8th Africa Transportation Technology Transfer Conference 2017

Theme: Linking Africa through Sustainable Transport Infrastructure Development

8th to 10th May 2017

AVANI Hotel, Livingstone, Zambia

CONFERENCE REPORT

30th September 2017

Organised By:

The Ministry of Housing & Infrastructure Development; ASANRA and the Road Development Agency;, Planning and Design Department, Research and Development Unit.
P.O. Box 50003
Government/ Fairley Road
Lusaka, Zambia
Tel/Fax: +260 (0)21 125 3088, +260 (0)21 125 3404
Email: rda_hq@roads.gov.zm
Website: http://www.t2conference2017.org/

Acronyms, Units and Currency

$	United States Dollar
AfCAP	Africa Community Access Partnership
ASANRA	Association of Southern African National Road Agencies
ARTReF	African Road and Transport Research Forum
BRT	Bus Rapid Transit
CBU	Copperbelt University
CPM	Critical Path Method
CSIR	Council for Scientific and Industrial Research
DCP	Dynamic Cone Penetrometer
DFID	Department for International Development
EIZ	Engineering Institution of Zambia
FHWA	Federal Highway Administration of United States of America
GIS	Geographic Information System
GPS	Global positioning system
ICT	Information and Communication Technology
IRF	International Road Federation
LoS	Level of Service
LRT	Light Gauge Rail Transit
LVR	Low Volume Road
LVSR	Low Volume Sealed Road
MCA	Multi Criteria Analysis
MHID	Ministry of Housing and Infrastructure Development
MRTS	Mass Rapid Transit System
NRFA	National Road Fund Agency
NGO	Non-Governmental Organisation
PBL	Problem Based Learning
PPP	Public Private Partnerships
RAMS	Road Asset Management System
RMI	Road Maintenance Initiative
RTSA	Road Transport and Safety Agency
SADC	Southern Africa Development Community
SDG	Sustainable Development Goal
SLoCaT	Sustainable Low Carbon Transport
SMEs	Small and Medium Enterprises
TRL	Transport Research Laboratory
TRP	Technical Review Panel
UK	United Kingdom (of Great Britain and Northern Ireland)
UKAid	United Kingdom Aid (Department for International Development, UK)
UNZA	University of Zambia
USA	United States of America

Table of Contents

Acronyms, Units and Currency 2
Executive Summary 5
1.0 Background 10
1.1 Conference Theme/Thematic Areas 13
1.1.1 The Conference Theme 13
1.2.2 Conference Sub-Themes 13
2.0 Organisation of the Conference 16
2.1 International Organising Committee 19
2.1.1 Terms of Reference for the International Technical Advisory Committee 19
2.2 Local Organising Committee 16
2.3 Time Table for Organisation of the Conference 21
2.4 Publicity 21
2.5 Peer review & Paper selection 22
3.0 Conference Proceedings 23
3.1 Keynote Speeches 23
3.2 Paper Presentations 24
3.3 Workshops 27
3.4 Site visits 30
3.5 Exhibitions 32
3.6 Social Events 32
3.6.1 Welcome Cocktail 32
3.6.2 Conference Dinner 32

4 Conference evaluation 33
4.1 Overall Objectives and Outcomes 33

4.2 Overall Presentations 33
4.3 Overall Conference Organisation; Conference Moderation; & Conference Venue 34
5 Financial Management 38
5.1 Fund Mobilisation 38
5.2 Income and Expenditure 39
6 Conclusion 43
7 Recommendations 45
8 Acknowledgements 45
9. Appendices 46

Executive Summary

The Association of Southern African National Road Agencies (ASANRA) through the Regional Technology Transfer and Capacity Building Committee organises bi-annual Technology Transfer Conferences hosted by ASANRA member states. The Ministry of Housing and Infrastructure Development, Zambia through the Road Development Agency hosted the 8th Africa Transportation Technology Transfer Conference (T2)—2017 from 8th to 10th May 2017 at the AVANI Victoria Falls Resort in Livingstone, the tourist capital of Zambia.

The African Transportation Technology Transfer (T2) conferences provide excellent platforms for sharing, exchanging and debating experiences, new technology and best practice in the provision, maintenance and management of all modes of transport. It is also a forum for sharing and exchanging new approaches on technology transfer that enable countries to develop effective integrated transportation systems which are safe, efficient, reliable and affordable. Since inception in May 2001 when the 1st Africa T2 Conference was held at the Arusha International Conference Centre, Arusha, Tanzania, the conferences have been providing a forum for government agencies and their representatives, academics, consultants, transport sector stakeholders, contractors from around the world and mainly Africa to discuss acute transportation needs and provide some of the solution to transportation needs.

In the past, various issues on road safety, capacity building and social economic and infrastructure development were addressed at seven Africa Transportation Technology Transfer (T^2) Conferences under different themes. The conferences were held as follows:

i. 1st Africa T^2 Conference held in Arusha Tanzania from 23rd – 25th May 2001, hosted by Tanzania Transportation Technology Transfer Centre: **"Technology Transfer in Road Transportation in Africa"**

ii. 2nd Africa T^2 Conference held in St. Pietermaritzburg, KwaZulu Natal, South Africa from 20th – 23rd September 2005, hosted by KwaZulu Natal Department of Transport: **"Transportation Technology Transfer in Africa's Renaissance"**

iii. 3rd Africa T^2 Conference held in Mangochi, Malawi from 23rd – 25th May 2007, hosted by Ministry of Transport and Public Works in Malawi: **"Technology Transfer for Africa's Sustainable Transportation System"**

iv. 4th Africa T^2 Conference held in Windhoek, Namibia from 31st August to 4th September 2009, hosted by Roads Authority of Namibia: **"Capacity Building Opportunities in the Transport Sector"**

v. 5th Africa T^2 Conference held in Arusha Tanzania from 21st - 25th November 2011, hosted by Ministry of Work in Tanzania through $TanT^2$ Centre: **"Developing Safe, Reliable and Sustainable Transportation Systems for Socio-Economic Development in Africa"**

vi. 6th Africa T^2 Conference held in Gaborone Botswana from 4th – 8th March 2013, hosted by University of Botswana through BwT2 Centre: **"Effective Management of Transport Infrastructure for Economic Recovery in Africa"**

vii. 7th Africa T^2 Conference held in Bulawayo Zimbabwe from 11th – 15th May 2015, hosted by The Zimbabwe Ministry of Transport & Infrastructural Development through $ZimT^2$ Centre: **"Mobilising Resources for Transport Infrastructural Development and Maintenance for Poverty Alleviation in Africa"**

The 8th **Africa Transportation Technology Transfer (T^2) Conference** was an event that took place from 8th – 10th of May 2017 in Livingstone the tourist capital of Zambia. The Conference was officially opened by the Minister of Housing and Infrastructure Development Honourable Ronald Kaoma Chitotela, the conference was closed by the Permanent Secretary for Housing and Infrastructure Development, Engineer Charles Mushota. Two hundred and Sixty Three (**263**) delegates from **13** countries in Africa and other countries worldwide attended the 8th Africa T^2 Conference. Delegates who attended the Conference were from Botswana, Ethiopia, Ghana, Malawi, Mozambique, Namibia, Nigeria, People`s Republic of China, Sierra Leone, South Africa, Madagascar, Tanzania, Uganda, UK and Zimbabwe.

The Conference Theme was **"Linking Africa through Sustainable Transport Infrastructure Development."**

The Conference programme comprised four **(04)** key note speakers, thirty-six **(36)** paper presentations, five (**5**) exhibitors, four workshops, three site visits. The conference was proceeded by an opening cocktail held on the 8th May, 2017 and the Gala Conference dinner held on 10th of May 2017, the closing day. The participants were drawn from various international and local organisations and individual experts. A wide range of current issues relevant to the development of the transport sector in Africa were discussed and debated at the Conference.

The purpose of this report is to ensure that the key issues arising at the Conference are recorded for wider dissemination and implementation where appropriate. It is also aimed at providing lessons learnt and additional guidance to future T^2 conference hosting organisations.

Through the evaluation forms provided to participants at the end of the Conference, forty four (44) forms were completed and submitted to secretariat , a summary of their assessment results was as follows: -

- More than **95%** of participants agreed that overall objectives and outcomes of the Conference were achieved.
- More than **96%** of participants rated overall presentations as very good.
- More than **98%** of participants agreed that they were comfortable with the Conference organisation; Conference moderation; & Conference venue.

Key Observations and Issues Raised

At the 8th Africa Transportation Technology Transfer (T^2) Conference, participants came up with key observations, issues and recommendations through presentations and discussions and workshops and discussions.

The following key issues were discussed and debated at the Conference:-

- Coordination of transport infrastructure in development;
- Traffic modelling is key in logical integration of a transport system;
- Five corridor lines have been identified that sets the basis for phasing of the project into long term and short term planning;
- In order for successful implementation of the project a new management authority has been set up to manage the MRTS;
- The selection of the BTR model over LRT was based on cost and easy operation challenges due to available local experience in running buses;
- There has been incorporation of the existing bus operators to avoid political hurdles associated with the existing bus operators;
- Proper stakeholder management is key to the success of the MRTS project.
- The proposed MRTS integrates railway and road transport modes in way that they complement each other;
- The study didn't clearly demonstrate the demand focus for the MRTS;
- Use of PBL has been successful in the medical field;
- There is need to apply the principles of PBL to roads for effective provision of solution to transport infrastructure development;
- Research results needs to be available to all relevant stakeholders in the road sector;
- The goal should be to undertake research, build capacity and manage knowledge transfers; AfCAP has been a good example in this area;
- Use of risk assessment to road infrastructure is a new field which has not been explored;
- Due to globalization and increased threat of climate and terrorism, there is need to evaluate the risk on critical logistical infrastructure;
- A proper assessment and evaluation of risks on critical logistical infrastructure can help in preparing for unwanted events that can disrupt a critical logistic link in the value chain;

- There is need to explore the subject on the risks arising from natural disasters due to climate change were the critical logistical infrastructure gets affected.
- No standards have been developed on risks associated with critical logistical infrastructure;
- Availability of data on the critical infrastructure in developing nations may be a challenge;
- Road transport is the dominant form of transportation in Africa due to inadequacies in other forms of transport;
- There is a need to standardize the location of weighbridges. A weighbridge plan for Southern African Development Countries (SADC) has been drafted however lack of political will has been a major concern;
- Axle load control standardization for asset management within the region is facing many challenges;
- Challenges in use of Critical Path Method (CPM) and other methods in determining project duration in comparison with Engineering Judgement (Conventional Wisdom & Experience).
- Implementing new technologies in the transportation sector in the SADC region
- Challenges in knowledge sharing among ASANRA member Agencies. ASARA as a member of the SADC Council of Ministers on transportation should influence the political decisions on recommendations made on transportation development;
- Africa needs to embrace innovative technology such as adaptive signal controls at intersections to reduce congestion;
- Pedestrian flyovers have not been a successful solution in resolving motorized and non-motorized conflicts at grade intersections. Extensive public consultations would be important for future solutions;
- Need for harmonization of Heavy Goods Vehicles and Public Service Vehicles;
- Use of bio-engineering methods to re-establish vegetation cover and improve soil stability;
- Provision of emergency transport, with a focus on appropriateness and economy.
- Use of risk assessment to road infrastructure: A proper assessment and evaluation of risks on critical logistical infrastructure can help in preparing for unwanted events that can disrupt a critical logistic link in the value chain.

Fund Mobilisation and Conference Costs

The 8th Africa T^{2} Conference was promoted and financed through payment of registration fees for participation and exhibition at the conference. The registration fees for participation and exhibition

were fixed low in order to capture a wider participation of delegates. As such the funds to be realised from the registration of delegates were not enough to cover the conference budget. Therefore, to cover the financial gap, various stakeholders and sponsors were approached for support. The following institutions /firms responded positively and supported in promoting and financing the Conference: -

- The Ministry of Housing and Infrastructure Development
- The Association of Southern Africa National Road Agencies (ASANRA)
- African Community Access Programme (AFCAP)
- National Road Fund Agency (NRFA)
- Road Transport \and Safety Agency (RTSA)
- AVIC-INTL Project Engineering Company
- Zambia National Commercial Bank
- China Jiangxi Corporation for International Economic and Technical Cooperation (CJIC)
- China Geo-Engineering Corporation

The budget for the Conference was ZMW3, 224,000 ($346,666.67). A total income of ZMW1, 789,436.36 ($192,412.51) was mobilised through contributions from partners, various stakeholders and registration of delegates and exhibitors which were not sufficient to meet the final cost for the Conference of ZMW3, 230,522.69 ($347,368.03). The conference incurred a loss of ZMW1, 443,786.33 (**$155,245.84**) and the deficit was covered by RDA.

Hosting of the 9th Africa T^2 Conference

The next Africa T^2 Conference will be hosted by the Mozambique National Roads Authority. During the closing session of the 8th Africa T^2 Conference it was announced that the Ministry of Public Works, Housing and Water Resources of Mozambique through the Mozambique National Roads Authority had been nominated by the Regional Technology Transfer and Capacity Building Committee and approved by the Board of Association of Southern African National Roads Agencies (ASANRA) to host the 9th Africa Transportation Technology Transfer Conference in 2019. The delegates from Mozambique made a brief presentation on Mozambique hosting the next Africa T^2 Conference and utilised the opportunity to invite the delegates to Mozambique and participate in the conference.

In conclusion the 8th Africa Transportation Technology Transfer (T^2) Conference was a great success in terms of sharing, exchanging and debating experiences, new technology and best practice in the provision, maintenance and management of various modes of transport.

1.0 Introduction

The Association of Southern African National Road Agencies (ASANRA) Board at a meeting held in Livingstone on 26th March 2015 proposed Zambia to host the Technology Transfer (T2) conference in 2017. The role of ASANRA in the road transport sector in the region is to harmonise policies, systems and procedures through preparation of guidelines and advocating for adoption of good asset management practices among Member States in line with the SADC Protocol on Transport, Communication and Meteorology. The Association established the Regional Technology Transfer and Capacity Building Programme with the objective of developing and sustaining active technology activities through effective Technology Transfer (T2) centres and providing professional and technical capacity in the Region. The Association has hosted seven bi-annual conferences in Tanzania, South Africa, Malawi, Namibia, Botswana and Zimbabwe.

The intention of holding the T2 conferences is to share, exchange and debate experiences, new technology and best practice in the provision, maintenance and management of all modes of transport. It is also a forum for sharing and exchanging new approaches on technology transfer that enables countries to develop effective integrated transportation systems which are safe efficient, reliable and affordable. The T2 conferences attract over 300 delegates from various continents which include Africa, Europe, America and Asia. During the Conference various selected presentations and workshops pertaining to the Conference Thematic-Areas and topic are held. The Conference format includes Technical Presentations, Panel Discussions, Workshops as well as Exhibitions on Products, Technologies and Services.

The preparations for the 8th African Transportation Technology Transfer (T2) hosted in Zambia were launched in August 2015 by Ministry of Housing and Infrastructure Development through the Road Development Agency. The Road Development Agency in collaboration with the Association of Southern African National Roads Agencies (ASANRA), Transportation Technology Transfer (T2) Centres in SADC region and other local and international stakeholder institutions organized the 8th Africa Transportation Technology Transfer (T2) Conference that took place at the AVANI Victoria Falls Resort in Livingstone, the tourist capital of Zambia from 8th – 10th of May 2017. The theme for the conference was "**Linking Africa through Sustainable Transport Infrastructure Development**".

