



## The Introduction and Trial of New Design Bicycle Ambulance/Trailers in Salima District, Malawi

**Project Location:** Salima District, Malawi

**Project Start Date:** October 2002

**Project Duration:** One year

### Introduction:

At the very beginning of the 21<sup>st</sup> century, governments in a number of African countries began to identify emergency transport as an area in urgent need of improvement. Transaid was approached by Niki Dun of the Emily Carr Institute of Art and Design with a request for assistance in the development of her Industrial Design Senior Project, a patient transport device for rural Africa. Niki's bicycle ambulance and trailer designs were responsive to the local context and incorporated the principles of design for developing countries, including the use of local materials and manufacturing processes.

Over the course of the year, the designer and Transaid focused on two areas of specific concern, highlighted by Transaid's project work in transport for the health sector and logistics for emergency preparedness. First, the problems faced in getting urgent medical cases referred to primary health facilities and second, the final distribution of food and supplies to rural areas.

Primarily, the project sought to improve the referral of patients to Primary Health Clinics from the local communities and homesteads in situations where motorised transport is unavailable or prohibitively expensive. The aim was to introduce and promote a well-designed bicycle ambulance as a viable transport solution offering faster transit times and one that was more appropriate in terms of patient comfort and accessibility than existing and alternative transport options.

The project also sought to facilitate the affordable carriage of greater volume of goods to and from local communities by the use of the bicycle trailer, thereby increasing economic opportunities, improving livelihoods and facilitating the transport of emergency relief supplies. The project focused on 2 areas of goods transport- 'end of the line' transport' in rural villages, and also the commercial transport of goods and supplies in and between market towns.

### Methodology:

A prototype of the bicycle ambulance was built in the UK and shipped to Malawi. The Project Team (Transaid, TNT and the designer) met on a number of occasions throughout the Designer's time in Malawi. The original meeting was used to clarify the roles of both the Designer and Local Consultant-

A stakeholder meeting was held upon the Designer's arrival in Salima and was attended by the Project Team and relevant district-level stakeholders. Organised and chaired by the Local Consultant, the

meeting provided stakeholders with an introduction to the project and a forum in which to discuss project participation and direction.

The Designer was responsible for supervising the production of six bicycle ambulances and four bicycle trailers by members of the Salima Garage and Welders' association (SAGWA) over a period of three weeks.

Having the prototype available in-field from the initial stages of production onward was extremely valuable to the project as a means of quickly evaluating and altering the initial ambulance design, as a teaching tool to illustrate correct production methods and the concept of design and as a means of generating community and stakeholder interest. Prior to the start of production, testing of the prototype was performed at Lonje Metalworks and environs in the town of Salima. It was also put to test during a genuine emergency. The SAGWA participants were able to bring the prototype stretcher into the building and load the patient onto the bicycle ambulance with no problems. One of the SAGWA members then pedalled the ambulance to the clinic where the man was treated for severe dehydration and released later that day.

Through a review of general overall transport in Salima District, it was found that motor vehicles 'rule the road'; pedestrians and bicycle riders were forced to defer to vehicles at all times and were regularly injured and killed by drivers who refused to modify their driving behaviour. Therefore, Transaid proposed a number of traffic safety programmes, including driver behaviour and bicycle safety (including visibility and load stability and manoeuvrability).

### Outcomes:

Bicycles were purchased by the Project Team and were supplied with the ambulances and trailers. Distribution of the bicycle ambulances and trailers began in mid-August and was coordinated by Salima District's Director of Planning and Development and the Local Consultant. Three sets of ambulances and trailers were distributed to appropriate villages within the District, while the Mua Mission utilised and monitored the fourth. Two additional bicycle trailers were tested and monitored by the Salima Bicycle Taxi group following establishment of mutually agreeable terms of use.

Following this a pilot study was performed and, as a result of feedback and general findings, a number of changes were proposed in order to improve the bicycle ambulance and trailer.

