



September 2012

# PRACTITIONER CONFERENCE NEWSLETTER



Francisco Pereira, deputy minister, Ministry of Public Works and Housing

**The Africa Community Access Programme (AFCAP) annual practitioner conference in Maputo, Mozambique provided insights into the latest developments in roads and transport research.**

Some 150 delegates from 18 mainly African countries attended the event from 3-5 July 2012, hosted by the Mozambique National Roads Administration, including officials and engineers in roads maintenance.

Speakers, including engineers, trainers and other road experts, delivered presentations on engineering topics such as road materials, construction and maintenance techniques as well as how far transport services meet the needs of local communities and the socio-economic impacts of past road projects. This newsletter highlights a selection of the presentations.

During the week delegates put theory into practice by taking part in various field exercises at a rural location outside Maputo where they assessed roads under construction and spoke to members of the local community about their views on transport services.

In a closing address, His Excellency Francisco Pereira, deputy Minister of Public Works, said: "There is no doubt from the feedback I have received that the AFCAP practitioner conference has again proved a great success in achieving its objectives to bring together practitioners to debate and share knowledge related to the provision of roads and transport services to rural areas of sub-Saharan Africa."

Liz Jones, DFID's senior infrastructure adviser, added that the conference had helped to raise awareness of the importance of both engineering and transport services research.

"AFCAP practitioners work with local authorities, engineers and communities to undertake research and establish best-practice guidelines for rural road development in each of the six focus countries, utilising local labour and local materials for sustainable change."

## Delegate feedback

Feedback collated on the final day showed that all respondents thought that the conference should be held on a regular basis and all but one said that they would recommend the event to others. Delegates rated different aspects of the conference on a scale of one to five with five the highest rating, as follows:

Conference as a whole	4.3/5
Presenters	4.1/5
Respondents' participation	4.3/5
Usefulness to job	4.2/5

## AFCAP PROGRAMME

AFCAP is helping to provide safe, reliable and sustainable access to markets, healthcare and education for rural communities in Africa.

The programme, launched in 2008 by the Department for International Development (DFID), operates in six core countries: Ethiopia, Kenya, Malawi, Mozambique, Tanzania, South Sudan and most recently in DRC, Ghana, South Africa and Zambia.

Crown Agents manages AFCAP in partnership with authorities in Africa to strengthen rural roads research, share knowledge, promote and influence policy and practice, build capacity and encourage the use of local resources for sustainable development.

AFCAP recognises the independence between engineering and transport-focused research and it emphasises both to ensure communities can not only access durable roads but also rely on transportation services with a focus on poverty and gender equality.

DFID awarded AFCAP its highest A++ score in its latest review for its continued success, which DFID's senior infrastructure adviser Liz Jones attributed to the "time, intellectual energy and hard work of the AFCAP team and its partners".

With African governments' commitment to continue adopting low cost, sustainable standards and design specifications, AFCAP aspires to the improved provision and maintenance of over 200,000km of rural roads by 2020.

## TRACKING TRANSPORT SERVICES



Investments in roads are often justified by improvements in rural transport services and AFCAP is funding research to measure indicators for the quantity and quality of rural transport services in Africa to help inform policy development.

Research in AFCAP's East Africa focus countries is assessing transport services from the perspectives of road users, operators and regulators. It also measures how far local transport supports local industries, health and education services, the environment and the empowerment of women and ethnic minorities.

Initial assessments have shown varied results including large numbers of 60-seater buses in Dodoma, Tanzania, but few motorcycles and a predominance of rural estate cars in the Highlands of Kenya.

'Chapas' (open trucks carrying an overflow of passengers) are popular in Mozambique while motorcycle taxis are prevalent in hard-to-reach areas of Tanzania.

In all countries assessed, reliable indicators for rural transport services are heavily influenced by the rainy season, markets, harvests, cultural festivals and holidays.

Paul Starkey, Transport Consultant

## Marginal materials and design for low volume roads

Marginal local materials and non-standard construction techniques can be used to successfully build low volume roads in Africa, research under AFCAP in Tanzania has found.

Current standards set out by the Tanzanian Pavement and Materials Design Manual (TPMDM) intended for major roads can be substituted for simpler, cost-effective materials and methods.

Under Environmentally Optimised Design (EOD) methodology, roads sections are designed to suit their surroundings, for example on marshy land and steep gradients, to save money, time and effort. Two demonstration sites in Tanzania are being assessed at six monthly intervals for the next eight years to help develop best practice guidelines and specifications for low volume roads.