The Conference which was a major event attended by a good number of delegates from African countries and world over, targeted at transport sector policy and decision makers, development partners, practitioners, contractors, consultants, researchers, the academia, students, transport users and other interested parties.

The main objectives of organizing the Africa T2 Conference are:-

- ❖ To promote Technology Transfer for Developing Sustainable Transportation Systems in Africa.
- ❖ To promote establishment and operations of Technology Transfer Centres as means for facilitating appropriate effective technology transfer in the transport sector.
- ❖ To provide a forum for discussion and exchange of views as well as learn experiences of best practices and innovative solutions in the Transportation Industry.

In the past seven Africa Transportation Technology Transfer (T2) Conferences various issues on road safety, capacity building and social economic and infrastructure development were addressed under different themes. The conferences were held as follows:

i. 1st Africa T^2 Conference held in Arusha Tanzania from 23rd – 25th May 2001 and hosted by Tanzania Transportation Technology Transfer Centre: **"Technology Transfer in Road Transportation in Africa"**

ii. 2nd Africa T^2 Conference held in St. Pietermaritzburg, KwaZulu Natal, South Africa from 20th – 23rd September 2005 hosted by KwaZulu Natal Department of Transport: **"Transportation Technology Transfer in Africa's Renaissance"**

iii. 3rd Africa T^2 Conference held in Mangochi, Malawi from 23rd – 25th May 2007 hosted by Ministry of Transport and Public Works in Malawi: **"Technology Transfer for Africa's Sustainable Transportation System"**

iv. 4th Africa T^2 Conference held in Windhoek, Namibia from 31st August to 4th September 2009 hosted by Roads Authority of Namibia: **"Capacity Building Opportunities in the Transport Sector"**

v. 5th Africa T^2 Conference held in Arusha Tanzania from 21st - 25th November 2011 and hosted by Ministry of Work in Tanzania through $TanT^2$ Centre: **"Developing Safe, Reliable and Sustainable Transportation Systems for Socio-Economic Development in Africa"**

vi. 6th Africa T^2 Conference held in Gaborone Botswana from 4th – 8th March 2013 and hosted by University of Botswana through BwT2 Centre: "**Effective Management of Transport Infrastructure for Economic Recovery in Africa**"

vii. 7th Africa T^2 Conference held in Bulawayo Zimbabwe from 11th – 14th May 2015 and hosted by The Zimbabwe Ministry of Transport & Infrastructural Development through $ZimT^2$ Centre: "**Mobilising Resources for Transport Infrastructural Development and Maintenance for Poverty Alleviation in Africa**"

During the past Africa Transportation T^2 Conferences, various presentations were made to address those themes. The Events have facilitated bringing together Member States, Ministries responsible for transport infrastructure, Roads Agencies and Authorities and Technology Transfer Centres in the region. In addition, among other things, the events have facilitated the following:

i) Exchange and sharing of technological information for transport infrastructure development
ii) Conducting of Technical Site Visits that enables professionals to learn from each other regarding application of appropriate materials in road construction, technologies, operations of various transportation modes such as roads and ports.
iii) Carried out Capacity Building Programmes such as training courses and workshops that were conducted concurrently with the Conference.
iv) Exhibitions on various products, technologies, and services applied by companies, organizations and institutions from within and outside Africa.
v) Formulation of collaborations and partnerships between institutions from Africa and those outside Africa.
vi) Gathering of professionals from various countries inside and outside Africa and sharing experiences and innovative solutions.
vii) Visiting natural resources and sightseeing in host countries.

The Africa Transportation T^2 Conference as highlighted above has been an event that has put Africa as a continent on the global map. Zambia through the Ministry of Housing and Infrastructure Development accepted the recommendation by ASANRA to host the 8th **Africa Transportation Technology Transfer Conference** that included technical presentations, panel discussions, workshops as well as exhibitions on products and services.

The 8th **Africa Transportation Technology Transfer (T^2) Conference** took place from 8th – 10th of May 2017 in Livingstone the tourist capital of Zambia. The Conference was officially opened by the Minister of Housing and Infrastructure Development Honourable Ronald Kaoma Chitotela, and closed by the Permanent Secretary for Housing and Infrastructure Development, Engineer Charles Mushota. Two hundred and Sixty Three (263) delegates from 13 countries in Africa and other countries worldwide attended the 8th Africa T2 Conference. Delegates who attended the Conference were from Botswana, Ethiopia, Ghana, Malawi, Mozambique, Namibia, Nigeria, People`s Republic of China, Sierra Leone, South Africa, Madagascar, Tanzania, Uganda, UK and Zimbabwe.

To meet its objective the Conference featured various parallel paper presentations, panel discussions and workshops pertaining to the Conference thematic-areas and topics. There were special sessions on varied topics arranged to enable each participant to optimise their stay and take part in as many of the activities as possible. Being fully aware of the current trends, the Conference agenda addressed the following; issues ranging from rural accessibility and transport services, innovative maintenance

and application of technologies in overcoming transport challenges, road safety, pavement designs, policy and financing, and cross cutting issues in the transport sector, all of which were expected to be beneficial to the delegates in attendance. The Conference offered a great opportunity to network with decision makers and key players in the African Transportation and Infrastructure sector, and also provided a platform to enhance professional networking and interaction between key industry players.

Exhibition of research activities and services by some sponsors and stakeholders was held in conjunction with the Conference. Stakeholders and research institutions were able to exhibit their research activities and services.

1.1 Conference Theme/Thematic Areas

1.1.1 The Conference Theme

The Conference Theme was **"Linking Africa through Sustainable Transport Infrastructure Development."**

1.2.2 Conference Sub-Themes

The Conference dealt with the following topics which were grouped in **six Thematic Areas.** There were no restrictions on attending any one specific area; such grouping of themes served only the organizational purpose of listing.

a) Thematic Area 1: Sustainable Financing for Transport Infrastructure Projects

(i) Public Private Partnerships (PPPs)
(ii) Contractor Financed Initiatives
(iii) Road Tolling
(iv) Bonds
(v) Road Fund
(vi) Innovative financing models for transport infrastructure projects

b) Thematic Area 2: Sustainable Construction, Maintenance and Rehabilitation Practices.

(i) Innovative approaches to utilization of materials
(ii) Innovative and Sustainable Geo-materials and Geo-systems
(iii) Use of Recycled Materials (Steel, Concrete, Asphalt Concrete) in Transport Infrastructure Construction, Maintenance and Rehabilitation
(iv) Ground Improvement and Chemical/Mechanical Stabilization

(v) Strategic selection of maintenance interventions
(vi) Materials, design, construction, maintenance and testing
(vii) Nano technology in transport infrastructure
(viii) Condition assessment and monitoring of transport infrastructure
(ix) Innovative repair methods for transport infrastructure
(x) Concrete pavements and life cycle analysis
(xi) Climate resilient infrastructure
(xii) Structural Health Monitoring of bridge structures
(xiii) Axle Load Control

c) Thematic Area 3: Integrated Transport Services and Infrastructure for Urban and Rural Communities.

(i) Pedestrian and cyclist considerations
(ii) Intermediate modes of transport (oxcarts, motor cycles, bicycles and donkeys)
(iii) Mixed mode transportation and traffic Management
(iv) Developing intelligent transportation systems for urban areas
(v) Road Safety
(vi) Environmental considerations
(vii) Social amenities and recreation
(viii) Optimized design and construction practices
(ix) Promoting rural access and mobility

d) Thematic Area 4: An Integrated Approach to Transport Infrastructure in Africa

(i) Railroad transport
(ii) Road transport
(iii) Water transport
(iv) Air transport
(v) Transport Infrastructure Project Management and Information Communication Technology (ICT)
(vi) Mining and transport infrastructure
(vii) Energy and transport infrastructure
(viii) Tourism and Agriculture
(ix) Land and Infrastructure Development, Socio-Political and Environmental Considerations

e) Thematic Area 5: Capacity Building, Skills Development, Knowledge Transfer and Research & Development

(i) Effective training approaches
(ii) Skills transfer and mentoring best practice
(iii) Knowledge transfer
(iv) R&D and knowledge Transfer
(v) Institutional and individual capacity building
(vi) Information dissemination and sharing

2.0 Organisation of the Conference

2.1 Local Organising Committee

Zambia through the Ministry of Housing and Infrastructure Development was the host and main organiser of the 8th Africa Transportation Technology Transfer (T^2) Conference. The Ministry of Housing and Infrastructure Development through the Road Development Agency formed an Organising Committee of Ten (10) officials from within the institution and various stakeholder institutions with interest in the transfer of transport technology being responsible for overall preparations and organisation of the 8th Africa Transportation Technology Transfer Conference in year 2017. Various Subcommittees that carried out specific duties were also set up.

The Conference organisation committee and the secretariat were responsible for organising the successful hosting of the Conference. The preparatory activities included the following activities: -

i. Preparation of the tentative budget;
ii. Sending invitation to participants and donors;
iii. Following -up, correspondence and custody of all conference records and information;
iv. Arranging Conference Organising Committee meetings and preparation of minutes of the same;
v. Arrangement for venue, accommodation, tours and other services related to the Conference;
vi. Preparation of advertisements and ensuring their timely release in the various media;
vii. Design of brochures, posters and banners;
viii. Arrangement for transport, Conference bags and stationery;
ix. Arrangement for social events;
x. Follow-up of production of Conference proceedings;
xi. Design for a set-up of exhibition area and stands;
xii. Provision of Standard Conference Team during the event days i.e. Secretaries, Logistics Officers, Facilitators and Rapporteurs;
xiii. Supervising the production of the Conference materials;
xiv. Preparation of the Conference Report.

The lists of the Conference Local Organising Committee, Conference Sub-Committees and Technical Sub-Committee are given in **Tables 1, 2 and 3** respectively:

Table 1: Conference Local Organising Committee

No.	Name	Title	Institution
1	Eng. Elias Mwape	LOC chair	Road Development Agency
2	Mrs. Loyce Saili	Chair –Marketing and Public relations , Sub Committee	Road Development Agency
3	Mr. Kapembwa Mulenga	Chair -Finance and Fundraising sub committee	Road Development Agency
4	Eng. Dickson Ndhlovu	Vice Chair –Technical sub committee	Road Development Agency
5	Eng. Christopher Kapasa	Chair –Logistics & Transport Sub committee	Road Development Agency
6	Cpt (Rtd) Chishimba Kabamba	Chair –ICT	Road Development Agency
7	Dr Michael Mulenga	Chair –Technical committee	UNZA
8	Eng. Thomson Banda	Secretariat	Road Development Agency
9	Mrs. .Dina Chisoti	Member – Finance and Fundraising sub committee	Road Development Agency
10	Mrs. Honeychile Tyetye	Member – Finance and Fundraising sub committee	Road Development Agency

Table 2: Conference Sub-Committees

No.	Name	Chairperson	Institution
1	Technical Sub-Committee	Dr. Michael Mulenga	University of Zambia
2	Finance Sub-Committee	Mr. Kapembwa Mulenga	Road Development Agency
3	ICT Sub-Committee	Mr. Chishimba Kabamba	Road Development Agency
4	Publicity & Marketing Sub-Committee	Ms. Loyce Saili	Road Development Agency
5	Logistics and Transport Sub-Committee	Eng. Christopher Kapasa	Road Development Agency
6	Secretariat	Eng .Thomson Banda	Road Development Agency

Table 3: Technical Sub-Committee

No.	Name	Position	Institution
1	Dr. Michael Mulenga	Chairperson	University of Zambia
2	Eng. Dickson Ndhlovu	Vice Chairperson	Road Development Agency
3	Eng. Thomson Banda	Secretary	Road Development Agency
4	Eng. Presley Chilonda	Member	Road Development Agency
5	Mr. John Kapenda	Member	Road Development Agency
6	Capt. Chishimba Kabamba	Member	Road Development Agency
7	Eng. Prudence Mushota	Member	National Council for Construction
8	Eng. Joseph Goma	Member	Road Development Agency
9	Eng. Musonda Mwale	Member	Road Development Agency
10	Eng. Edgar Kakoma	Member	Road Development Agency
11	Eng. Philimon Goma	Member	Road Development Agency

2.2 International Technical Advisory Committee

In order to effectively organise the 8th Africa T2 Conference, the Technical Sub Committee decided to appoint the International Technical Advisory Committee and this committee was responsible for advising and assisting the Local Organising Committee in the overall preparation, organisation and coordination of the 8th Africa Transportation Technology Transfer Conference. Members of the International Technical Advisory Committee for the 8th Africa T2 Conference were from international organisations and institutions which have been involved in supporting the development and management of the transport sector in African countries and those expected to support the organisation of the Africa T2 Conference such as AfCAP and the World Bank.

2.1.1 Terms of Reference for the International Technical Advisory Committee

The International Technical Advisory Committee was responsible for advising and assisting the Local Organising Committee in the overall preparation, organisation and follow-up of the 8th Africa Transportation Technology Transfer Conference which took place in Livingstone, Zambia from 8th - 10th May2017. Advice and assistance covered the following specific areas: -

i. Validating Conference objectives and expected outcomes
ii. Adopting a strategy for the Conference
iii. Adopting the themes and sub-themes of the Conference
iv. Assist the Organising Committee in identifying targeted paper presenters on sub-themes / topics of special interest
v. Defining the need and modalities for parallel thematic sessions
vi. Reviewing and validating the programme of the Conference
vii. Identification of session chairpersons, moderators and invited speakers
viii. Providing guidance on the promotion of the Conference to potential sponsors and participants.
ix. Making proposals for post-Conference follow-up

The International Technical Advisory Committee carried out its tasks mainly through electronic communications. The list of the members of the International Technical Advisory Committee is given in Table 4.

Table 4: International Technical Advisory Committee

S/N	Name	Title	Institution
1	Les Sampson	Infrastructure Research Manager	ReCAP, African Community Access Partnership (AfCAP) Les Sampson <lsampson@iafrica.com> Les.Sampson@cardno.uk.com
2	Eng N. Leta,	Manager for East and Southern Africa	Recap, African Community Access Partnership(AfCAP) nkululeko.leta@gmail.com Nkululeko.leta@cardno.uk.com
3	Dr Cesar Queiroz	Consultant	Sub Saharan Africa Transport Policy Program (SSATP) The World Bank
4	Dr. Simon A. Oladele	Lecturer , Consultant	Botswana International University of Science and Technology(BIUST)
5	Mr. J. Malota,	ASANRA Secretariat	ASANRA
6	Eng Elias Mwape	Chief Executive Officer	Road Development Agency (RDA) , Zambia emwape@roads.gov.zm
7	Dr Michael Mulenga	Senior Lecturer &Consultant, Civil and environmental Engineering	University of Zambia (UNZA) mnmul@yahoo.com mmulenga@unza.zm
8	Dr Erastus Mwanaumo	Lecturer &Consultant, Civil and Environmental Engineering	University of Zambia (UNZA) barbs.erastus@gmail.com
9	Dr Ignasio Ngoma	Manager	T2 Centre, Malawi
10	Mr Mike Pinard	Consultant	InfraAfrica Consultants, Botswana
11	Mr Joe Odiambo	Regional Technology Transfer Centre	CSIR, Pretoria, South Africa

2.3 Time Table for Organisation of the Conference

The following timetable for organisation of the Conference was agreed upon by the Organising Committee: -

15th December, 2015: First Call for Papers

30th October 2016: Closing Date for Electronic submission of abstracts

30th June, 2016: Provisional Acceptance. Authors advised to submit full papers

30th November, 2016: Deadline for Submission of full papers in the required format

31st January 2017: Deadline for Submission of finalised papers

19th February 2017: Reviewed papers returned to authors for possible amendment

8th – 10th May 2017: CONFERENCE at AVANI Hotel, Livingstone, Zambia

2.4 Publicity

The Permanent Secretary –Works and Supply made the first press statement at a press briefing held at the Ministerial Board room of Zambia hosting the 8th Africa Technology Transfer Conference on 2nd November 2016. The first call for abstracts and exhibitors was issued on 15th December, 2015 and posted on the Conference website http://www.t2conference2017.org/. The announcement contained most details about the Conference including Conference theme, thematic areas, topics, guidelines to authors of papers and conducting of courses and workshops, exhibitions, venue, registration information, sponsorship, accommodation, transport and other practical information. Invitation letters in both hard copies and electronic forms were sent to institutions and individuals who are stakeholders in the transportation sector. Locally, awareness about the Conference were raised through print media, electronic media and press briefing.