The process of pipe bending was introduced by the Designer to participating SAGWA members. Pipe bending is used in product manufacturing as an alternative process to cutting and welding metal tube and pipe. The process uses less material and labour than conventional joints and can result in stronger and more durable products. In 2002, the use of pipe benders was uncommon in Salima and it was considered essential to the project's sustainability that a bender be sourced locally. The group was able to locate a pipe bender at the nearby technical college. SAGWA members

communicated to the Designer that they see ways in which they could use this new skill in their work, to improve existing methods of manufacture and to increase the range of products that they offer.

Through participation in this project, SAGWA became a stronger organisation looking towards a future that they had not previously thought possible:

- The group as a whole developed new skill sets and actively planned the means by which these skills would afford greater economic opportunity
- The project fostered a sense of cooperation among participating members
- Working on a production project with a tight schedule necessitated the development of management and communication skills
- By reflecting on their experience of working as a production team, SAGWA were able to more clearly define their goals as an association
- As the project progressed, the association began to discover new ways in which they can market themselves as a group, improving prospects for themselves and the community

Prior to the Designer's departure from Malawi, the production group were approached on three different occasions by parties wishing to purchase a bicycle ambulance and to acquire related technical drawings. Because the product was designated for project use and the ambulances were in the testing stage, SAGWA and the Project Team determined that ambulance production should be limited until the monitoring and evaluation phases of the pilot project were complete.

From the moment that production of the bicycle trailers began at Lonje Metal Works, it was clear that the products would be adopted for common use. There was a large contingent of bicycle taxi riders within the town of Salima who earn their living transporting people and goods, and the trailers afford a means of safely increasing load size, thereby expanding economic opportunity.

Following the Project Team's departure from Salima, SAGWA and Lonje Metal Works have continued to produce trailers on demands, and are adapting the project design according to customer and community needs.

#### Conclusion:

The project has helped Transaid learn much about the design and utilisation of bicycle ambulances and trailers. The pilot study has shown that the bicycle ambulance is a successful means of transporting patients in rural areas to health facilities in Salima. The success of the bicycle trailer was even greater than anticipated, as they provide an appropriate solution to a high demand. However further monitoring and evaluation is required to understand their real sustainability.

Transaid has a number of recommendations in order to sustain the success of the project:

- Members of participating villages need to be fully briefed on project intent and must be given the opportunity to participate in project planning and to contribute to the process of implementation and management
- Training must be provided in the use, management, repair and maintenance of the bicycle ambulances and trailers
- A monitoring system needs to be established so the project can be effectively evaluated and informed decisions can be made as to its future

- An evaluation of the project should be instigated 6 months following the start.

**Tools Utilised:** The Introduction and Trial of New Design Bicycle Ambulances/Trailers in Salima District, Malawi- Project Report by Niki Dun September 2003.

**Partners:** The District of Salima, Mua Mission, SAGWA, The Salima Bicycle Taxi Group, Save the Children UK, Ferdinand Csaky and Finewerk Production House, TNT Canada.

#### About Transaid:

Transaid is an international UK development charity that aims to reduce poverty and improve livelihoods across Africa and the developing world through creating better transport. Transaid was founded by Save the Children and the Chartered Institute of Logistics and Transport. Our Patron is HRH The Princess Royal. Transaid specializes in the following:

- Building the capacity of public health authorities to provide effective, safe and cost efficient transport management systems to promote equitable access to primary health care services.
- Developing and improving logistics and supply chain systems to enhance the delivery of medicines, equipment and relief services to vulnerable communities.
- Promoting effective partnerships to support and enhance community participation in developing sustainable transport solutions in rural areas.
- Developing and delivering transport and logistics training and qualifications for public and private sector operators.

Transaid has the capacity and reach to lead projects throughout the developing world, but is equally capable of providing niche technical assistance to large scale health systems strengthening projects. Transaid maintains strong relationships with a number of leading international organizations including donor agencies such as DfID, DANIDA and USAID, and implementing organizations such as Health Partners International, Options Consulting, John Snow Inc. and Management Sciences for Health.

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