Germans and equipped each shop with brand-new German equipment. In fact, Vinh has more equipment than it can use. The most pressing need is for materials and training for the workmen.

I do not recommend any assistance be provided to upgrade surgical facilities. The director at the center wants a vehicle for outreach activities, so perhaps any money originally budgeted for the upgrading of surgical facilities could be transferred to buy a vehicle for the center.

We spent the rest of the day driving south on Highway One in an attempt to reach Hue. The road was absolutely terrible. It says something for the economy of the country when the one major road is in such terrible condition. We reached Hue in Thua Thien Province, at approximately 2200 hours. On the morning of the 19th of May, we visited the headquarters of LISA. There is no rehabilitation workshop or prosthetic/orthotic center in Hue, however, LISA officials told us that there have been discussions about locating a prosthetic/orthotic workshop in a nursing home for the disabled.

A prosthetic/orthotic workshop is definitely needed in a city the size of Hue, responsible for the province. There are approximately 2,500 amputees in the province - 1,580 lower limbs and 1,000 upper limbs. Again, the number of upper extremity amputations is a matter of interest, both as to the numbers and the cause. At this time, no upper limbs are being provided in Vietnam to my knowledge.

We were told that Da Nang provides the artificial limbs for amputees and that Da Nang is thinking of establishing a rehabilitation sub-center in Hue. This is a good idea, but if any workshop is established, care must be given to ensuring that the technicians are properly trained before being assigned to the shop; otherwise, a lot of effort will be expended for no good reason as the amputee will be ill served and unhappy with a poorly- fitted limb.

There is an active vocation training center in a building next to the LISA office in Hue. No disabled are among the trainees. World Vision is supporting the project which teaches embroidery and small electrical motor repair. The sewing classes had approximately 40 young ladies working but the other classrooms were vacant. The explanation was that those classes met later in the day.

We left Hue at mid-morning and, after a hard three hour drive, reached the Da Nang Rehabilitation Center, Quang Nam-Da Nang Province, mid-day on the 19th of May. We met with the director of the center whom we had met last year on our trip. This visit to Da Nang would be the first and only opportunity to see any improvements or problems in the World Vision Project that had developed since our visit one year ago. We had intended in our original schedule to travel south to review the centers we had visited last year so that we could compare their progress/problems also but unfortunately our compressed schedule would keep us from doing that.

We were obviously excited to see the positive results in the Da Nang center from our trip one year ago. We were disappointed to discover that USAID assistance had had a negative effect on the center. The production of limbs had not gone up but down. The reasons given were that USAID money was slow in coming because of procedural administration problems, but World Vision cut their aid before anyone realized these financial problems were happening. World Vision had had trouble getting a project manager/technical person located and set up in the country. Without money and leadership, the Vietnamese were unable to provide limbs at their productivity level of last year.

Thankfully those two problems have recently been solved and our belief in Da Nang's ability and enthusiasm to become the model rehabilitation/prosthetic/orthotic workshop center is still solid.

Da Nang's plans for increased production and expansion as reported a year ago are still valid. They still intend to have three sub-centers; we visited one last year at Quang Ngai which has been in operation for one year. They are planning to move it from its present

location three or four miles out of town into a building in Quang Ngai. This makes good sense as it will be in a population center and closer to a main road (Highway One).

The other two locations planned as sub-centers are Hue and Dong Hoi.

It is a good idea to have prosthetic workshops in these two locations but it is important that the shops be properly equipped and supplied with materials. The technicians must be experienced and properly trained beforehand. A continuing education program must be established on a yearly basis to keep the workmen up-to-speed.

Conclusions:

All of the places we visited this trip are located in the provinces most attacked during the American/Vietnam War. North of the DMZ, the damage was from the air-war, and south of the DMZ the damage was from both the air-war and ground combat. As further proof of this, the five provinces in the central part of Vietnam contain the largest percentage of aircraft shot down. One district in Quang Binh Province has 75 crashed aircraft in it alone.

The rehabilitation centers are more properly prosthetic/orthotic workshops with some physical therapy provided.

The surgical facilities at the rehabilitation centers are poorly equipped and vastly under utilized. The real surgical work is being done at the general hospitals.

LISA has expanded the number of rehabilitation centers from six in 1987 to approximately 12 in 1992. Some of the rehabilitation centers are actually only prosthetics/orthotic workshops; the definition of what constitutes a rehabilitation center needs to be defined.

At least one prosthetic/orthotic workshop is needed in each province. The newly established prosthetic/orthotic workshop in Thanh Hoa, and the prosthetic/orthotic workshops planned as sub-centers in Quang Ngai, Hue, and Don Hoi are good ideas.

We saw plenty of public buses on the roads and trains are available so there is an infrastructure of transportation available to those amputees who can get to a main road. Highway One is the major and only complete north/south road between Hanoi and Ho Chi Minh City. All of the rehabilitation centers between the two cities are located on this road and so, in theory, they are accessible to the amputees but the distance and conditions of the roads make it impractical for any amputee to travel more than a few kilometers to get a limb. Therefore, a prosthetic/orthotic workshop in each province is a good idea.

The fabrication methods, materials, and techniques used by the Vietnamese prosthetists are at least 25 years out of date. They are skilled but limited in their ability because they have not received training in the new skill/technical areas.

We were unable to visit the centers south of Da Nang, however, World Vision is consolidating its position and has good plans to bring the centers up-to-speed as recommended, except for Can Tho in the Delta.

Can Tho has refused any help from World Vision and is receiving assistance from a Vietnamese/American group, "Vietnam Assistance for the Disabled." They are paying the Can Tho Rehabilitation Center fifty dollars for every limb they make. The emphasis of the group is to provide limbs to former ARVN soldiers. This program has been very successful from the evidence provided by the NGO group. Each amputee that is fitted from money provided by the NGO has his picture taken and biographical information, including address as evidence, is recorded.

The NGO group, Vietnam Assistance for the Disabled, has received financial support from the Disabled American Veterans and AMVET, two veterans organizations headquartered in Washington, D.C.

Recommendations:

Dan Watkins (World Vision Project) should establish his office and home in Da Nang where the World Vision major project supporting the prosthetic rehabilitation center is located. He must be in the workshop on a continuous basis to train prosthetists/orthotists and provide leadership and management on the project both on-site and at other locations.

Polyester 4110 needs to replace the outdated resin the Vietnamese are presently using in fabrication of limbs.

None of the prosthetic technicians in Vietnam understands or uses dynamic alignment in fitting the prosthetic limb. They must be taught the importance of understanding the usefulness of this technique in achieving a good fitting limb.

Dan Watkins must visit the ICRC component factory and the Vietnam Veterans of America Foundation (VVAFA) Jaipur Foot Project in Phnom Penh, Cambodia.

Dan Watkins should visit the Friend-In-Need Society's Jaipur Foot project in Sri Lanka in order to study their procedure for combining the vacuum-formed plastic socket with the aluminum shank. He also needs to compare their Jaipur foot methods against the VVAFA's Jaipur foot method.

Polypropylene plastic and vacuum-forming socket methods should be introduced as a demonstration procedure in the Da Nang Rehabilitation Center.

The polypropylene socket inserted inside the aluminum shank should be considered as a standard procedure for all workshops if the Da Nang model works.

The feasibility of using the ICRC foot make in Ho Chi Minh City or a substitute rubber foot used as a component with the aluminum shank should be considered.