All information about the 8th Africa T^2 Conference including the "First Announcement and call for Papers and Exhibitors" were made available at the Conference website http://www.t2conference2017.org/. Delegates to attend the Conference were required to fill the registration form and submit by e-mail to the Conference Secretariat.

Over 1,000 local and international potential participants were informed and invited to participate in the Conference by electronic mail. In order to make effective sharing of the Conference information, regular reminders at various intervals were sent to stakeholders on the mailing list. Also the Conference was publicised at the ANSARA and AfCAP websites.

2.5 Abstract and Paper review Process

The first call for papers and exhibitors was issued on 15th December, 2015 and posted on the Conference website http://www.t2conference2017.org/. Guidelines for authors and deadlines were also included in the announcement. A total of forty-seven (47) papers were received and the call for papers ended on 30th November 2016. The Technical Sub Committee appointed eleven (11) experts to the T2 Technical Review Panel (TRP) and the deadline for review of papers was 31st December 2016. Based on recommendations of the reviewers, the Organising Committee accepted and approved thirty six (36) full papers for presentation during the Conference. Authors were advised to adhere to the given guidelines during their submission.

The Secretariat received the thirty six (36) full papers which were reviewed by the Technical Review Panel (TRP) which comprised of experts with adequate experience from different organisations in Zambia on the themes of the Conference.

Call for proposals for conducting workshops during the Conference were included in the first announcement and call for papers. Guidelines for conducting workshops and deadlines were also included in the announcement. A total of six (6) proposals for conducting workshops were received by the Secretariat. Based on recommendations from the Technical Sub Committee, the Organising Committee accepted and approved four (4) proposals for conducting workshops for preparation of detailed workshops.

Detailed workshops received, were reviewed by the Secretariat with regard to provided guidelines, scope of the materials and time frame available in the Conference programme. A total of four workshops were accepted for conducting during the Conference.

3.0 Conference Proceedings

3.1 Keynote Speeches

3.1.1 Eng. Robinson Misitala (Managing Director ,Zambia Airports Corporation)

a) Full implementation of the Yamoussoukro Decision of 1999 is the solution to linking Africa by Air Transport.
b) Air Transport does not require huge capital investment in the construction and maintenance of surface pathways, it therefore can easily be used to link countries on the continent of Africa.
c) Air services are key to facilitating the development of a more diversified export base and increased tourism in Africa.

3.1.2 Eng. George Sitali (President, Engineering Institution of Zambia)

a) A regulatory framework should be instituted providing for broader participation of the private sector in transport management and financing.
b) Human institutional capacities should be strengthened and training institutions rehabilitated.
c) Databases should be created for measuring progress made in transport sector development.

3.1.3 Dr. Jasper Cook (Team Leader, Recap, AfCAP)

a) Events such as 8th T2 Conference are vital in a framework of knowledge exchange.
b) Rural transport services must be capable of moving peoples and freight in a safe and secure manner and must be fully aware of the special needs of vulnerable groups, including women and children.
c) Current and future climate impacts pose considerable threats to rural transport networks and the communities they serve.

3.1.4 Mr Christopher C. Musonda (Chief Executive Officer, Zambia Railways Limited)

a) The railway sector plays the role of an economic engine in the development of countries.
b) The corridor will become a symbol of regional integration in Southern, Central and Eastern Africa and promote economic activities in the region.
c) Railway infrastructure development needs capital injection both from government and the private sector through PPPs.

3.1.5 Eng. Wallace Mumba (Director & Chief Executive Officer, National Road Fund Agency)

a) Road Funds in Africa through innovative Resource Mobilization Strategies, Fiduciary Management and VfM play a critical role in financing of Sustainable Transport Infrastructure in efforts to link Africa.
b) Need for a paradigm shift to embrace new techniques, technologies, re-align policies, management styles including mindset in order to effectively achieve desired results.

3.2 Paper Presentations

3.2.1 Sustainable Financing for Transport Infrastructure Projects

i. Key Issues

a) MCA was biased in that economic benefits had the highest score, hence certain types of roads, by their very nature would automatically score highly when analysed using the MCA.

ii. Recommendations

a) Analysis of financing models should be structured such that social and economic roads are analysed separately;

3.2.2 Sustainable Construction, Maintenance and Rehabilitation Practices.

i. Key Issues

a) Sub-Saharan Africa has the lowest Paved Roads Network.
b) Effectiveness of tractor based maintenance technology in very wet climates.
c) Road Maintenance scheduling based on Road condition surveys.
d) Road Roughness Measurement is expensive: need cost-effective solutions.
e) Key benefits of using tractor based technology in the road maintenance.
f) Effectiveness of the tractor based technology in very wet climates
g) Cost-effectiveness and success of mechanical stabilization
h) Sustainable road transportation system requires road maintenance scheduling based on road condition surveys
i) Need for cost-effective solutions for Road Roughness Measurement

ii. Recommendations

a) Improvement of operation and maintenance of low volume rural road infrastructure
b) Increase the level of networking among ASANRA member countries.
c) Formulation of strategy to ensure political leaders buy-in into the solutions proposed for implementation of new technologies in the transportation sector in the SADC region.
d) Broaden research scope to consider various factors that cause delays in project implementation.
e) Address challenges facing axle load control standardization and standardize the location of weighbridges.
f) Increase tractor based technology utilization to increase benefits;

3.2.3 Integrated Transport Services and Infrastructure for Urban and Rural Communities

i. Key Issues

a) Pedestrian flyovers have not been a successful solution in resolving motorized and non-motorized conflicts at grade intersections. Extensive public consultations is necessary for future solutions.
b) Selection of appropriate erosion control measures
c) Improvement of Erosion Monitoring Techniques - reporting and monitoring system using GIS type mapping.
d) The costs and benefits of the erosion control for roads versus traditional road maintenance and upgrading of drainage structures;

ii. Recommendations:

a) Africa need to embrace innovative technology such as adaptive signal controls at intersections to reduce congestion;
b) Harmonization of Heavy Goods Vehicles and Public Service Vehicles;
c) Development of additional Erosion Control Methodologies for different areas and conditions.
   - ❖ Improving production, planting and care of vegetation methods;
   - ❖ Improving community participation and integration into the road erosion control operations;
d) Coordination of transport infrastructure development;
e) Need for synergy in the planning, design and operation of transport infrastructure. There is need for various stakeholders to work together as compared to work in isolation

3.2.4 An Integrated Approach to Transport Infrastructure in Africa

i. Key Issues

a) Use of risk assessment to road infrastructure is a new field which has not be explored
b) Due to globalization and increased threat of climate and terrorism, there is need to evaluate the risk on critical logistical infrastructure.
c) Assessment and evaluation of risks on critical logistical infrastructure.

ii. Recommendations

a) There is need to explore the subject on the risks arising from natural disasters due to climate change were the critical logistical infrastructure gets affected.

3.2.5 Capacity Building, Skills Development, Knowledge Transfer and Research & Development

i. Key Issues

a) Early preparation of students (i.e primary and secondary schools) is equally important and has a bearing on a student being admitted into university.
b) Problem Based Learning (PBL) as a tool to integrate research in the road sector, to create a link between research, capacity building and knowledge transfer.
c) Need for harmonization of qualifications across the continent.
d) Research on cost-effective ways of building Roads: General approach in Road Design is empirical methods - catalogues, there's need to be innovative and consider ways to improve on this.

ii. Recommendations

a) There is need to apply the principals of PBL to roads for effective provision of solution to transport infrastructure development.

3.3 Workshops

All the four workshops were supported by the Africa Community Access Partnership (AFCAP). The workshops focused on a range of current issues relevant to the development of the rural transport sector in Africa, climate adaptation of rural road networks, rural road Asset Management and transport services in the transport sector.

3.3.1 Using High-Tech Solutions for road network and condition analysis, including satellite imagery

The workshop aimed to explore alternative, cost-effective methods using high-tech solutions to support asset management through enabling countries to gain a better understanding of their rural road networks and to be able to make more informed decisions on the funding for maintenance and management of those networks.

i. Key Issues

a) Correlations: what coefficients were used? What type of correlation?
b) Institutional Adoption / Resistance.
c) Technology Mapping. Who uses what technology in which areas, what is the most applicable technology for a particular country or situation.
d) How useful would this system be for any country, given the costs against the information it provides? Would it be good value?
e) What assistance can high-tech solutions provide to other areas in the sector, such as climate change resilience and rural transportation systems?

ii. Resolutions

a) There is need to determine cost Implications, e.g. satellite imagery costing 17 Pounds per km2 (A minimum purchase of 100km2 is required)
b) There is need to determine the purpose and level of detail required and assess the costs Vs benefits.
c) It is absolutely necessary to establish a RAMS. Most countries in Africa don't have this established.
d) There is need to improve GIS skills in the roads sector
e) Regarding the use of drones - The World Bank is carrying out some research work in Tanzania, including mapping of Zanzibar, etc.
f) There is need to learn from other countries where similar technology has been used: In Nepal, earthquake disaster management used Satellite Imagery to assess accessible roads and determine safe routes to access affected areas and provide aid.

3.3.2 Rural Road Asset Management

The workshop focused on performance of road agencies in rural road asset management to ensure greater accountability.

i. Key Issues

a) Typical strengths and weaknesses of rural road agencies in Africa include: Poor Financing, Unavailability of Skilled & Experienced Personnel, Neglecting of Rural Roads and Lack of Transparency /Accountability; Road Agencies /Authorities are closer to the people, so the rural road problems should be well understood by road agencies
b) What are the key components of Rural Road Asset Management?
c) How does rural road asset management affect delivery of social services and economic development in rural communities?
d) Can we maintain all of the roads that are on our inventory list? If not, what criteria should be used for prioritization?
e) Is public consultation important for a Rural Roads Agency? If Yes, Why?

ii. Resolutions

a) There is need to enhance awareness of what's required to ensure that Road Agencies deliver to expectation.
b) There is need to take necessary measures to address the weaknesses facing the road agencies.
c) There is a clear appreciation that the road asset is worth billions. We need to ask ourselves how we can lobby for increased funding based on the asset value.
d) Road Agencies should take measures to close the gaps identified in the building blocks of the road preservation pyramid.
e) It is clear that it's not just technical aspects / impacts, but social impacts are very important as well.
f) There's need to identify Core Network, to look at both technical and social criteria and maintain a balance in classifying the prioritization of the roads.
g) We need to interact with stakeholders
h) In determining Level of Service (LoS) based on Speed, it's important to specify the vehicle used, because different vehicles move at different speeds.

3.3.3 Climate adaptation of rural road networks

The workshop focused on responses to climate change effects and innovation of cost effective erosion control measures.

i. Key Issues

a. Climate change a significant obstacle to the sustained eradication of poverty.
b. Climate change has at least a doubling effect on maintenance costs for road infrastructure.
c. Climate resilience is about good engineering and not a new type of engineering.
d. Road Engineers should move from the "large scale" understanding of climate change to the "local understanding" at the road level in order to design climate resilient infrastructure.

ii. Resolutions

a) There is an urgent need for Sub-Saharan to invest more effort into finding cost effective erosion control.
b) Enhanced research under the following scope:

- Development of additional Erosion Control Methodologies for different areas and conditions. Improvement of Erosion Monitoring Techniques - reporting and monitoring system using GIS type mapping;
- Appraisal of what makes certain areas more susceptible to erosion and what the anticipated effects of climate change may be;
- The costs and benefits of the erosion control for roads versus traditional road maintenance and upgrading of drainage structures;
- Improving production, planting and care of vegetation methods;

c) Improving community participation and integration into the road erosion control operations.

3.3.4 Transport Services with a Focus on Motorcycle Taxis

The workshop was based on transformation of community access and mobilization of access to health services with a focus on use of motorcycle taxis and bicycles.

i. Key Discussions and Findings

a) It was observed that rural access mobility can be improved by the use of simple and cheaper vessels such as motorcycles and bicycles.
b) In order to provide sustainable rural transport services in our African villages, we need to think of the use of bicycles and three wheelers as well as motors cycles to improve

rural access to health services, schools. Various examples in Africa were discussed that motor cycle taxis can help improve rural accessibility.

c) There is need to investigate the proper use of the motor cycles to eliminate the fears associated with their use.

d) Use of motor cycles reduces travel time significantly compared to walking. To increase safety all users need to ride at an appropriate low speed.

ii. Recommendations

a) To this proposal, I recommend participants of this conference to further into research concerning the fear on the use of motor cycles. This I believe will allow more user of motor cycles.

b) It was suggested that trails should be constructed in rural areas that will lead to main roads and also to other service centres (ie Clinics and Hospitals).

3.4 Site visits

3.4.1 Kazungula Bridge Project, Kazungula, Zambia Botswana Border

The Project Manager Engineer Godfrey Songeya guided the conference delegates to the project site which was approximately 60km from the conference venue. The project involves construction of a 923m long rail/road extra dosed cable stayed bridge including approach roads and one stop boarder post between Zambia and Botswana. Once completed the project will facilitate trade through reduced transit time for freight and passengers, reduced time-based trade and transport cost and improved border management operations.

i. Key Issues/ Project Challenges

a) Frequent plant breakdown;
b) Slow Rate of Progress;
c) Inclement Weather (Rain);
d) Liquidation of main subcontractor - BNG Consultants for Package 1;
e) Heat of Hydration;
f) Cracks on concrete (P6 and P7 first lift);
g) Machenje Quarry a concern; Operator under Receivership
h) Delayed acquisition of Botswana gravel sources;
i) Difficulties in recruiting qualified Key staff;
j) Inclement Weather;
k) Lengthy logistics processes in transporting Materials from Zambia.
l) Relocation of services

ii. Recommendations/ Mitigation measures

a) Mobilization of additional Plant;
b) Increased Working Hours;
c) Transfer of equipment, some members of staff and technical support from BNG to Daewoo Company;
d) Investigations and change of mix design and Mock test;
e) Keren Motors, Daewoo and Creditor Engaged to find solution on quarry production;
f) Revision to construction programme;
g) Engage service providers ahead of time on relocation of services;

3.4.2 Harry Mwanga Nkumbula International Airport, Livingstone

The group was taken round by the staff from Zambia Airports Corporation and upgrading works included the terminal building, security and customer service facilities.

i. Key Issues

a) Increased regional and international flights;
b) Increased tourist visits;
c) Airport services should meet modern transportation needs
d) Airport should spread the advertisement to increase clientele

ii. Recommendations

a) The company should consider introducing on-line checking in services.

