



Emergency Intermediate Modes of Transport Design Workshop in Madagascar

Project Location: Antsirabe, Madagascar

Project Start Date: May 2014

Project Duration: 3 weeks total (workshop 9th – 13th June) plus follow-on work

Introduction: The need for ensuring that designs of Intermediate Modes of Transport (IMTs) are fit for purpose and that communities and local partners input into the design of any such modes of transport was highlighted at an AFCAP/Transaid Emergency Transport Workshop on the 26-27th March 2014 in Dar es Salaam. This workshop brought together 45 key emergency transport stakeholders from 12 different countries to discuss and explore how to improve emergency transport for health across sub-Saharan Africa. Please visit this page for more information - <http://www.transaid.org/resources/afcap-transaid-emergency-transport-workshop-march-2014>

Transaid organised a workshop in Antsirabe, Madagascar, that brought together transport technicians, trainers and engineers to review the design and quality of production of emergency IMTs previously produced by Transaid in collaboration with local partners MIDAS in the context of a community-based integrated health programme (MAHEFA) working in the northern and western regions of Madagascar. This workshop aimed to address the need for ensuring that the IMT designs for the MAHEFA programme are fit for purpose and that the local communities and partners have an input into the design of these modes of transport. MAHEFA is a USAID funded programme that provides basic, quality healthcare to isolated populations in Madagascar. The lead implementing organisation of this programme is JSI Research and Training.

The IMT workshop was conducted in June 2014 and funded by the Africa Community Access Programme (AFCAP). It was facilitated by two appropriate technology and design consultants, Jessica Vechakul and Kurt Kornbluth, and focused on the design of IMTs, this included; quality of production, accurate construction of the bicycle ambulance (BA) design and design modifications.

Methodology: The workshop was preceded by a period of desk work to review existing information about the production and performance of the emergency modes of transport, as well as information about the context in which they are currently, and will be used, in the future. The desk work review during the two weeks before the workshop allowed the consultants to identify the most important issues to address, the additional tools needed and to have materials ready upon arrival.

Three main topics were addressed at the workshop:

- Quality of production (in addition to overall quality control processes), in particular welding and painting;

- Accurate construction of the bicycle-ambulance design being used and design modifications;
- Design flaws with the current wheeled stretcher design.

At the end of the workshop, all the main topics had been covered:

- The consultants and participants reviewed the processes for welding and painting;
- A quality control checklist was developed;
- The design modifications of the bicycle-ambulance were reviewed and agreed upon by the workshop participants;
- A new wheeled stretcher design was developed and a prototype was built, as well as the corresponding welding fixtures.

Outputs: The workshop was highly practical, which allowed time for training in new processes. The consultants were always working in collaboration with one or more technicians, who therefore had the opportunity to produce the prototype, the fixtures and to experiment with new techniques while being oriented by the consultants. This allowed the capacity of local organisations in Madagascar to be built.

The consultants selected and purchased a number of tools for the training. All of these tools will help MIDAS produce better quality products and some cannot be found in Madagascar.

A new wheeled stretcher design was developed and a prototype produced. The wheeled stretcher design started as simple as possible and the important decision to make it non-detachable (from the wheel) was made in the initial stages of the design process. Changes were made after testing as much as possible around the workshop and features were only added if necessary and suggested for field testing. A fixture (which can be used for both the wheeled stretcher and the bicycle ambulance stretcher) was built with the technicians who attended the workshop, allowing them to understand the process.

The design of the bicycle ambulance was modified to accommodate the locally available materials and precise instructions were given regarding the necessary steps for welding and painting. Example parts were produced and marked in red for future reference and an axle fixture was also produced.

Further field testing of the new wheeled stretcher was not possible during the workshop, but was recommended as one of the next steps after the workshop and before scaling-up production. This will help identify further design issues, have feedback from the users and make decisions about additional features (such as rails and brakes). The stretcher was later tested for a week in a rural commune close to Antananarivo, with off-roads and mountains that resemble the context in the regions where the stretcher will be used. It was possible to also receive feedback from local communities. It was decided that breaks were not necessary, but that side rails should be

added, as well as a metal sheet to avoid the stretcher tarp to touch the wheel (due to sagging of the tarp with the weight of the patient).

A new wheeled stretcher prototype and a revised bicycle ambulance trailer were produced in early July 2014 that will be extremely valuable for ensuring that the MIDAS staff has understood all production processes and are able to interdependently produce the materials.

Although feedback was received requesting a workshop that spends more time on theory and explanation of the different processes (especially new ones), the consultants ensured that participants understood and actively participated in the different steps of the design process during the workshop. Two key people were identified to understand the entire process and design reviews (for both the wheeled stretcher and the bicycle ambulance) and these will be the people in charge of quality control.

The workshop identified a number of best practices to consider when implementing IMT design programmes including:

- Considering culture in addition to functionality,
- Starting with simple designs,
- Using locally available materials
- Testing prototypes before scaling up production.

This project in Madagascar can be used as an example of many of the above-mentioned good practices, whilst also highlighting some important learning that can be used in IMT design in other countries. In particular, the need to have a multidisciplinary team working together and the importance of documenting designs and making them open-sourced, are two areas that still need further attention from donors, researchers and programme implementers.

Overall, this project achieved its main objectives and helped highlight current good practices and areas for improvement in projects working on the development of appropriate IMT technology.

This was one of the first rural emergency transport projects that uses IMTs built and implemented on the ground in Madagascar and aims to build the capacity of local organisations in the area. Whilst this workshop focused on a very specific activity, it will now influence and shape the design of equipment that will be built and distributed in Madagascar in the future.

Conclusion: The workshop was successful in achieving its initial objectives: a new wheeled stretcher design was developed and a prototype produced; the bicycle ambulance design was revised to include modifications as a result of Transaid's experiences in other countries, but also adaptations considering available local materials; new production tools were introduced; and it was possible to review the production process and produce a quality control checklist.

The following next steps were identified:

- The wheeled stretchers (one with rails and one without rails) should be tested in rural mountainous communities around the capital Antananarivo, using focus groups to receive feedback from the communities (representing potential users);
- Feedback from the two processes described above should be discussed and lessons learned or further issues identified should be addressed before scaling up the production.
- The changes to the bicycle ambulance design need to be documented in order to ensure that the production process

can easily be replicated elsewhere. Progress has been made in developing practical videos on how to construct a bicycle ambulance; these will be accessible through the Transaid website.

Tools Utilised: Bicycle Ambulance quality control checklist, participant feedback forms, 'Bicycle Ambulance Production Manual' by Jessica Vechakul.

Partners: Africa Community Access Programme (AFCAP) – managed by Crown Agents and funded by DfID.

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.

Contact:

Transaid
137 Euston Road, London NW1 2AA
United Kingdom
t: +44 (0)20 7387 8136
f: +44 (0)20 7387 2669
e: info@transaid.org
www.transaid.org

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