Marly Limestone, a raised reef sedimentary rock that is abundant along the east coast of Tanzania, is being investigated on the 20.24km long Bago-Talawanda road in the coastal Bagamoyo district. Marly Limestone does not meet traditional grading specifications but it has performed well due to high levels of compaction and self-cementation.

Motorcycle drivers use the gravel shoulders of roads instead of the central hand-packed Marly Limestone due to its rough surface, but during the rainy seasons when the gravel is slippery they find the harder surface has more traction. The Dynamic Cone Penetrometer (DCP) method for designing rural roads has proved a highly effective and cost-saving activity for the second 13.4km long demonstration site from Lawate to Kibongoto in the Siha district of northern Tanzania.

DCP equipment determined the in-situ strength of the pavement structure and facilitated a reduction in the number of pavement layers recommended by TPMDM through the 'compaction to refusal' approach, thereby achieving a cost saving of US\$17,500 per kilometre. Cost savings also allowed for improvements to the drainage system to better cope with high rainfall in the region.

James Mitchell, Roughton International

## Standardising soil testing methods for rural roads construction

In Eastern and Southern Africa differing standards for soil tests often lead to inconsistent materials used in the construction of roads, thereby affecting their long-term durability.



Three major standards – TMH1, BS and AASHTO – were compared for a range of soil tests from preparing soil for Atterberg limits and grading; determining the liquid limit, plastic limit and linear shrinkage of a soil to

determining the optimum moisture content, maximum dry density and California Bearing Ratio (CBR) of soil.

The accuracy and precision of various test methods using different testing standards varied by as much as 10-25 per cent. The CBR test in particular was criticised for its poor reproducibility, despite being one of the most widely used tests for evaluating the strength of materials.

The study calls for a more comprehensive review of all commonly used soil test methods to take into account variations when setting specifications. Testing standards in common transport regions in Eastern and Southern Africa should be standardised and testing laboratories should also be properly accredited, it found.

Mike Pinard and Frank Netterberg, InfraAfrica Consultants

## TRANSPORT FOR MATERNAL AND CHILDCARE EMERGENCIES

**A transport initiative for maternal emergencies in Nigeria is highlighting the importance of roads and transport for effective health service delivery.**

The Emergency Transport System (ETS) is providing safe emergency transport for women using locally available modes of transport. Under the initiative, which is being implemented by the National Union of Road and Transport along with state government ministries, a forum nominates four drivers in each community to receive training through Transaid and the National Union of Road Transport Workers and to be introduced to health facilities and security personnel.

Under the ETS model, drivers are alerted to an emergency by phone; they transport the woman to the closest facility where a health worker signs their log book and they are later compensated for the cost of fuel.

Despite challenges in vehicle maintenance, security and reaching more remote areas, local communities appear to be embracing the initiative.

Some 78 per cent of people in the catchment areas have used an ETS



driver compared to 33 per cent who used public transport; 25 per cent turned to a member of their community with a vehicle; two per cent used an ox and cart and 20 per cent walked to health facilities.

Between January 2010 and March 2012, the number of women transferred by ETS totalled 1617 in Yobe district, 1934 in Katsina and 1964 in Zamfara.

**Dr Fatima L Adamu, PRRRINN—MNCH and the Department of Sociology, Usmanu Danfodiyo University**

## Construction and maintenance of rural roads in Mozambique

Rural roads assessments are helping to set standards for maintenance and construction techniques in Mozambique to ensure that future roads are more durable and communities are better connected.



In the Inhumbane province, an Area Based Maintenance System has divided 600km of a provincial road network of 1660km into more manageable chunks of 150-200km. Road workers are based in local accommodation for convenience and assess their designated sections using tractors, towed graders and other maintenance equipment.

Grass cutting, pot hole filling, erosion repairs, opening drains and cleaning culverts as well as equipment-based cutting gravel and towed grading take place during the rainy season from November to April. Less labour intensive works continue during the dry season from May to October including stockpiling calcrete, tyre dragging to smooth and even road surfacing, painting road signs and sign maintenance.

The AFCAP project is intended to assess and improve existing road maintenance techniques by developing a sustainable maintenance system taking into account the local sand, red soil and calcrete terrain and climate.

**Kingstone Gongera, Stange-Consult**

## Revisit to Mozambique roads project reveals positive impacts

AFCAP is assessing the long-term impacts of a project carried out 10 years ago in the Zambézia province of Mozambique to reopen 900km of feeder roads, create sustainable all-weather transport conditions and increase the socioeconomic development of rural households.