3.4.2 Livingstone Bus Terminus, Livingstone

The project was approximately 90% complete and is the first of its kind to be built in Zambia. The group was taken through the different sections of the building by officials from the Ministry of Local Government, Livingstone City Council and the project Consultant (Ndilila Associates Architects & Project Managers).

i. Key Issues

a) The development of such a modern structure will assist in improving the transport system in terms of passenger movements.

ii. Recommendations

b) Construction projects of similar structures should be initiated in the SADC region

3.5 Exhibitions

At the Conference venue, an exhibition of technologies, products and services – a showcase for all related industries were held in conjunction with the Conference whereby local and foreign firms and institutions were able to exhibit their products, services and technologies. Local Institutions and International organisations exhibited their products, technologies and services at the Conference as follows:

3.5.1 African Community Access Partnership (AfCAP)

i. ***Technologies, products and services exhibited:*** USB Flashes, Soft and Hard Copies of Transportation Manuals, AfCAP Asian and African Programmes
ii. ***Contact:*** Mr. N. Leta, AfCAP-South Africa Regional Technical Manager; ***Email:***nkululeko.leta@gmail.com

3.5.2 Exhibition by Sponsors and cooperating Partners

i. ***Research Activities and services were exhibited:*** The Institutions included The Copperbelt University, Engineering Institution of Zambia and the Road Transport and Safety Agency.

3.6 Social Events

A Welcome Cocktail Party and Conference Dinner were hosted at the Conference and the closing dinner was sponsored by Zambia Airports Corporation Limited while the welcome cocktail party was financed by the Road Development Agency, Zambia .

3.6.1 Welcome Cocktail

The Welcome Cocktail took place on the first day of the Conference on **Monday, 8thMay 2017 from 19:30 to 21:00 hours** at AVANI Hotel, Livingstone, Zambia. The programme for the event included entertainment by Zambia Cultural Dance Troupe an entertainment group from Livingstone, and was officially hosted by His Worship the Mayor of Livingstone.

3.6.2 Conference Dinner

The Conference Dinner took place on the final day of the Conference on Wednesday**, 10th of May 2017 from 19:20 to 21:00 hours** at the AVANI Hotel, Livingstone. The programme for the event included entertainment by Amayenge Band. Competition Prizes were presented during the Dinner and the event was graced by RDA Chief Executive Officer Engineer Elias Mwape.

4 Conference evaluation

Conference participants were requested to evaluate the Conference by filling an evaluation form. The following are a summary of the Conference evaluation results provided by forty four (44) participants.

4.1 Presentation Programme Content

More than 95% participants agreed that the presentation programme content were good and very educative.

a) The following objectives of the Conference were achieved;
   - To promote Technology Transfer of Developing Sustainable Transportation Systems in Africa
   - To promote establishment and operations of Technology Transfer Centres as means for facilitating appropriate effective technology transfer in the transport sector.
   - To provide a forum for discussion and exchange of views as well as learn experiences of best practices and innovative solutions in the Transportation Industry.

b) Outputs of the Conference were;
   - Papers to be included in the Publication of International Journal of Transportation Technology Transfer.
   - Collaborative research
   - Conference proceedings
   - Workshops
   - Oral presentations

c) The Conference has provided them? with a better understanding of the key challenges facing transport sector in Africa

d) The Conference has equipped them? with better knowledge on safe, reliable and sustainable transportation systems

4.2 Were the subjects beneficial?

More than 98% of the participants agreed that the subjects in the presentations were beneficial to them.

4.3 Presentation style and clarity

More than 95% of the participants agreed that the overall conference presentation style and clarity was good. Some delegates commented that:

- ✓ The Conference was well organised
- ✓ The Presentations were of good quality

4.4 Presentation aid quality

More than 91% of the participant agreed that the presentation aid was good and provided easy comprehension.

4.5 Presentation technical quality

More than 96% affirmed that the technical quality of the presentation was good.

4.6 Expected conference information

96% of the presenters accepted that they received the information expected from the conference.

4.7 Was sufficient time provided for the presentations

61% of the participant noted that they was insufficient time allocated for the presenters. Some of the comments from participants were that:

- ✓ In most presentations the provided time was not sufficient.
- ✓ Presenters quickly made presentations due to insufficient time allocation, but on the whole the presentations were okay.
- ✓ Although some presentations while too long, next time there is need to limit the number of slides.
- ✓ For the presentations, time was sufficient but there was need for additional time for very relevant topics.
- ✓ Presenters needed more time in order to run through their slides.
- ✓ Question time was limited.
- ✓ I think presentation time should be at least 5 minutes to 15 minutes of questions and answer (only better papers to be allowed).
- ✓ However, time allowing, the conference should have been extended by one more day to allow for more interactive sessions.
- ✓ All session chairs did their work well. There were too many presentations compressed in a short period.

4.8 Meeting venue

98% of the participants were impressed with the conference venue.

4.9 Suggestion for future presentation topics

- ✓ Future presentations should be limited to a particular class of roads
- ✓ In future presentations, should include the following:
  - ❖ Asset Management Frameworks
  - ❖ Public Private Partnership
  - ❖ Infrastructure Asset Management
- ✓ It is important that users are included and informed in advance so that they can present challenges they have been facing nationally and regionally in transporting goods
- ✓ Include comprehensive urban transportation as presentation topic
- ✓ Allow some time for delegates to see the city
- ✓ Most of the presenters were representatives of the paper owners; they would have benefited a lot from the observation from the audience.
- ✓ Either extend the conference time to 4 days or reduce the number of presenters
- ✓ Include enhancing technical audits in roads projects for value addition as presentation topic.
- ✓ The role of intelligent transportation systems for African cities should be included in future topics
- ✓ Topics on other modes of transportation in Africa to reduce congestion on road should be included
- ✓ Level of implementation / adoption of technology research projects.
- ✓ Provision of tables to be considered rather than participants using rapporteurs for writing
- ✓ Presentations and interactions should be given ample time. Most time should be given to discussion or exchange of transportation technologies.
- ✓ Explore future on nano – technology
- ✓ Improvements of rural roads in Africa
- ✓ Follow up process – implementation and not plans of what was or how they are.
- ✓ Include transport and mobility topics
- ✓ Need more topics on the improvement of rural roads network
- ✓ Content of presentations need analysis, lengthy presentations relevant to theme be given more time
- ✓ Reduce number of presentations to fit time or give more time
- ✓ Sufficient time should be provided or presentation should be reduced to suit the time

- ✓ Topics wide enough, if any, it would be bringing in general inhibiting factors such as political and economic dimension, as real or indeed mythical factors
- ✓ Sustainable development – alternative materials utilization
- ✓ The topics are fine
- ✓ Invite presentations from related field of highway and pavement engineering such as ICTS, Communication.
- ✓ New methods of road maintenance with particular emphasis on new technologies
- ✓ Local contractor participation in transport infrastructure development
- ✓ Case studies in member states including the challenges and how they were mitigated:
    - ❖ Geotechnical problems and solution on civil engineering projects
    - ❖ Innovations on upgrading of low volume roads
- ✓ To consider topics of experiences for strategies to intervene natural/artificial disasters on transport infrastructure
- ✓ More intelligent transport system in Africa
- ✓ More presentations on applied research and applications

4.10 Suggestion for future meeting venues

- ✓ Malawi, Mozambique
- ✓ Rotating the meeting will be highly appreciated
- ✓ Close proximity to where there is a major road or bridge project to visit
- ✓ I think this venue is fine
- ✓ Livingstone is okay, AVANI is fine
- ✓ Siavonga resort would make a good venue
- ✓ Lusaka
- ✓ South Africa
- ✓ Similar venue acceptable
- ✓ The venue is excellent
- ✓ This venue is much suitable as it allows business and leisure
- ✓ Copper belt province, Ndola or Kitwe
    - Protea hotel Livingstone
    - Chrismar hotel Livingstone
- ✓ The venue was good, let's keep the same standard
- ✓ AVANI is the best
- ✓ The venue is perfect and can be used for future
    - Meetings
- ✓ Tanzania
- ✓ Democratic Republic of Congo

4.11 Any other suggestion

- ✓ Invitation should be extended to engineering schools so that engineering students can learn new road technology,
- ✓ Students from colleges and universities must be involved. Find a way to motivate politicians (MPS) and line ministries to be part of presentations. This will promote integrated approach of planning for our mother Zambia.
- ✓ Time for presentation and discussions should be increased
- ✓ We hope the slides will be given to us so that we keep learning even as we go home.
- ✓ The presentation were too many and the time was not sufficient. Not enough time.
- ✓ Engage the end users of the roads i.e., transports I future conference to understand better the challenges they face.
- ✓ Students should be encouraged to attend such meetings
- ✓ The following meetings should take stock of the uptake and embedment of the recommendation from the presentations and discussion. This will ascertain that progress is being made in the implementation of the issues discussed.
- ✓ For future presentation I would like to increase the duration of the conference.
- ✓ Extend invitation to chief executive officers of local authorities (councils) especially councils in Zambia.
- ✓ Abstract to be sent out to expected participants earlier.
- ✓ Introduction about the country where the conference is taking place, the people governance, economy, state of infrastructure and institutions providing infrastructure.
- ✓ Delegates should be given time for site seeing since they were in the tourism capital.
- ✓ Next time please communicate effectively and efficiently to invited delegates or participants. Not much information was used for this important event.
- ✓ The element of taking advantage of the conference to market Livingstone tourism has been missed. There is no deliberate effort to make the participants sample tourism sites.
- ✓ Increase paper on project implementation, challenges and way forward for big projects in the region.
- ✓ Thank you secretariat for all the arrangements and for a well arranged conference; thank you for also looking after me so well.

5 Financial Management

5.1 Fund Mobilisation

The 8th Africa T2 Conference was promoted and financed through payment of registration fees for participation and exhibition at the conference. The registration fees for participation and exhibition were fixed low in order to capture a wider participation of delegates. As such the funds to be realised from the registration of delegates were not enough to cover the conference budget. Therefore, to cover the financial gap, various stakeholders and sponsors were approached for support. The following institutions /firms responded positively and supported in promoting and financing the Conference: -

- The Ministry of Housing and Infrastructure Development
- The Association of Southern Africa National Road Agencies (ASANRA)
- African Community Access Programme (AfCAP)
- National Road Fund Agency (NRFA)
- Road Transport and Safety Agency (RTSA)
- AVIC-INTL Project Engineering Company
- Zambia National Commercial Bank (ZANACO)
- China Jiangxi Corporation for International Economic and Technical Cooperation (CJIC)
- China Geo-Engineering Corporation
- Zambia Airports Corporation
- Engineering Institution of Zambia (EIZ)
- Zambia Environmental Management Authority (ZEMA)

Details of the expected income from sponsors are as indicated in Table 5 below:

Table 5: Expected income from Sponsors

No.	Sponsors	Amount
1	Road Transport and Safety Agency	$20,000.00
2	Zambia Airports Corporation	$18,000.00
3	AVIC-INTL Project Engineering Company	$17,500.00
4	China Geo-Engineering Corporation	$17,500.00
5	China Jiangxi Corporation for International Economic and Technical Cooperation	$17,500.00
6	VIABUILD	$4,650.00
7	China Henan Corporation	$20,000.00
8	Zambia National Commercial Bank	$10,000.00
9	Engineering Institution of Zambia	$2,000.00
10	Zambia Environmental Management Authority	$1,500.00
11	National Road Fund Agency	$20,000.0
12	China CAMC	$10,000.0
13	**Total**	**$158,650.00**

5.2 Income and Expenditure

Details of the budget, income and expenditure are as indicated in the Financial Statements in Table 6 and 9 below:

Table 6: Conference Budget

S/N	Description	Unit	Rate (ZMW)	Quantity	Amount (ZMW)	Amount ($)
1	Conference venue	EA	1,200,000.00	1.00	1,200,000.00	115,384.62
2	Meetings LOC	EA	4,000.00	20.00	80,000.00	7,692.31
3	Subcommittee meetings (Inspections and Review of papers)	EA	3,000.00	15.00	45,000.00	4,326.92
4	Conferences / advertisements	EA	30,000.00	3.00	90,000.00	8,653.85
5	Event Management and Logistics	EA	25,000.00	13.00	325,000.00	31,250.00
6	Conference preparations	EA	40,000.00	10.00	400,000.00	38,461.54
7	Website and management	EA	40,000.00	1.00	40,000.00	3,846.15
8	Review of abstracts and papers	EA	500.00	150.00	75,000.00	7,211.54
9	Printing of conference materials	EA	45,000.00	3.00	135,000.00	12,980.77
10	Sundry expenses	EA	35,000.00	3.00	105,000.00	10,096.15
11	Accommodation of LOC/ Chairs and rapporteurs	EA	5,000.00	45.00	225,000.00	21,634.62
12	Accommodation of Secretariat	EA	3,000.00	30.00	90,000.00	8,653.85
13	Study tours / bus hire shuttle	EA	3,000.00	40.00	120,000.00	11,538.46
14	Contingency	EA	294,000.00	1.00	294,000.00	28,269.23
					3,224,000.00	**310,000.00**

Table 7: Income and Expenditure Summary

Revenue	Notes	Amount (ZMW)	Amount ($)	Total (ZMW)	Total ($)
Delegate fees	1	400,384.86	43,052.14		
Corporate Sponsorship	2	1,389,051.50	149360.38		
Total Revenue				1,789,436.36	**192,412.51**
Expenses					
Conference facilities & accommodation	3	1,302,661.50			
Event Management and Logistics	4	634,758.00			
Promotional materials	5	586,864.63			
Allowances	6	344,229.92			
Advertisements	7	170,961.77			
Entertainment	8	60,825.00			
Other	9	132,921.87			
Total Expenses				3,233,222.69	**347,658.35**
[1]Loss/ (Deficit)				1,443,786.33	**155,245.84**

Note:
This is the loss incurred by the conference and funding to cover the loss was provided by RDA

Table 8: Revenue

		USD	ZMW Equivalent (@9.3)	ZMW	TOTAL (ZMW)	TOTAL ($)
Notes						
1	**Delegates Fees**	**24,719.00**	**229,886.70**	**170,498.16**	**400,384.86**	**43,052.13**
2	**Sponsorship**					
	Amount paid to RDA					
	China Jiangxi	17,455.00	162,331.50		179,786.50	17,455.00
	Avic			163,275.00	163,275.00	17,562.53
	China Geo	17,500.00	162,750.00		180,250.00	17,500.00
	ZEMA	1,500.00	13,950.00		15,450.00	1,500.00
	VIABUILD	4,650.00	43,245.00		47,895.00	4,650.00
	China Henan			20,000.00	20,000.00	2,150.54
	China CAMC			10,000.00	10,000.00	1,075.27
	EIZ			10,400.00	10,400.00	1,075.27
	ZANACO			93,100.00	93,100.00	10,010.75
	NRFA			200,000.00	200,000.00	21,505.38
	Indirect payments :					
	ASANRA- paid directly to AVANI			190,000.00	190,000.00	20,430.11
	Zambia Airports Corporation - paid directly to AVANI			120,000.00	120,000.00	12,9.3.23
	RTSA - paid into RDA Projects A/C			200,000.00	200,000.00	21,505.38
	Total Sponsorship	**41,105.00**	**382,276.50**	**1,006,775.00**	**1,389,051.50**	**149,360.38**
	Total Revenue	**65,824.00**	**612,163.20**	**1,177,273.16**	**1,789,436.36**	**192,412.51**

Table 9: Expenditure

Notes	Description	Amount (ZMW)	Total (ZMW)	Total ($)
1	*Conference facilities & accommodation*			
	Conference facilities	824,644.00		
	Accommodation of Secretariat and LOC	478,017.50		
			1,302,661.50	**140,071.13**
4	Event Management and Logistics	634,758.00	634,758.00	**68,253.55**
5	*Promotional materials*			
	Corporate attire, gifts	374,036.63		
	Conference Banners	66,060.00		
	Printing of conference materials	63,176.00		
	Conference Banners	36,192.00		
	Printing conference magazine Juziel	35,900.00		
	Video production	11,500.00		
			586,864.63	**63,103.72**
6	*Allowances*			
	Secretariat/officials	248,947.72		
	Review of abstracts and papers	78,800.00		
	Advance party	16,482.20		
			344,229.92	**37,013.97**
7	*Advertisements*			
	Television and radio advertisements	95,456.40		
	Print media advertisements	75,505.37		
			170,961.77	**18,382.99**
8	*Entertainment*			
	Live Band	22,000.00		
	Master of Ceremony	17,500.00		
	Hire of Stage	10,000.00		
	Hire of PA system and DJ	8,325.00		
	Cultural Dance Troop	3,000.00		
			60,825.00	**6,540.32**
9	*Other*			
	Study tours / bus hire shuttle	79,900.00		
	Website management	23,670.00		
	Sundry Expenses	17,385.20		
	Medical facilities	5,966.67		
	Stationary	5,000.00		
	Local Fuel	1,000.00		
			132,921.87	**14,292.67**
		3,230,522.69	3,230,522.69	**347,368.03**

6 Conclusion

The 8th Africa Transportation Technology Transfer (T2) Conference was successfully organized and the attendance was good and the level of participation by delegates was high. It is worth noting that the relevance of the subjects that were selected for discussion and the preparedness of the presenters, facilitators and key speakers made the whole conference a success. It is expected that various issues discussed during the conference and highlighted in this report will provide impetus to stakeholders in the transportation sector to address some of the challenges affecting the sector. Further, various key issues highlighted by the delegates which continue to affect the transport sector will also provide a basis for discussion at the next T2 conference.

Key issues discussed

- Coordination of transport infrastructure in development;
- Traffic modelling is key in logical integration of a transport system;
- Five corridor lines have been identified that sets the basis for phasing of the project into long term and short term planning;
- In order for successful implementation of the project a new management authority has been set up to manage the MRTS;
- The selection of the BTR model over LRT was based on cost and easy operation challenges due to available local experience in running buses;
- There has been incorporation of the existing bus operators to avoid political hurdles associated with the existing bus operators;
- Proper stakeholder management is key to the success of the MRTS project;
- The proposed MRTS integrates railway and road transport modes in way that they complement each other;
- The study didn't clearly demonstrate the demand focus for the MRTS;
- Use of PBL has been successful in the medical field;
- There is need to apply the principals of PBL to roads for effective provision of solution to transport infrastructure development;
- Research results needs to be available to all relevant stakeholders in the road sector;
- The goal should be to undertake research, build capacity and manage knowledge transfers; AfCAP has been a good example in this area;
- Use of risk assessment to road infrastructure is a new field which has not been explored;
- Due to globalization and increased threat of climate and terrorism, there is need to evaluate the risk on critical logistical infrastructure;

- A proper assessment and evaluation of risks on critical logistical infrastructure can help in preparing for unwanted events that can disrupt a critical logistic link in the value chain;
- There is need to explore the subject on the risks arising from natural disasters due to climate change were the critical logistical infrastructure gets affected;
- No standards have been developed on risks associated with critical logistical infrastructure;
- Availability of data on the critical infrastructure in developing nations may be a challenge;
- Road transport is the dominant form of transportation in Africa due to inadequacies in other forms of transport;
- There is a need to standardize the location of weighbridges. A weighbridge plan for Southern African Development Countries (SADC) has been drafted however lack of political will has been a major concern;
- Axle load control standardization for asset management within the region is facing many challenges;
- Challenges in use of Critical Path Method (CPM) and other methods in determining project duration in comparison with Engineering Judgement (Conventional Wisdom & Experience);
- Implementing new technologies in the transportation sector in the SADC region
- Challenges in knowledge sharing among ASANRA member Agencies. ASARA as a member of the SADC Council of Ministers on transportation should influence the political decisions on recommendations made on transportation development;
- Africa needs to embrace innovative technology such as adaptive signal controls at intersections to reduce congestion;
- Pedestrian flyovers have not been a successful solution in resolving motorized and non-motorized conflicts at grade intersections. Extensive public consultations would be important for future solutions;
- Need for harmonization of Heavy Goods Vehicles and Public Service Vehicles
- Use of bio-engineering methods to re-establish vegetation cover and improve soil stability;
- Provision of emergency transport, with a focus on appropriateness and economy.
- Use of risk assessment to road infrastructure: A proper assessment and evaluation of risks on critical logistical infrastructure can help in preparing for unwanted events that can disrupt a critical logistic link in the value chain;

7 Recommendations

Delegates attending the 8th Africa T^2 Conference which included paper presentations, workshops and exhibitions on technologies, products and services in the transport sector came up with the following key recommendations:-

a) Apply the principles of PBL to roads for effective provision of solution to transport infrastructure development;
b) Standardization of locations for weighbridges in the SADC region;
c) Enhancement of public consultation to resolve motorized and non-motorized conflicts at grade intersections. Extensive public consultations would be important for future solutions;
d) Creation of databases to measure progress made in transport sector development;
e) Increase the level of networking among ASANRA member countries;
f) Broaden research scope to consider various factors that cause delays in project implementation;

g) Increase tractor based technology utilization to increase benefits;

h) Extensive study of risks arising from natural disasters due to climate change;
i) Enhance awareness on Road Agencies performance and mandate;
j) Invest more effort into finding cost effective erosion control.
k) Fund mobilization for the conference should commence well in advance to avoid incurring a loss due to inadequate time given to sponsors to provide financial support.

l) Advertisement for the future T2 conferences should commence well in advance such as through print and electronic media and at other similar conferences to invite authors to submit abstracts and also for delegates to prepare for conference attendance in good time.

8 Acknowledgements

The Ministry of Housing and Infrastructure Development in Zambia and the Road Development Agency would like to thank all stakeholders who contributed towards the hosting of the 8th Africa Technology Transportation Technology Transfer Conference, we offer our sincere gratitude.

We cannot express enough gratitude to the local organising committee and its subcommittees for their contribution towards the conference: of specific mention we wish to thank Dr. Michael Mulenga, from UNZA for his role as chair of the Technical Sub Committee, Special thanks go to the International Advisory Committee for their advisory role in ensuring the smooth preparation and running of the Conference.

To our sponsors, thank you very much for your contribution which was both financial and also in kind. Lastly we thank our partners ASANRA, AFCAP, RTSA, and NRFA, for your support, the conference would not have been as success without your contribution.

9. Appendices

Appendix 1: Conference Programme

Conference Programme

8TH AFRICA TRANPORTATION TECHNOLOGY TRANSFER CONFERENCE – 2017
LIVINGSTONE, ZAMBIA 8th -10th MAY 2017

THEME: "Linking Africa through Sustainable Transport Infrastructure Development."

Conference Programme		
Sunday	**7 May, 2017: Registration and Final Build up / Organization**	
Time	**Detailed Description of Activities**	**Responsibility**
08:30 a.m to 18:00 p.m	Onsite Registration of Conference Participants	Eng. P Goma - Registration Team / Secretariat
08:30 a.m to 18:00 p.m	Poster presentations build up	Eng. Musonda C. Mwale / Secretariat

Monday: 8 May, 2017 :	**Summary of Monday Program**	
Time	**Detailed Description of Activities**	**Responsibility**
07:30 a.m to 17:30 p.m	Onsite Registration of Conference Participants	Registration team-Presley
08:25 a.m to 17:45 p.m	Conference Proceedings-Opening & Key Note Speeches, Paper Presentations	Director of Ceremony / Presenters / Exhibitors and Poster Presenters
19:00 to 21:00 p.m	Welcome Cocktail Party	Secretariat

Monday: 8 May, 2017 : **Monday: 8 May, 2017**	**Monday Detailed Program** **Session: First Plenary Session-Combined:**	**Venue: Main conference Hall**
Programme Moderator	Director of Ceremony / Moderator	
Time	**Detailed Description of Activities**	**Responsibility / Presenter**
07:30 a.m to 09:00 a.m	Onsite Registration of Conference Participants	Registration team-Presley
08:25 – 08:35 a.m	Introductory Remarks and Announcements	Director of Ceremony
08:35 – 08:40 a.m	Opening Remarks	Eng. Elias Mwape-Chairperson T2 Conference, Director & CEO-Road Development Agency (RDA), Zambia
08:40 – 08:55 a.m	Speech by ASANRA President	Mr. Conrad Lutombi , ASANRA President
08:55 – 09:10 a.m	*Entertainment*	*Cultural Dance Troup*

09:10 – 09:20 a.m	Speech by Platinum Sponsor 1 - AVIC INTERNATIONAL Project Engineering Company	AVIC - Representative
09:20 – 09:30 a.m	Speech by Platinum Sponsor 2- China Geo- Engineering Corporation (CGC)	CGC - Representative
09:30 – 09:40 a.m	Speech by Platinum Sponsor 3- China Jiangxi Corporation for International Economic and Technical Cooperation (CJIC)	CJIC - Representative
09:40 – 09:50 a.m	Welcome Remarks	Hon. Edify Hamukale, Provincial Minister- Southern Province, Zambia
09:50 – 10:05 a.m	Official Opening Speech	Hon. Ronald Chitotela, Minister of Housing and Infrastructure Development
10:05 – 10:20 a.m	*Tea Break - Designated Area*	
10:20 – 10:30 a.m	Key Note Speech and Presentation 1 - Managing Director, Zambia Airports Corporation Limited	Eng. Robinson Misitala, Managing Director, Zambia Airports Corporation Limited .
10:30 – 10:40 a.m	Key Note Speech and Presentation 2 - President of the Engineering Institution of Zambia	Eng. George Sitali, President of the Engineering Institution of Zambia, Managing Partner and CEO and Chairman of Brian Colquhoun, Hugh O'Donnell and Partners Zambia (BCHOD) Consulting Engineers
10:40 – 10:50 a.m	Key Note Speech and Presentation 3 - Research for Community Access Partnership (ReCAP)	Dr Jasper Cook , Technical Team Leader for the DFID funded Research for Community Access Partnership (ReCAP)
10:50 – 11:00 a.m	Key Note Speech and Presentation 4- Zambia Railways Limited	Managing Director-Zambia Railways Limited
11:00 – 11:30 a.m	Technical Presentation NRFA/RDA	Eng Wallace Mumba, Acting Director & CEO, National Road Fund Agency
11:30 a.m	**Paper Presentations :** Session Chair: Eng Dickson Ndhlovu	Eng. Dickson Ndhlovu-Acting Director Planning and Design, RDA
11:30 – 12:00 p.m	**Paper 1:** MASS RAPID TRANSIT SYSTEM HARMONISATION STUDY FOR NAIROBI METROLOPITAN REGION	Brümmer H., Kern G., Osano P. and Doerner S.
12:00 – 12:30 p.m	**Paper 2:** LINKING ROAD RESEARCH PROGRAMMES THROUGH PROBLEM-BASED LEARNING AS MODALITY FOR RESEARCH SKILLS DEVELOPMENT	Mgangira M.B
12:30 – 13:00 p.m	**Paper 3**: DATA-DRIVEN RISK ASSESSMENT AND EVALUATION APPROACH FOR CRITICAL LOGISTICAL INFRASTRUCTURE	Sascha Düerkop and Michael Huth
13:00 – 13:05 p.m	Presentations of Gifts, VIP Guests Taken to Group Photo	Director of Ceremony, Local Organizing Committee Chairperson
13:05 p.m	*End of Morning Session*	
13:05 p.m	*End of Morning Session*	
13:05 – 14:00 p.m	Lunch at designated area	Secretariat

Monday: 8 May, 2017 : **Monday: 8 May, 2017**	**Monday Detailed Program " continued" Combined Session** **Session: First Technical Plenary Session-Combined**	**Venue: Main conference Hall**
Programme Moderator	Director of Ceremony / Session Chairperson: Mathew Ngulube, Executive Director National Council For Construction (NCC), Zambia	
Time	**Detailed Description of Activities**	**Responsibility / Presenter**
14:00 – 14:30 p.m	**Paper 4**: SUSTAINABLE URBAN TRANSPORT FOR SCHOOL STUDENTS IN GABORONE - BOTSWANA	Tshephang Pitso and Adewole S. Oladele
14:30 – 15:00 p.m	**Paper 5**: TRUCK ANALYSIS OF A SINGLE CARRIAGE WAY PROPAGATING ALLIGATOR CRACKS	Akinmade, O.D., Ozigi C. and Surajo L.A.
15:00 – 15:30 p.m	**Paper 6**: INNOVATIONS IN ROAD TRANSPORT TECHNOLOGY SOLUTIONS: ASANRA EXPERIENCE	Hagai K.S. Bishanga, Ignasio Ngoma, Mussa Mataka
15:30 – 16:00 p.m	**Paper 7:** ~~DESIGN OF A LINK ROAD AND INTERSECTION TO CONNECT THE BEITBRIDGE-CHIRUNDU HIGHWAY TO HARARE DRIVE IN HARARE, ZIMBABWE~~	Shumba J.R., Vassileva L.D., Salahuddin A.S. and Shumba S.
16:00 – 16:15 p.m	*Tea Break - Designated Area*	*Secretariat*
16:15 – 16:45 p.m	**Paper 8:** INNOVATIVE APPROACH FOR ALLOCATION OF ROAD INVESTMENT EXPENDITURE AMONG THE COMPETING NEEDS. CASE STUDY FROM TANZANIA	Ephatar L. Mlavi, Vitalis Ndume, Ebenezer Mollel and Bencolias Tinkaligaile **(MOVE TO 15:30HOURS)**
16:45 – 17:15 p.m	**Paper 9:** ADAPTIVE SIGNAL CONTROL USING PTV BALANCE AND PTV EPICS FOR APPLICATION IN A DEVELOPING COUNTRY	Bruwer M. and Weichenmeier F **(MOVE TO 16:15)**
~~*17:45 p.m*~~	*End of Afternoon Sessions*	

Monday	**8 May, 2017: Evening Activity: Welcome Cocktail**	**Venue : Main conference Hall**
Time Programme Moderator	**Detailed Description of Activities** Director of Ceremony / Secretariat	**Responsibility / Presenters**
18:45 – 19:00 p.m	Arrival of delegates	Secretariat
19:00 – 19:05 p.m	Speech by Conference Technical Chairperson	Dr M.N Mulenga-Technical Committee Chair
19:05 – 19:10 p.m	Speech by Conference Chairperson	Eng. Elias Mwape
19:10- 19:20 p.m	Speech by the Mayor of Livingstone	His Worship the Mayor of Livingstone Mayor
19:20 – 19:30 p.m	Speech by Sponsors	Secretariat
19:30 – 21:00 p.m	Welcome Cocktail Party	Secretariat
21:00 p.m	*End of program*	