During the Feeder Roads Project (1996-2001), the capacity of SME contractors for road work and support services increased and USD1.3m was injected into the local economy through local employment with contractors; the volume of motorised and non-motorised traffic and goods transportation grew and there was greater access to food, health, education and social connections along rehabilitated roads.

AFCAP's project is assessing five road sections, five project-monitored and four control communities and is carrying out interviews, field observations, questionnaires and traffic counts to determine the long-term impacts on communities living within the vicinity of the rehabilitated roads.

Preliminary field observations have identified an increased traffic flow of goods, more social infrastructure and services including schools, health units and water supplies. Agricultural producers and small-scale traders in firewood and charcoal have also been found.

These assessments and other findings are providing invaluable insights into developmental impacts as well as highlighting areas for improvement to inform current and future roads projects.

**Gaye Thompson, SCDS, part of the Norconsult Group**

## Capacity building for low volume roads sealing in Uganda

The government of Uganda pledged to rehabilitate 11,067km of district roads and seal a further 10,095km using low cost sealing technology as part of its National Development plan up to 2014.

Under the U-Growth programme and in partnership with the Ministry of Works and Transport, the Mount Elgon Labour-based training centre has built the capacity of 212 district technical staff in the public sector and 100 labour-based contractor staff in the private sector on low volume roads sealing.

Gravel is in scarce supply in Uganda and delegates learned how to preserve materials, utilise local resources and research low cost sealing technologies to help secure the longevity and sustainability of Africa's rural roads.

During the two week long course, delegates learned how to assess the condition of roads and areas for improvement; surfacing designs; health and safety procedures; preparations for surfacing works and road sealing.

On a section of road from Busamaga to Magada, delegates collected field data, widened drains, constructed pavement layers using laterite gravel, tested for compaction and undertook sealing operations. They undertook trials on various seals including penetration macadam (crushed stone and emulsified asphalt), otta seal, sand seal and cold pre-mix asphalt.

The course emphasised designing low cost sealing technology using available materials rather than procuring materials to suit a design – bitumen alone accounts for 75% of sealing costs. For best practice, delegates were also encouraged to look at the life cycle costs of constructing roads rather than initial construction costs to ensure the right investments are made for sustainability.

Henry Komakech, Training Engineer



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## Spiral wound U-PVC culvert trials in Uganda

A pilot project launched earlier this year is demonstrating innovative technologies for low volume bitumen sealed roads that are designed to withstand heavy and prolonged rainfall in Uganda. Design manuals, specifications and guidelines for sealed low volume traffic roads across the country are being produced under the project.

Construction trials are underway on pavements, swamps and most recently, culverts in Matugga, Semuto and Kapeka using spiral wound U-PVC pipes. The lightweight, waterproof, durable pipes – used successfully in China for a number of years – can be manufactured on site from rolls of 130m wide U-PVC and quickly installed, saving time and transportation costs.

Trials by Uganda's National Bureau of Standards (UNBS) showed the PVC spiral wound pipes complied with ASTM F949-06 specifications for PVC Corrugation Sewer Pipes and further tests by the Danish Technological Institute produced similarly reliable results.

When procured in bulk and produced locally, the pipes are significantly cheaper than concrete or steel pipe culverts. All pipes constructed in Uganda more than two years ago are still performing well and continue to be monitored at six monthly intervals.

Ted Bishop, COWI Ltd

## BEYOND THE CONFERENCE...

**AFCAP continues to find innovative ways to increase access for rural communities in Africa through current and future projects as well as knowledge-sharing at events around the world. Here are some of our latest activities:**

- AFCAP technical manager Nkululeko Leta and TRL's Kenneth Mukura visited DRC's Burhale Shabunda road in South Kivu province and Kalemie-Fizi-Ulvira road in Katanga Province this July 2012, assigned under the DFID Rural Roads Programme.

A 'Scoping Report' has since been submitted to DFID with a focus on capacity building and if recommendations are accepted we will carry out detailed designs for pavement and surfacing options using local engineering expertise.

- During an African Studies Association Conference at Leeds University in September 2012 AFCAP delivered three panel discussions under the title 'Making new connections: mobilities, roads and rural access in sub Saharan Africa', highlighting current and future projects.
- Elsewhere, Crown Agents has commenced procurement activities on a number of new projects including conducting a cost-benefit analysis of AFCAP research outputs; piloting an intensive training course to build skills in transport services research and launching a feasibility study into options for long-term knowledge sharing, management and dissemination of research generated in the transport sector.