Tuesday: 9 May,	**Summary of Tuesday Program**	**Venue: Various Venues**

2017 :		
Time	**Detailed Description of Activities**	**Responsibility**
07:30 – 09:00 a.m	Onsite Registration of Conference Participants	Registration team-J Goma
08:30 a.m – 14:00 p.m	Parallel Technical Sessions-paper presentations & Lunch & poster presentation	Director of Ceremony, Eng. George Manyele, Dr M.N Mulenga,
14:00 – 17:15 p.m	Parallel Workshop Sessions and Discussions on various transportation issues	AFCAP Representatives / Dr. Yohane Tembo, Thomson Banda / Secretariat
08:30 a.m – 17:00 p.m	Poster Presentations	Secretariat / Responsible Officials

Tuesday: 9 May, 2017 : Parallel Session A.	**Tuesday Detailed Program-Parallel Sessions** **Session: Parallel Session A (Morning)**	**Venue: Room A**
Programme Moderator	Director of Ceremony / Session Chairperson: Eng. George Manyele, Director Construction, Road Development Agency, Zambia	
Time	**Detailed Description of Activities**	**Responsibility / Presenter**
08:30 – 09:00 a.m	**Paper 11:** DEVELOPING A NEW GENERATION OF AFRICAN ENGINEERING ACADEMICS	GD MPYE, WJvdM STEYN and JW MAINA
09:00 – 09:30 a.m	**Paper 12:** EVALUATION OF THE PERFORMANCE OF PEDESTRIAN FLYOVERS IN MALAWI	Ignasio Ngoma, Witness Kuotchax, Lusayo Mwanyongoy and Precious Bandasony
09:30 – 10:00 a.m	**Paper 13:** VIABILITY OF BIOMETHANE AS A FUTURE TRANSPORT FUEL FOR URBAN ZAMBIAN TOWNS	Agabu Shane, Young Kafwembe and Pride Kafwembe
10:00 – 10:30 a.m	**Paper 14:** ROAD TRAFFIC INJURY IN TANZANIA: DEVELOPMENT OF A LOCAL GOVERNMENT ROAD SAFETY PROGRAMME	Tom Bishop and Dr. Fikiri Magafu
10:30 – 11:00 a.m	*Tea Break & Poster Presentations*	
11:00 a.m – 11:30 a.m	**Paper 19:** INTRODUCTION OF TRACTOR BASED RURAL ROAD MAINTENANCE APPROACHES IN ZAMBIA	Robert Petts, Kingstone Gongera and Joseph M. Goma
11:30 a.m – 12:00 p.m	**Paper 20:** ASSESSMENT OF CRITICAL FAILURE FACTORS PUBLIC-PRIVATE PARTNERSHIP AS AN INFRASTRUCTURE PROCUREMENT METHOD IN NIGERIA	Olufemi A. Oyedele
12:00 – 12:30 p.m	**Paper 21:** TOWARDS STANDARDIZATION OF AXLE LOAD CONTROL PROGRAMMES IN THE SUB-REGION-FOR BETTER MANAGEMENT AND SUSTAINABILITY OF THE ROAD ASSET	C Kandeke and M N Mulenga
12:30 – 13:00 p.m	**Paper 22:** ~~ASSESSMENT OF ROAD CRASH DATA SURVEILLANCE SYSTEMS IN KENYA~~	James Gachanja , Eric Aligula,
13:00 Hours	*End of Morning Session*	
13:00 – 14:00 p.m	*Lunch at designated area & Poster Presentations*	

Tuesday: 9 May, 2017 :	**Tuesday Detailed Program "continued"**	
Parallel Session B.	**Session: Parallel Session B (Morning)**	**Venue: Room B**
Programme Moderator	Director of Ceremony / Session Chairperson: Dr. M.N Mulenga, Technical Sub-Committee Chairperson of LOC	
Time	**Detailed Description of Activities**	**Responsibility / Presenter**
08:30 – 09:00 a.m	PRESENTATION ON ROAD SECTOR TECHNICAL AUDITS	Dr. Yohane Tembo
09:00 – 09:30 a.m	**Paper 16:** IMPROVING ROAD SAFETY THROUGH NATIONAL AND REGIONAL STANDARDS FOR PROFESSIONAL DRIVER TRAINING IN EAST AFRICA	Neil Rettie, Caroline Barber and Sam Clark3
09:30 – 10:00 a.m	**Paper 17:** PRACTICAL APPLICATION OF NANO-TECHNOLOGY IN ROADS IN SOUTHERN AFRICA	Prof. Jordaan G. J., Kilian A., Muthivelli N and Dlamin D
10:00 – 10:30 a.m	**Paper 18:** SADC TRAINING NEEDS ANALYSIS PERTAINING TO CAPACITY BUILDING	Ignasio Ngoma, Hagai K S Bishanga and Mussa Mataka
10:30 – 11:00 a.m	*Tea Break & Poster Presentations*	
11:00 a.m – 11:30 a.m	**Paper 23:** EFFECTS OF ALKALI-AGGREGATES REACTIONS IN THE USE OF LIMESTONE QUARRY AGGREGATES IN ROAD-BASE AND CONCRETE STRUCTURES/ VENDOR RATING	Zonde, A/ John Kapenda
11:30 a.m – 12:00 p.m	**Paper 24:** THE USE OF ROADROID APPLICATION AND SMART PHONES FOR ROAD CONDITION MONITORING IN DEVELOPING COUNTRIES	Akinmade, O. D, Cinfwat K.Z, Ibrahim A.I and Omange, G. N
12:00 – 12:30 p.m	**Paper 25:** RESPONDING TO CLIMATE CHANGE EFFECTS ON RURAL ROADS THROUGH APPLICATION OF COST EFFECTIVE EROSION CONTROL MEASURES. A CASE STUDY IN ZIMBABWE	Paul Wiggins and Kingstone Gongera
12:30 – 13:00 p.m	**Paper 26:** PROMOTING RURAL ACCESS AND MOBILITY IN NORTHERN NAMIBIA: AN INTEGRATED APPROACH	Paul Starkey, Ernst-Benedikt Riehle, Robert Ambunda, Reginald Sheehama and Hilya Ekand
13:00 p.m	*End of Morning Session*	
13:00 – 14:00 p.m	*Lunch at designated area & Poster Presentations*	

Tuesday: 9 May, 2017 : Parallel Session A.	**Tuesday Detailed Program " continued" Parallel Sessions** **Session: Workshop Parallel Session A (Afternoon)**	**Venue: Room A**
Programme Moderator	Director of Ceremony / Session Chairperson: Dr Yohane Tembo, National Road Fund Agency, Zambia	
Time	**Detailed Description of Activities**	**Responsibility / Presenter**
14:00 – 15:30 p.m	**Workshop 1**: Using High-Tech Solutions for road network and condition analysis, including satellite imagery	AFCAP 1 – R Workman
15:30 - 15:45 p.m	*Tea Break - Designated Area*	
15:45 – 17:15 p.m	**Workshop 2**: Rural Road Asset Management	AFCAP 2 – R Geddes

Tuesday: 9 May,	**Tuesday Detailed Program " continued"**

2017 : Parallel Session B.	**Session: Workshop Parallel Session B (Afternoon)**	**Venue: Room B**
Programme Moderator	Director of Ceremony / Session Chairperson: Eng. Thomson Banda: Senior Manager R&D, RDA	
Time	**Detailed Description of Activities**	**Responsibility / Presenter**
14:00 – 15:30 p.m	**Workshop 3**: Climate adaptation of rural road networks	AFCAP 3 – B Verhaeghe
15:30 - 15:45 p.m	*Tea Break - Designated Area*	
15:45 – 17:15 p.m	**Workshop 4**: Workshop on Transport Services with a Focus on Motorcycle Taxis	AFCAP 4 – P Starkey
17:15 p.m	*End of Tuesday Program*	

Wednesday: 10 May, 2017	**Summary of Wednesday Program**	**Venue: Various Venues**
Time	**Detailed Description of Activities**	**Responsibility**
07:30 – 08:30 a.m	Onsite Registration of Conference Participants	Registration team-E. M Kakoma
08:30 a.m – 10:30 a.m	Parallel Technical Sessions-Paper presentations	Eng. Kapasa Christopher, RDA-Director Commercial and Technical Services and Chance Kaonga, Principal , Construction School, NCC, Zambia
11:00 a.m – 13:00 p.m	**Closing Session**: Combined & End of proceedings-Paper presentations closing remarks, announcement of next T2 conference venue	Director of Ceremony, Eng. Dickson Ndhlovu-Acting Director Planning and Design, RDA / ASANRA / Mozambique delegates / Ministry Officials / Presenters
13:00 – 14:00 p.m	*Lunch*	
14:00 – 18:00 p.m	Post Conference Activities-Technical Tours	Secretariat-Musonda C. Mwale/Presley
19:00 to 21:00 p.m	Closing Dinner-Main Conference Hall	Director of Ceremony/Secretariat

Wednesday: 10 May, 2017	**Wednesday Detailed Program: Parallel and Combined Sessions**	
Wednesday: 10 May, 2017	**Wednesday Detailed Program**	
Parallel Session A.	**Session: Parallel Session A (Morning)**	**Venue: Room A**
Programme Moderator	Director of Ceremony / Session Chairperson: Eng. Kapasa Christopher, RDA-Director Commercial and Technical Services	
Time	**Detailed Description of Activities**	**Responsibility / Presenter**
08:30 – 09:00 a.m	**Paper 27:** COLD MIX ASPHALT A SUSTAINABLE PAVEMENT TECHNOLOGY FOR RURAL ROADS IN AFRICA	Lang'at C.K
09:00 – 09:30 a.m	**Paper 28:** SUSTAINABLE INTERNATIONAL TRANSPORTATION TECHNOLOGY TRANSFER THROUGH COLLABORATION AMONG ACADEMIA, INDUSTRY AND TRANSPORT SECTOR IN AFRICA	Adewole Simon Oladele
09:30 – 10:00 a.m	**Paper 29:** ANALYSIS AND REDESIGN OF SIMON MAZORODZE AND CHITUNGWIZA ROAD INTERSECTION IN HARARE, ZIMBABWE	Philip T., Vassileva L.D. and Shumba S

10:00 – 10:30 a.m	**Paper 30:** THE IMPACT OF ROAD SURFACE CONDITION ON RURAL TRANSPORT SERVICES	Alemayehu Ayele Endale and Andrew Otto
10:30 – 11:00 a.m	*Tea Break & Poster Presentations*	
Wednesday: 10 May, 2017 Parallel Session B.	**Wednesday Detailed Program** **Session: Parallel Session B (Morning)**	**Venue: Room B**
Programme Moderator	Director of Ceremony / Session Chairperson: Chance Kaonga, Principal , Construction School, NCC, Zambia	
Time	**Detailed Description of Activities**	**Responsibility / Presenter**
08:30 – 09:00 a.m	**Paper 31:** LIFE-CYCLE COST COMPARISON OF ALTERNATIVE SURFACING FOR STEEP SLOPES ON LOW-VOLUME ROADS IN GHANA	J.K. Anochie-Boateng , L. Sampson, P. Agyekum K.O. Ampadu
09:00 – 09:30 a.m	**Paper 32:** DETERMINATION OF PROJECT DURATION IN THE ZAMBIAN ROAD SECTOR	Nkonde William and Mwiya Balimu
09:30 – 10:00 a.m	**Paper 33:** CONSTRUCTION OF MAPUTO-KATEMBE SUSPENSION BRIDGE	Silva Magaia and Basilio Nzunga
10:00 – 10:30 a.m	**Paper 34:** IMPLEMENTING AN EMERGENCY TRANSPORT SCHEME IN RURAL MADAGASCAR	Ramadany A, Eagan S, Barber C and Kruse I
10:30 – 11:00 a.m	*Tea Break & Poster Presentations*	

Wednesday: 10 May, 2017: 11:00 a.m -13:00 p.m	**Session: Closing Session; Combined**	**Venue: Main conference Hall**
Programme Moderator	Director of Ceremony / Eng. Dickson Ndhlovu-Acting Director Planning and Design, RDA	
Time	**Detailed Description of Activities**	**Responsibility / Presenter**
11:00 – 11:30 a.m	**Paper 35:** COMMUNITY BASED RURAL TRANSPORT SOLUTIONS FOR IMPROVING ACCESS TO ESSENTIAL HEALTH SERVICES IN ZAMBIA	Simfukwe V., Mubuyaeta K and O'Connor E
11:30 – 12:00 p.m	**Paper 36:** ESTABLISHMENT AND OPERATION OF A TRANSPORTATION TECHNOLOGY TRANSFER CENTRE: LESSONS AND EXPERIENCE FROM THE TANZANIA TRANSPORTATION TECHNOLOGY TRANSFER CENTRE	Hagai K.S. Bishanga and Silvester T. Haonga
12:00 – 12:20 p.m	**Paper Presentation 1:** The Railroad Growth: A Perspective of Sustainable Development in Africa through the use of Cleaner Fuel for Locomotive Engines.	Siwale L., Mudenda C., and Ngoma N.
12:20 – 12:40 p.m	**Presentation 2:** Kazungula Bridge Project	Geoffrey Songea and Pius Seone- KBPO
12:40 – 12:50 p.m	Announcement of Next T2 conference	ASANRA & Mozambique Representatives
12:50 – 13:00 p.m	**Conference Closing Remarks -Ministry of Housing & Infrastructure Development (MHID)**	**Eng. Charles Mushota-Permanent Secretary (MHID) , Zambia**
13:00 – 14:00 p.m	**Lunch and Preparations for Departure for Technical Tours**	
14:00 – 18:00 p.m	**Technical Tours : Secretariat**	
14:00 – 18:00 p.m	Technical Tour 1: Kazungula Bridge Project, Kazungula, Zambia Botswana Border	Secretariat-Musonda C. Mwale/ E.M Kakoma/ Joseph Goma
14:30 – 18:00 p.m	Technical Tour 2: Harry Mwanga Nkumbula International Airport, Livingstone	Secretariat-Presley Chilonda / Joseph Chibwe / Philimon Goma

	Technical Tour 3: Livingstone Bus Terminus, Livingstone	
Wednesday: 10 May, 2017	**Session: Evening Activity: Conference Dinner**	**Venue: Main conference Hall**
Time Programme Moderator	**Detailed Description of Activities** Director of Ceremony / Secretariat	**Responsibility / Presenters**
18:45 – 19:00 p.m	Arrival of delegates-	Secretariat
19:00 – 19:05 p.m	Speech by Conference Chairperson	Eng. Elias Mwape
19:05 – 19:20 p.m	Speech by Dinner Sponsor	Secretariat
19:20 – 21:00 p.m	Dinner Party	Secretariat
21:00 p.m	End of Dinner Party	
Thursday 11 May , 2017	**Post Conference Activities: Committee Meetings**	**Venues : TBA**
Time	**Detailed Description of Activities**	**Responsibility**
08:30 a.m to 12:00 p.m	AFCAP Steering Committee Members Meeting	AFCAP representatives
14:00 to 16:00 p.m	ASANRA Road Safety Committee Members Meeting	ASANRA representatives
14:00 to 16:00 p.m	ATReF Committee Members Meetings	ATReF Committee Members

Appendix 2: LOC Speech

OPENING REMARKS BY CHAIRPERSON OF THE LOCAL ORGANISING COMMITTEE AND CHIEF EXECUTIVE OFFICER FOR THE ROAD DEVELOPMENT AGENCY ENG. ELIAS MWAPE DELIVERED AT THE OFFICIAL OPENING OF THE 8TH AFRICA TRANSPORTATION TECHNOLOGY (T2) CONFERENCE AT AVANI HOTEL AND RESORT IN LIVINGSTONE ON MAY 08, 2017

The Honorable Minister of Housing and Infrastructure Development;
Representatives from ASANRA;
Invited delegates;
Representatives from all media houses; and
Should I say ladies and Gentlemen.

On behalf of the association of southern Africa national road agencies (ASANRA) we welcome you to the 8th Africa Transportation Technology Transfer Conference – 2017 to be hosted in Livingstone, Zambia.

The African Transportation Technology Transfer (T2) conferences provide excellent platforms for sharing, exchanging and debating experiences, new technology and best practice in the provision, maintenance and management of all modes of transport.

It is also a forum for sharing and exchanging new approaches on technology transfer that enable countries to develop effective integrated transportation systems which are safe, efficient, reliable and affordable.

The theme for this year's conference is "**Linking Africa through Sustainable Transport Infrastructure Development**".

T2 conferences are spearheaded by asanra and are held after every two years. since their inception in May 2001 when the 1st Africa T2 conference was held at the Arusha International Conference Centre, Arusha, Tanzania, the conferences have been providing a forum for government agencies and

their representatives, academics, consultants and contractors from around the world and mainly Africa to discuss acute transportation needs and provide some of the solution to these needs for all modes of transport. It also enables countries to develop effective management of transport infrastructure, integrated transportation systems, which are safe, efficient, reliable and affordable. Since year 2001, ASANRA through its sixth standing committee on regional technology transfer centre in collaboration with ministries and agencies responsible for the transport sector in the member states of the Southern Africa Development Community (SADC) has been organizing Africa T2 conferences and so far seven Africa T2 conferences have since been held. The 8th Africa T2 conference will be hosted by the Zambian Ministry of Housing and Infrastructure Development through the Road Development Agency.

The ever increasing world and regional populations, continues to put more pressures on existing transportation resources and thus increasing the needs for more transport infrastructure development, maintenance and management. There is more demand for transport infrastructure to be sustainable and well managed so that its reliability is not questionable. These are some of the challenges that transportation professionals and academics must solve in order to keep as all mobile. During the week of the T2 conference 2017 here in Livingstone, guests and delegates will be exposed to various challenging transportation and engineering problems and how best they can be worked out by professionals and academics.

Since the last T2 conference in Zimbabwe, the T2 conference 2017 organizing committee has worked tirelessly in order to make this conference a success. The conference will cover themes in various areas of transport needs such as sustainable financing for transport infrastructure projects, sustainable construction, maintenance and rehabilitation practices, integrated transport services and infrastructure for urban and rural communities, an integrated approach to transport infrastructure in Africa, capacity building, skills development, knowledge transfer and research & development and other cross cutting issues. These will be attended through technical plenary sessions in addition to poster presentations and conferences. Finally, delegates will also be exposed to exhibitions and technical tours.

Therefore, enjoy your week here in Livingstone and we welcome you to Zambia on behalf of the Association of Southern Africa National Road Agencies and the organizing committee.

I thank you all.

Appendix 3: Official Opening

OPENING REMARKS BY MINISTER OF HOUSING AND INFRASTRUCTURE DEVELOPMENT HON. RONALD CHITOTELA DELIVERED AT THE OFFICIAL OPENING OF THE 8TH AFRICA TRANSPORTATION TECHNOLOGY (T2) CONFERENCE AT AVANI HOTEL AND RESORT IN LIVINGSTONE ON MAY 08, 2017

The Minister Southern Province Hon Edify Hamukale;

The Permanent Secretary Ministry Of Housing & Infrastructure Development Eng. Charles Mushota;

The Permanent Secretary Southern Province Mr. Homeuhoba;

District Commissioner for Livingstone and Kazungula Respectively;

The Town Clerk of Livingstone;

The ASANRA President;

Chief Executive Officers and Heads of Road Agencies in Southern Africa;

Heads and Representatives of various Government and Private Institutions Present;

Sponsors;

Speakers;

Delegates;

The Media;

Distinguished Invited Guests.

It is my honor and privilege to welcome you all to this important conference. I wish to extend a special welcome to our foreign delegates to Zambia and to Livingstone in particular. I know that you are here for serious business but I urge you to take time off your busy schedule to sample our tourism products which include the mighty Victoria Falls, game and others. It is hoped that your hosts and convenors of this conference have already made arrangements for such activities.

I am particularly pleased that this is the first time that Zambia is hosting the transportation technology transfer (T2) conference, under the auspices of the Association of Southern Africa National Road Agencies (ASANRA). I am reliably informed that this is the 8th transportation conference and is being held under the theme "linking Africa through sustainable transport infrastructure development".

The Transportation Technology Transfer (T2) Conference provides an excellent platform for knowledge exchange, sharing experiences and technology transfer in the provision, maintenance and management of all modes of transport and related infrastructure.

The increasing world and regional populations continue to place pressure on existing transportation infrastructure and government resources and thus the need for the development and maintenance of transport infrastructure by governments across the globe. There is also a growing requirement for all transport infrastructure to be sustainable well managed and reliable.

In order to attain trade competiveness to the rest of the world, the region and Africa at large, an integrated, cost effective reliable and safe transport system is key.

Distinguished ladies and gentlemen, transportation professionals and academia must therefore rise above identified challenges and provide solutions to the transportation sector.

Today most world governments realise that the prosperity of any nation lies partly in the effective management of its transportation sector including the embrace of innovation and new technologies. In this vein, I wish to implore all participants to this conference to take keen interest in the deliberations and take time to interact, share experiences, innovations, new technologies and best practice in the provision, maintenance and management of all modes of transport.

I am hopeful that your experience at this conference will enable you to develop effective integrated transportation systems which are safe, efficient, reliable and affordable and beneficial to Africa and the world as a whole.

I wish to assure you that government in line with our policies on the provision of sustainable intermodal transportation systems, is expectant that this conference will provide solutions to the sectoral challenges.

Once again, I wish to welcome all our visitors to Zambia and wish all the delegates local and foreign, fruitful deliberations in the next two days.

I thank you and God bless you all.

Appendix 4: Address by ASANRA

ADDRESS BY MR JOEY MALOTA, REPRESENTATIVE OF THE ASSOCIATION OF SOUTHERN AFRICAN NATIONAL ROADS AGENCIES DELIVERED AT THE OFFICIAL OPENING CEREMONY OF THE 8TH AFRICA TRANSPORTATION TECHNOLOGY TRANSFER CONFERENCE AT AVANI HOTEL AND RESORT IN LIVINGSTONE ON MAY 08, 2017

Honourable Ronald Chitotela, Minister of Housing and Infrastructure Development in Zambia,

Honourable Edify Hamukale, Provincial Minister - Southern Province in Zambia,

Eng. Elias Mwape, Director and Chief Executive Officer of Roads Development Agency in Zambia,

Representative of Research for Community Access Partnership (ReCAP), Dr. Jasper Cook,

Fellow Board Members of the Association of Southern African National Roads Agency (ASANRA)

Members of the Media

Distinguished Guests

Ladies and Gentlemen

On behalf of the Board of the Association of Southern African National Roads Agencies (ASANRA) and indeed on my own behalf, I would like to welcome you to the 8th Africa Transportation Technology Transfer Conference here at world heritage city of Livingstone in Zambia. This Conference has a special significance as it aims at linking Africa through sustainable transport infrastructure development. Since one of the objectives of ASANRA is advocating research and promoting best practices for sustainable transport infrastructure, I am, therefore, humbled and honoured for being accorded the opportunity to deliver a keynote address at this important

conference hosted by the Government of Zambia through the Ministry of Communication and Transport in collaboration with ASANRA.

Your Excellencies, distinguished guests, ladies and gentlemen, the conference theme "**Linking Africa through Sustainable Transport Infrastructure Development**" was carefully selected to reflect the importance of an efficient and effective road network in Africa. The availability of quality transport infrastructure has long been recognised as a critical input to productivity and competitiveness. Inadequate infrastructure has raised the transaction costs of business in most African economies. Today African economies exhibit the lowest levels of productivity of all low-income countries and are among the least competitive economies in the World. According to African Bank Report inadequate infrastructure has been estimated to shave off at least 2 percent of Africa's annual growth. With adequate infrastructure, African firms could achieve productivity gains of up to 40 percent.

Infrastructure that is sufficient and work properly is also crucial for Africa's economic integration. African economies can begin the process of deep integration if the infrastructure networks are designed in such a way as to link production centres and distribution hubs across the continent as the networks of developed economies do. Such infrastructure will enable Africa to compete effectively, tap regional markets and benefit from globalisation through investment and trade. To achieve this, calls for the construction of an efficient and secure national and cross border physical infrastructure as well as a coherent system of regulation for business transactions.

A considerable investment in infrastructure that uses innovative sources of funding is needed to address Africa's low level of competitiveness. Indeed, the Programme for Infrastructure Development in Africa (PIDA) estimates that Africa will need to invest up to US$93 billion annually

until 2020 for both capital investment and maintenance. Given the substantial amounts involved, governments will need to be innovative in the search for sustainable approaches to infrastructure development as well as financing. The private sector will need to play an increasingly important role. Governments on the other hand, will do well to create conditions where private sector engagement is encouraged, probably through public-private partnerships (PPPs). Efficiency gains from performance improvements in infrastructure provision are themselves a significant source of finance and the development of infrastructure bonds as financing a vehicle will need to be encouraged.

Adequate maintenance plans are prerequisites for sustainable infrastructure. Maintenance is not only corrective but also preventative because it inspects assets and reduces the risk of failure. Costs associated with statutory maintenance can be substantial-even considerably larger than the asset –yet providing for these maintenance costs is crucial. Without adequate maintenance, infrastructure deteriorates quickly and is unsustainable.

Ladies and gentlemen, the longer-term performance of Information Communication Technology (ICT) sector should be reviewed in light of the adequacy of the maintenance plans. It is noteworthy, however, that although ICT infrastructure is relatively new, it could rapidly become obsolete and downgraded if maintenance plans are not in place and implemented. It is, therefore, critically important to make adequate provisions to ensure maintenance is taken in a timely manner thereby making gains from ICTs sustainable.

The 8th Africa T2Conference has attracted over 300 delegates from countries and continents. Delegates will attend workshops and have opportunities to listen to various presentations and view several exhibitions that are on display outside. The subjects will range from transport policy, road

safety, financing of road infrastructure, institutional set ups and arrangements, innovations in road pavement design and material specifications, and improving rural road accessibility. I am confident that the selection of topics will provide you with an information database and many opportunities for serious discussions.

Distinguished ladies and gentlemen, at this function of the 8th technology Transfer Conference, let me give you an update on the progress in the regional technology transfer and capacity building programme of ASANRA. I am sure delegates are aware of the role of ASANRA in the road transport sector in the Region – that of harmonising policies, systems and procedures through preparation of guidelines and advocating for adoption of good asset management practices among Member States in line with the SADC Protocol on Transport, Communication and Meteorology. The Association established the Regional Technology Transfer and Capacity Building Programme with the objective of developing and sustaining active technology activities through effective Technology (T2) centres and providing professional and technical capacity in the Region.

Distinguished ladies and gentlemen, I am pleased to report that ASANRA has published and disseminated new technologies through its website, database of research and development projects. Most profound, the Association has hosted eight bi-annual conferences in Tanzania, South Africa, Malawi, Namibia, Botswana, and Zimbabwe including this one here in Livingstone, Zambia. To this effect let me take this opportunity to request support of development partners and organisations to explore areas of synergy and collaboration for the good of the region.

Distinguished ladies and gentlemen, I would be failing in my duty if I do not thank all those who have contributed to the realisation of this Conference. Most notable ones are the British Government through AFCAP, the Road Development Agency (RDA) in Zambia, China Geo-Engineering

Corporation, AVIC-International Engineering, China Jiangxi Corporation for International Economic and Technical Cooperation, Zambia National Road Fund Agency (NRFA), the Road Transport and Safety Agency (RTSA) and many numerous individuals and organisations. It is said that for you to be where you are, there is always a hand that assisted you. Your contributions whether in cash or kind is very much appreciated and I say thank you. Special thank you should also go to the Conference Organising Committee for the wonderful work making sure that this conference sees the light of the day and that the delegates have a memorable time in Livingstone.

Despite these commendable achievements, financial sustainability of the National Technology Centres in the Region has remained a daunting challenge over the period. I wish, therefore, to take this opportunity to also reiterate my call upon Member States to explore alternative financial, legislative and administrative measures to address this challenge.

As mentioned earlier, the conference will be delivered through workshops, presentations and plenary sessions as means for promoting capacity building, I wish to encourage delegates to actively participate in the deliberations and share their experiences. The expectations of the stakeholders out there regarding this conference are high, but I am confident that you will succeed in your objectives. I wish you a productive conference.

Thank you!!!

Muito Obrigado!!!

Asante sana!!!

Zikomo Kwambiri!!!

Merci beaucoup!!!

Appendix 5: Closing Remarks

CLOSING SPEECH BY PERMANENT SECRETARY OF HOUSING AND INFRASTRUCTURE DEVELOPMENT MR CHARLES MUSHOTA DELIVERED AT THE OFFICIAL CLOSING OF THE 8TH AFRICA TRANSPORTATION TECHNOLOGY (T2) CONFERENCE AT AVANI HOTEL AND RESORT IN LIVINGSTONE ON MAY 08, 2017

All Senior Government Officials Present;

Representatives from ASANRA;

Speakers;

Delegates;

All Participants

Representatives from the media; and

All Distinguished invited Guests, Ladies and Gentlemen, All Protocols Observed.

It is with great pleasure for me to say a few words on the last day of this transportation technology transfer (t2) conference, under the theme "linking Africa through sustainable transport infrastructure development". I would like to thank you all for participating in this t2 conference. Your presence during these three days has shown a strong commitment to work towards knowledge exchange, sharing of experiences and technology transfer in the provision, maintenance and management of all modes of transport and related infrastructure.

In particular, I would like to thank all the presenters for sharing their research papers. I took note with a great interest of your personal efforts to address problems that affect us all today. Your efforts have been clearly demonstrated in the presentations made during the various sessions.

Ladies and gentlemen,

Allow me in my closing remarks to highlight some of the key issues which were discussed during this conference.

Sustainable financing for transport infrastructure highlighted the fact that there is need for a paradigm shift with regards to how we address the transport infrastructure development process, there is need to learn from the past and ensure value for money for our governments across the continent and beyond.

Regarding sustainable construction, maintenance and rehabilitation practices our presentations have highlighted that there is need for synergies in the planning, design and operation of transport infrastructure. Furthermore stakeholders need to work together to ensure that plans are well formulated at planning stage.

An integrated approach to transport infrastructure has highlighted the need for problem based learning as a tool to integrate research in the transport infrastructure sector, in order to create a link between research, capacity building and knowledge transfer. This requirement cannot be over emphasised.

It is my sincere hope that we shall continue to strengthen our research collaboration going forward in order to develop tailor made solutions to our problems based on shared experiences. This collaboration will ensure the sustainable development of our urban and rural communities as we strive towards economic prosperity for our people.

Ladies and gentlemen

As we have come to the end of this conference, I would like to express my warmest thanks to the asana board for allowing Zambia to host the 8th t2 conference.

I would like also to thank the sponsors and the local organising committee for making this event successful.

Lastly I wish to thank all of you for your active participation and open dialogue. I look forward to continued interactions between fellow transport sector experts well beyond this event. I trust that you all build on this experience and seek further inspiration on how to develop home grown solutions to our various challenges through the interactions held, we hope to see more solutions based on our research work. I thank you and god bless.

Appendix 6: Conference Evaluation Results Summary

CONFERENCE EVALUATION RESULTS SUMMARY

AVANI Hotel, Livingstone, Zambia, 08th– 10th of May 2017

Your cooperation is requested in filling out this questionnaire. The response will help in evaluating and adjusting future Africa T2 Conference to meet needs of participants and stakeholders in the transport sector in general

1. OVERALL OBJECTIVE AND OUTCOMES

Please tick the appropriate box

	Description	**Excellent**	**Good**	**Fair**	**Poor**	**No response**	**Total**
1	Presentation program content	7	35	1	0	1	44
		95%					
	Comment:	- Very educative presentations					
		Yes	No			No response	
2	Were the subjects beneficial to you?	43	0			1	44
		98%					
		Excellent	Good	Fair	Poor	No response	Total
3	Presentation style and clarity	6	36	2	0	0	44
		95%					
	Comments:	- Well organized conference - Very clear presentations. Clear and academically well set/organized.					
		Excellent	Good	Fair	Poor	No response	Total
4	Presentation aids quality	14	26	3	0	1	44
		91%					
	Comment:	- The presentation volume /sound was a bit loud. -					
		Excellent	Good	Fair	Poor	No response	Total
5	Presentation technical quality	10	32	2	0	0	44
		96%					
6	Did you receive the information you expected	43	1			0	44
		98%					
	Comments:	- Though due to time presenters had to leave out necessary information - The information that has something to do with rural roads was highly					

		useful to me. - I also expected some presentation on airports and railway infrastructure development					
		Yes	No			No response	
7	Was sufficient time provided for the presentations?	17	27			0	44
		39%	**61%**				
	Comments:	- In most presentations the provided time was sufficient. - Presenters quickly made presentations due to insufficient time allocation, but on the whole the presentations were okay. - Although some presentations while too long. Next time we need to limit number of slides. - For the presentations, time was sufficient but I would have preferred for additional time due to what I was expecting to be comprehensively understood. - Presenters needed more time in order to run through their slides. - Question time was limited. - I think presentation time should be at least 5 minutes to 15 minutes of questions and answer (only better papers to be allowed). - However, time allowing, the conference should have been extended by one more day to allow for more interactive sessions. - All session chairs did their work well. There were too many presentations compressed in a short period.					
		Yes	No			No response	
8	Was sufficient time provided for the discussion on the presentations	22	21			1	44
		50%	48%				
	Comments:	- There are papers that were key to making ASANRA more effective and in my opinion should have been given a bit more time. - The topics presented where exhaustive during discussion session. - For future presentation, we will like for additional time for discussion.					
		Excellent	Good	Fair	Poor	No response	Total
9	Meeting venue	32	11	1	0		44
		98					

10. Suggestion for future presentation topics

- I believe future presentations should be limited to a particular class of roads
    - ❖ Asset Management Frameworks
    - ❖ Public Private Partnership
    - ❖ Infrastructure Asset Management
- It is important that users are included and informed in advance so that they can present challenges they have been facing nationally and regionally in transporting goods
- Comprehensive urban transportation
- Allow some time for delegates to see the city
- Most of the presenters were representatives of the paper owners; they would have benefited a lot from the observation from the audience.
- Either extend the conference time to 4 days or reduce the number of presenters
- Enhancing technical audits in roads projects for value addition.
- The role of intelligent transportation systems for African cities
- Topics on other modes of transportation in Africa to reduce congestion on road.
- Level of implementation / adoption of technology research projects.
- Provision of tables to be considered rather than participants using rapporteurs for writing.
- Presentations and interactions should be given ample time. Most time should be given to discussion or exchange of transportation technologies.
- Explore future on Nano – technology
- Improvements of rural roads in Africa
- Follow up process – implementation and not plans of what was or how they are
- Transport and mobility topics
- Need more topics on the improvement of rural roads network
- Content of presentations need analysis, lengthy presentations relevant to theme be given more time
- Reduce number of presentations to fit time or give more time
- Sufficient time should be provided or presentation should be reduced to suit the time
- Topics wide enough, if any, it would be bringing in general inhibiting factors such as political and economic dimension, as real or indeed mythical factors
- Sustainable development – alternative materials utilization
- The topics are fine
- Invite presentations from related field of highway and pavement engineering such as ICTS, Communication.
- The choice of topics are good as they are
- New methods of road maintenance with particular emphasis on new technologies
- Local contractor participation in transport infrastructure development
- Case studies in member states including the challenges and how were they mitigated
    - ❖ Geotechnical problems and solution on civil engineering projects
    - ❖ Innovations on upgrading of low volume roads
- To consider topics of experiences for strategies to intervene natural/artificial disasters on transport infrastructure
- More intelligent transport system in Africa
- More presentations on applied research and applications

11. Suggestion for future meeting venues

- Malawi, Mozambique
- Rotating the meeting will be highly appreciated
- Close proximity to where there is a major road or bridge project to visit
- Livingstone is okay, AVANI is fine
- Siavonga resort would make a good venue
- Lusaka
- South Africa
- Similar venue acceptable
- The venue is excellent
- This venue is much suitable as it allows business and leisure
- Copper belt province, Ndola or Kitwe
- Protea hotel Livingstone
- Chrismar hotel Livingstone
- The venue was good, let's keep the same standard
- AVANI is the best
- The venue is perfect and can be used for future meetings
- Tanzania
- Democratic Republic of Congo

12. Any other suggestion

- Invitation should be extended to engineering schools so that engineering students can learn new road technology
- Students from colleges and universities must be involved. Find a way to motivate politicians (MPS) and line ministries to be part of presentations. This will promote integrated approach of planning for our mother Zambia.
- Time for presentation and discussions should be increased
- We hope the slides will be given to us so that we keep learning even as we go home.
- The presentation were too many and the time was not sufficient. Not enough time.
    - Engage the end users of the roads i.e., transports I future conference to understand better the challenges they face.
    - Students should be encouraged to attend such meetings
- - The following meetings should take stock of the uptake and embedment of the recommendation from the presentations and discussion. This will ascertain that progress is being made in the implementation of the issues discussed.
- For future presentation I would like to increase the duration of the conference
- Extend invitation to chief executive officers of local authorities (councils) especially councils in Zambia.
- Abstract to be sent out to expected participants earlier
- Introduction about the country where the conference is taking place, the people governance, economy, state of infrastructure and institutions providing infrastructure.
- Delegates should be given time for site seeing since they were in the tourism capital

- Next time please communicate effectively and efficiently to invited delegates or participants. Not much information was used for this important event.
- The element of taking advantage of the conference to market Livingstone tourism has been missed. There is no deliberate effort to make the participants sample tourism sites.
- Increase paper on project implementation, challenges and way forward for big projects in the region.
- Thank you secretariat for all the arrangements and for a well arranged conference; thank you for also looking after me so well.

Appendix 7: Guidance Notes to Paper Reviewers

8th Africa Transportation T2 Conference Information for Reviewers of Technical Papers

REVIEWER'S REPORT FORM

PAPER ID No:……..

AUTHOR(S):……

MANUSCRIPT TITLE:……..

SN	DESCRIPTION OF THE GENEREAL CRITERIA	YES	NO	See Comments
1	Is paper written in English with spelling, grammar and syntax of an academic publishing standard?			
2	Is the name of the author(s) and affiliation, with the e-mail address for lead or corresponding author indicated?			
3	Does the title clearly and sufficiently reflect the content?			
4	Is the abstract 300 words or less?			
5	Are the keywords and abstract or summary informative?			
6	Is the subject of the article within the scope of the conference themes?			
7	Is the literature review showing gaps of knowledge that the paper is meant to address?			
8	Is the article a new and original contribution? This can be checked using available software for checking plagiarism online.			
9	Are the interpretations / conclusions justified by the data?			
10	Are the presentation, organisation and length satisfactory in line with the general requirements issued to authors?			
11	Can you suggest any reductions or amendments to			

	the manuscript?			
12	Are the illustrations and tables necessary and acceptable?			
13	Are the references adequate and are they all necessary?			
14	Is the paper acceptable for publication in its present form?			
15	Is the paper acceptable for publication with minor revisions?			
16	Should the paper be reconsidered after major revision?			
17	Do you wish to reveal your name to the author(s)?			
	IS PAPER ACCEPTED {INDICATE AS APPROPRIATE IF CONDITIONAL}			

NB: THE REVIEWER MAY MAKE SPECIFIC ADDITIONAL COMMENTS BELOW **WHERE CONDITIONAL ACCEPTANCE IS GIVEN**. EACH PAPER WILL BE ASSESSED BY TWO REVIEWERS AND IN AN EVENT OF A TIE THE TECHNICAL COMMITTEE CHAIRPERSON OR DESIGNATED MEMBER WILL UNDERTAKE THE THIRD AND FINAL REVIEW.

SN	COMMENT	ACTION REQUIRED

Name:…….. Signature: ……. Date: …….

Please send your comments together with the manuscript to:

T2 Conference Technical Committee Chairperson, Road Development Agency, P O Box 50003 Lusaka.

E-mail: t2conference@roads.gov.zm

Appendix 8: Template for writing articles for the 8th ASANRA 8th T2 Conference in Zambia 2017.

The title should have a maximum length of two lines or 20 words. (FONT: TIMES NEW ROMAN 14)

CALL FOR PAPERS

The Zambian Ministry of Works, Supply, Transport and Communication, through the Road Development Agency, will be hosting the 8th AFRICA TRANPORTATION TECHNOLOGY TRANSFER (T2) CONFERENCE which will be held at the **AVANI VICTORIA FALLS RESORT** (formerly Zambezi Sun Hotel) in Livingstone, the tourist capital of Zambia. The theme for the conference is "**Linking Africa through Sustainable Transport Infrastructure Development**". The conference will be held from 8th to 10th May 2017.

Thematic Areas

The Transportation Technology Transfer (T2) conferences provide excellent platforms for sharing, exchanging and debating experiences, new technology and best practice in the provision, maintenance and management of all modes of transport. It is also a forum for sharing and exchanging new approaches on technology transfer that enable countries to develop effective integrated transportation systems which are safe, efficient, reliable and affordable. Prospective authors are invited to submit papers under the following thematic areas:

SUSTAINABLE FINANCING FOR TRANSPORT INFRASTRUCTURE PROJECTS

- Public Private Partnerships (PPPs)
- Contractor Financed Initiatives
- Road Tolling
- Bonds
- Road Fund
- Innovative financing models for transport infrastructure projects

SUSTAINABLE CONSTRUCTION, MAINTENANCE AND REHABILITATION PRACTICES

- Innovative approaches to utilization of materials
- Innovative and Sustainable Geo-materials and Geo-systems

- Use of Recycled Materials (Steel, Concrete, Asphalt Concrete) in Transport Infrastructure Construction, Maintenance and Rehabilitation
- Ground Improvement and Chemical/Mechanical Stabilization
- Strategic selection of maintenance interventions
- Materials, design, construction, maintenance and testing
- Nano technology in transport infrastructure
- Condition assessment and monitoring of transport infrastructure
- Innovative repair methods for transport infrastructure
- Concrete pavements and life cycle analysis
- Climate resilient infrastructure
- Structural Health Monitoring of bridge structures
- Axle Load Control

INTEGRATED TRANSPORT SERVICES AND INFRASTRUCTURE FOR URBAN AND RURAL COMMUNITIES

- Pedestrian and cyclist considerations
- Intermediate modes of transport (oxcarts, motor cycles, bicycles and donkeys)
- Mixed mode transportation and traffic Management
- Developing intelligent transportation systems for urban areas
- Road Safety
- Environmental considerations
- Social amenities and recreation
- Optimized design and construction practices
- Promoting rural access and mobility

AN INTEGRATED APPROACH TO TRANSPORT INFRASTRUCTURE IN AFRICA

- Railroad transport
- Road transport
- Water transport
- Air transport
- Transport Infrastructure Project Management and Information Communication Technology (ICT)
- Mining and transport infrastructure
- Energy and transport infrastructure
- Tourism and Agriculture
- Land and Infrastructure Development, Socio-Political and Environmental Considerations

CAPACITY BUILDING, SKILLS DEVELOPMENT, KNOWLEDGE TRANSFER AND RESEARCH & DEVELOPMENT

- Effective training approaches
- Skills transfer and mentoring best practice
- Knowledge transfer

- R&D and knowledge Transfer
- Institutional and individual capacity building
- Information dissemination and sharing

Paper submission

Authors are invited to submit papers to the 8th AFRICA TRANPORTATION TECHNOLOGY TRANSFER (T2) CONFERENCE by 30th October, 2016 via email to the Conference Organising Committee (email given below). Submissions must be original and should not have been published previously or be under consideration for publication while being evaluated for this symposium.

The papers submitted should not exceed 15 pages in length inclusive of illustrations. The papers must be in MSWord, produced on A4 paper size in 12 Point Times New Roman font, single line spacing, and in a single column format. The margins should be 35mm on the left and 25mm on the other three sides of the page. The text must be fully justified and paragraphed must be separated by single line spaces.

Submitted papers must contain the following sections as a minimum requirement:

1. Title
2. Name of author(s) and affiliation with the e-mail address for lead or corresponding author
3. Abstract not exceeding 300 words.
4. About five keywords (which must also appear in the abstract)
5. Main body of the paper
6. Conclusions
7. References (Harvard style)

Review process and publication

The papers will be peer reviewed and evaluated based on originality, research content, correctness and relevance to conference thematic areas. Papers should be about either a research project, educational, a practice development, a case study, project presentation, audit, primary research or on a research related issue.

IMPORTANT DEADLINES	ADDRESS FOR COMMUNCATION
Authors are advised to take note of these dates: • October 30, 2016: Deadline for submission of full papers • April 7, 2017: confirmation of presentations	The 8th Transportation Technology Transfer Conference Road Development Agency P.O. Box 50003 Government/ Fairley Road Lusaka, Zambia Tel/Fax : +260 (0)21 125 5161 Email :t2conference @roads.gov.zm

NB: **THOSE WHO MAY HAVE MISSED THE SUBMISSION DEADLINE FOR ABSTRACTS ARE ALSO ENCOURAGED TO SUBMIT FULL PAPERS INCLUSIVE OF ABSTRACTS TO THE CONFERENCE SECRETARIAT ON THE ABOVE EMAIL**

Papers

Please note that papers submitted in response to this Call for Papers will be subjected to a full peer review process. Deadline dates will be as follows: -

15th December, 2015: First Call for Papers

30th October 2016: Closing Date for Electronic submission of abstracts

30th June, 2016: Provisional Acceptance. Authors advised to submit full papers

30th November, 2016: Deadline for Submission of full papers in the required format

31st January 2017: Deadline for Submission of finalised papers

19th February 2017: Reviewed papers returned to authors for possible amendment

8th – 10th May 2017: CONFERENCE at AVANI Hotel, Livingstone, Zambia

Electronic Submission

Papers should be submitted electronically, preferably in Microsoft Word, to the Editors at the following e-mail address: http://www.t2conference2017.org/

When the authors are notified of acceptance, they will be asked to provide the final, accepted version of the article in electronic format containing the article text files.

Language

The official language of the Conference will be English. There will be no interpretations.